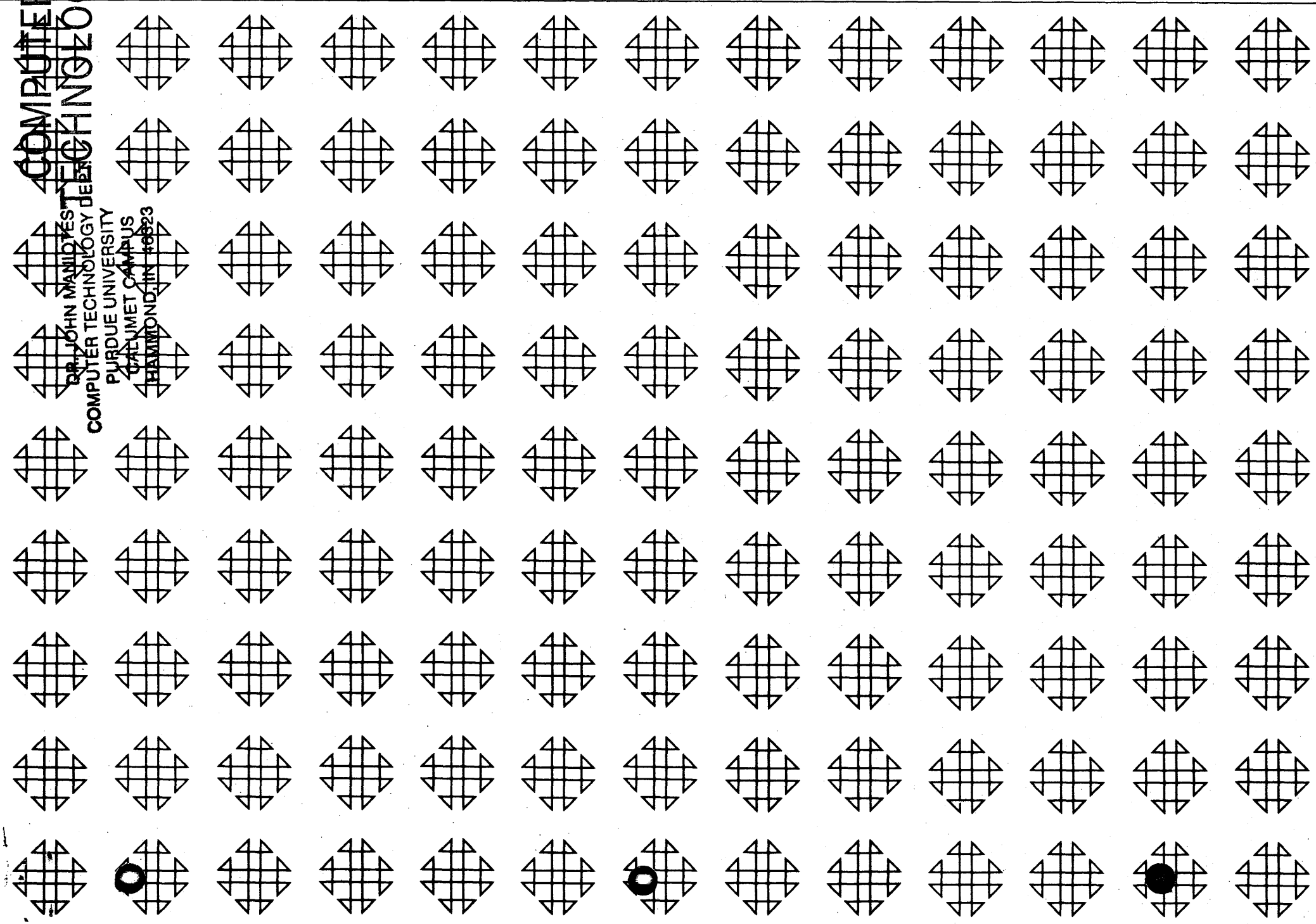


DISCLAIMER

Although each program has been tested by its contributor, no warranty, express or implied, is made by the contributor or 1620 USERS Group, as to the accuracy and functioning of the program and related program material, nor shall the fact of distribution constitute any such warranty, and no responsibility is assumed by the contributor or 1620 USERS Group, in connection therewith.

1620 USERS GROUP PROGRAM REVIEW AND EVALUATION

(fill out in typewriter or pencil, do not use ink)

Program No. _____ Date _____

Program Name: _____

1. Does the abstract adequately describe what the program is and what it does? Yes___ No___
   Comment _____

2. Does the program do what the abstract says? Yes___ No___
   Comment _____

3. Is the Description clear, understandable, and adequate? Yes___ No___
   Comment _____

4. Are the Operating Instructions understandable and in sufficient detail? Yes___ No___
   Comment _____
   Are the Sense Switch options adequately described (if applicable)? Yes___ No___
   Are the mnemonic labels identified or sufficiently understandable? Yes___ No___
   Comment _____

5. Does the source program compile satisfactorily (if applicable)? Yes___ No___
   Comment _____

6. Does the object program run satisfactorily? Yes___ No___
   Comment _____

7. Number of test cases run_____. Are any restrictions as to data, size, range, etc. covered adequately in description? Yes___ No___
   Comment _____

8. Does the Program Meet the minimal standards of the 1620 Users Group? Yes___ No___
   Comment _____

9. Were all necessary parts of the program received? Yes___ No___
   Comment _____

10. Please list on the back any suggestions to improve the usefulness of the program. These will be passed onto the author for his consideration.

Please return to:

Mr. Richard L. Pratt
Data Corporation
7500 Old Xenia Pike
Dayton, Ohio 45432

Your Name _____

Company _____

Address _____

User Group Code _____

THIS REVIEW FORM IS PART OF THE 1620 USER GROUP ORGANIZATION'S PROGRAM REVIEW AND EVALUATION PROCEDURE. NONMEMBERS ARE CORDIALLY INVITED TO PARTICIPATE IN THIS EVALUATION.

11/09/64

DECK KEY

Deck I	**Program Deck**
Deck II	**Sample Problem Input Data**

NORTHEASTERN UNIVERSITY

MARK SENSE TEST SCORING PROGRAM

Robert M. O'Brien
Northeastern University
Computation Center
360 Huntington Avenue
Boston 15, Massachusetts

September, 1962

13.0.003

Modifications or revisions to this program, as they occur, will be announced in the appropriate Catalog of Programs for IBM Data Processing Systems. When such an announcement occurs, users should order a complete new program from the Program Information Department.

TABLE OF CONTENTS

PROGRAM ABSTRACT

TITLE: Northeastern University Test Scoring Program (Card)

SUBJECT CLASSIFICATION: 13.0

AUTHOR: Robert M. O'Brien

DIRECT INQUIRIES TO: Robert M. O'Brien
Computation Center
Northeastern University
360 Huntington Avenue
Boston 15, Massachusetts
COngress-2-1100 Ext. 336

PURPOSE/DESCRIPTION: To grade multiple choice objective exams taken on mark sense cards and publish, in addition to the grade for each student, a grade distribution (with mean and standard deviation) and an analysis of the exam indicating how many chose each choice for each question and the percent of correct answers for each question.

MATHEMATICAL METHOD: No special methods used.

RESTRICTIONS/RANGE: Maximum of 150 5-choice questions per exam. Program requires that there be only one choice as the correct answer for each question and will not handle examinations which require multiple answers per question.

STORAGE REQUIREMENTS: 19563 locations

EQUIPMENT SPECIFICATIONS: Memory 20K, 1622, no special features required, however, see additional remarks.

ADDITIONAL REMARKS: SPS Language. Fixed Point. Not relocatable. Running time is approximately 3 seconds for one 150 choice examination, plus punch out of analysis at the end which is at punch speed. This program was written to run using automatic divide, but by changing one column in one card it can be run on machines which do not have the automatic divide feature. It was also written to handle data cards which contain a maximum of 50 questions per card. As there are only 27 mark sense columns it was necessary to take 25 of them and split them in half putting questions 1-25 in the 9 to 5 area and questions 26-50 in the 4 to 0 area. However, each answer must be punched in a separate column for the computer so that a half-after-four time pick up was added to the mark sense punch to pick up coselectors and punch each question in a separate column. A slight change in the program can be made to eliminate this requirement also.

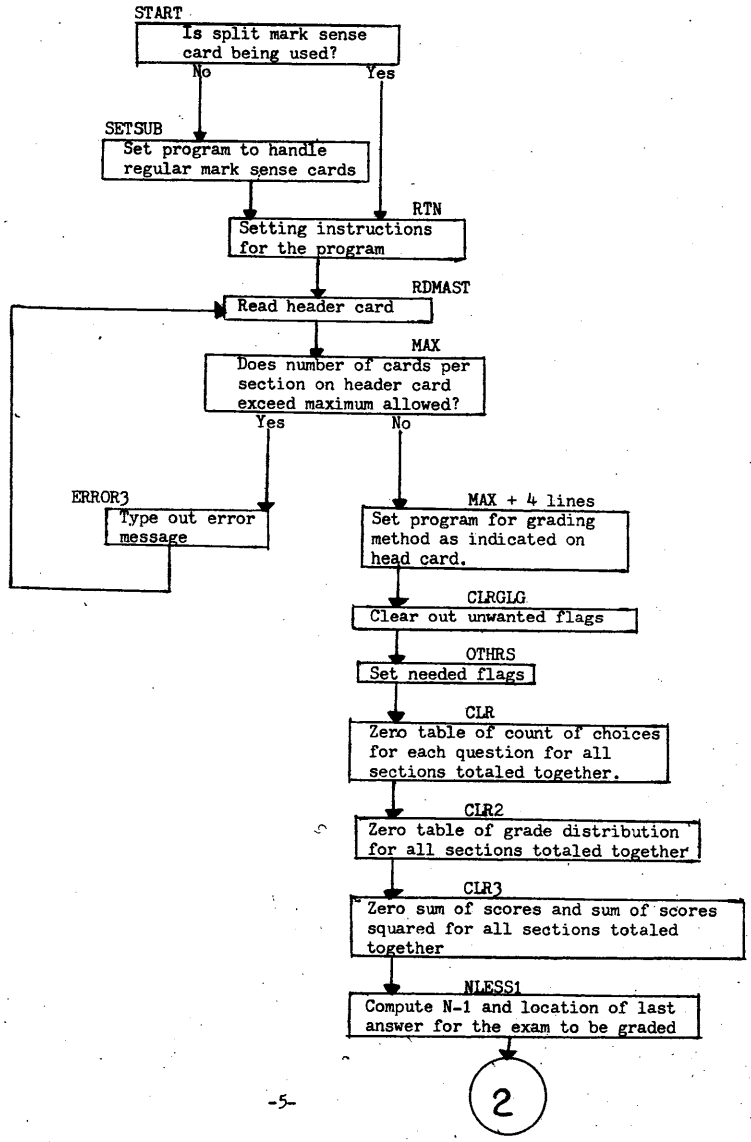
DETAILED DESCRIPTION OF PROGRAM

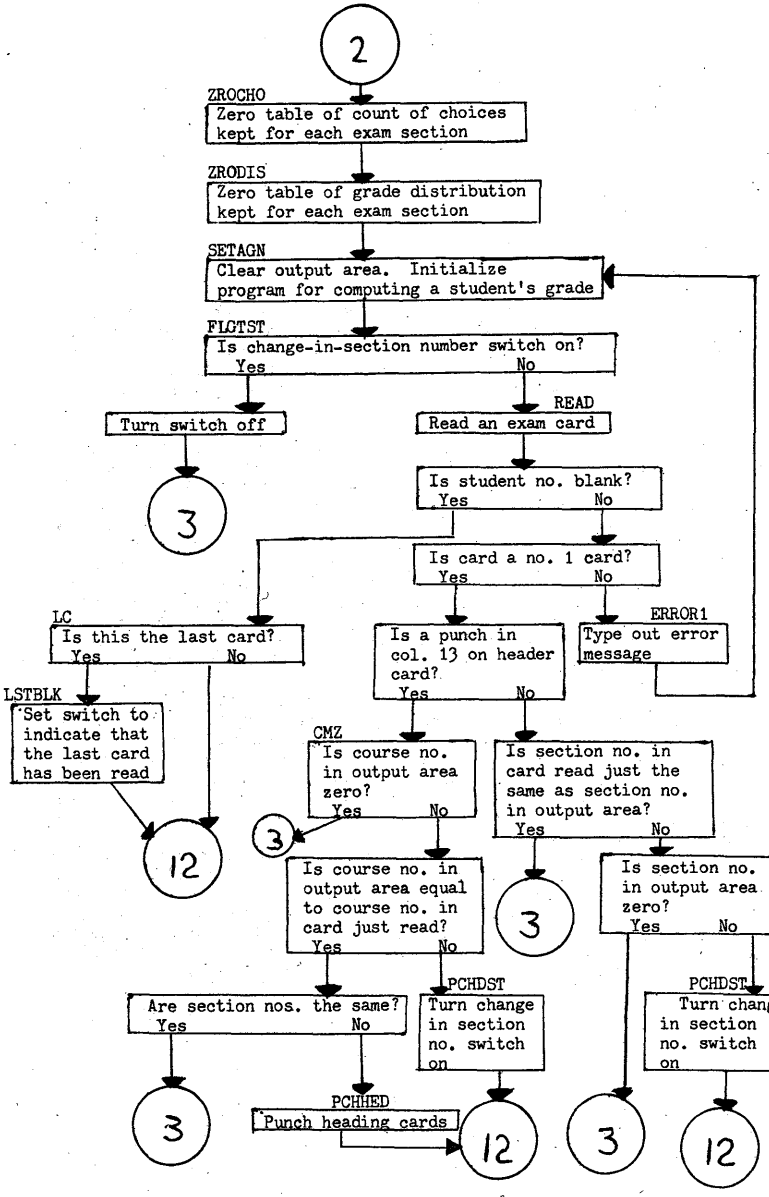
RESULTS AND METHODS

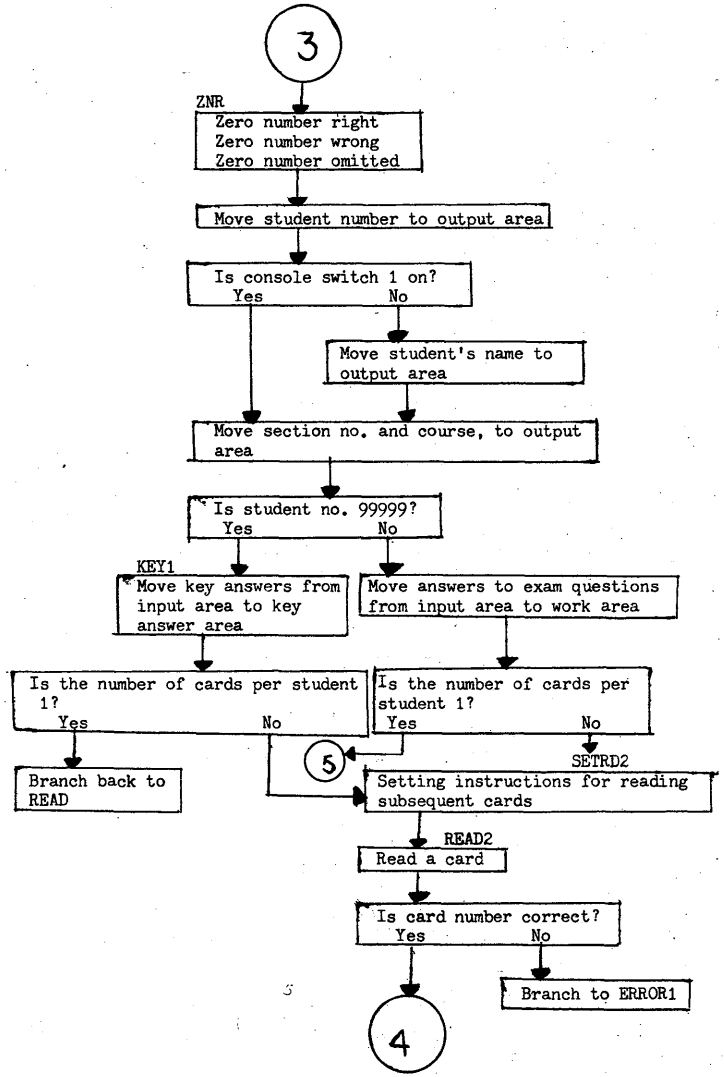
This program is designed to grade objective examinations for a maximum of 150 5-choice questions for 999 students per exam. The program reads and stores a key card which contains the correct answers to the exam. It then reads in a student's answer card, compares each answer of the student with each of the correct answers, counts the number of correct answers, the number of wrong answers, and the number of questions not answered. A table is set up in the computer which is used to tabulate the number of people who have selected each choice of each question. This table is updated as the student's exam is corrected. When the last question is corrected the student's grade is computed and a grade card is punched out for that student containing section number, course number, student name, student number, the number of correct answers, the number of wrong answers, the number of omitted questions and the score. The score can be calculated in one of two ways, either as the percent of the correct answers or as a formula of RIGHTS $-\left(\frac{\text{WRONGS}}{\text{N-1}}\right)$ where N is the number of choices per question. A table containing the distribution of the grades is updated in the computer and then the next student's cards are read in and corrected. After the last student's exam is graded the program will punch out the grade distribution table, followed by a statistical card containing the number of students who took the exam, the sum of all scores, the sum of all the scores squared, the mean, and the standard deviation. This is followed by the table of the choices made for each question which includes an asterisk beside the correct choice for each question and the percent of correct answers for each question. For a multiple section exam, the above information may be punched out for each section and in addition the grade distribution, mean, standard deviation, and exam analysis by question for all the sections totaled together.

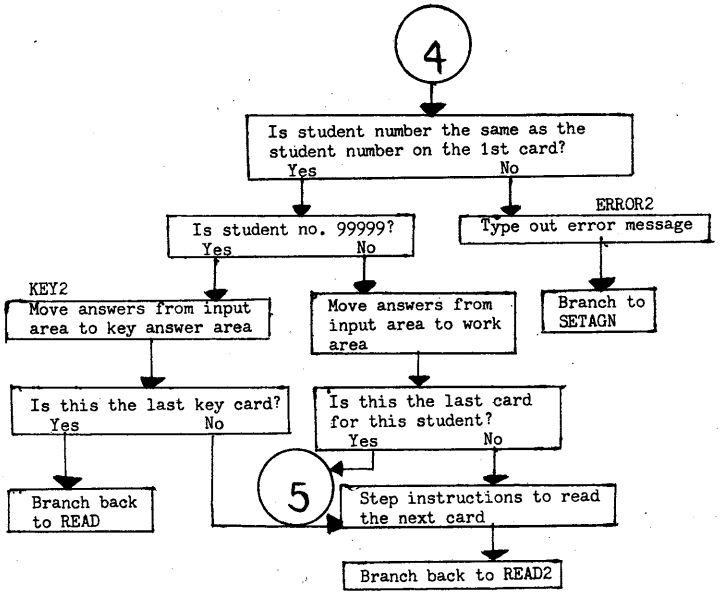
The answer cards have appropriate heading cards included in them so that they can be printed with an 80-80, 407 board and all columns are automatically headed. An "X" punch is placed in column 5 of the first heading card of each group in order to permit skipping to a new page for each group (by wiring first reading column 5 to "X" carriage skip, channel one.)

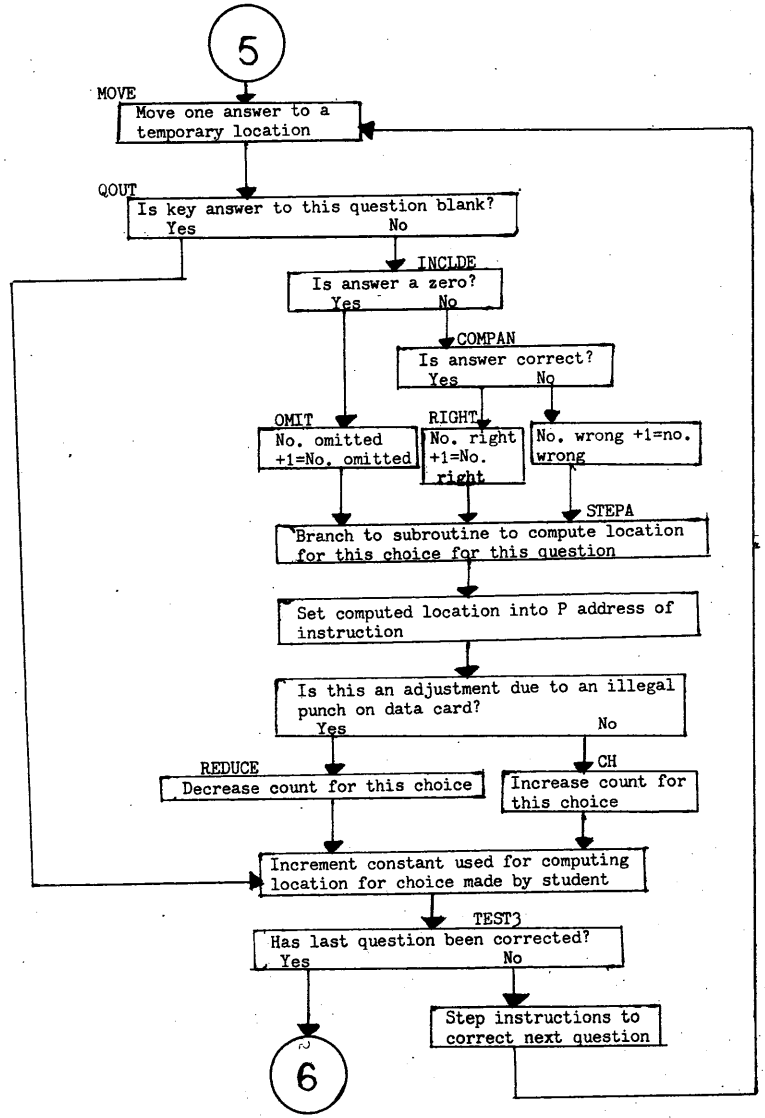
NORTHEASTERN UNIVERSITY
TEST SCORING PROGRAM FLOW CHART

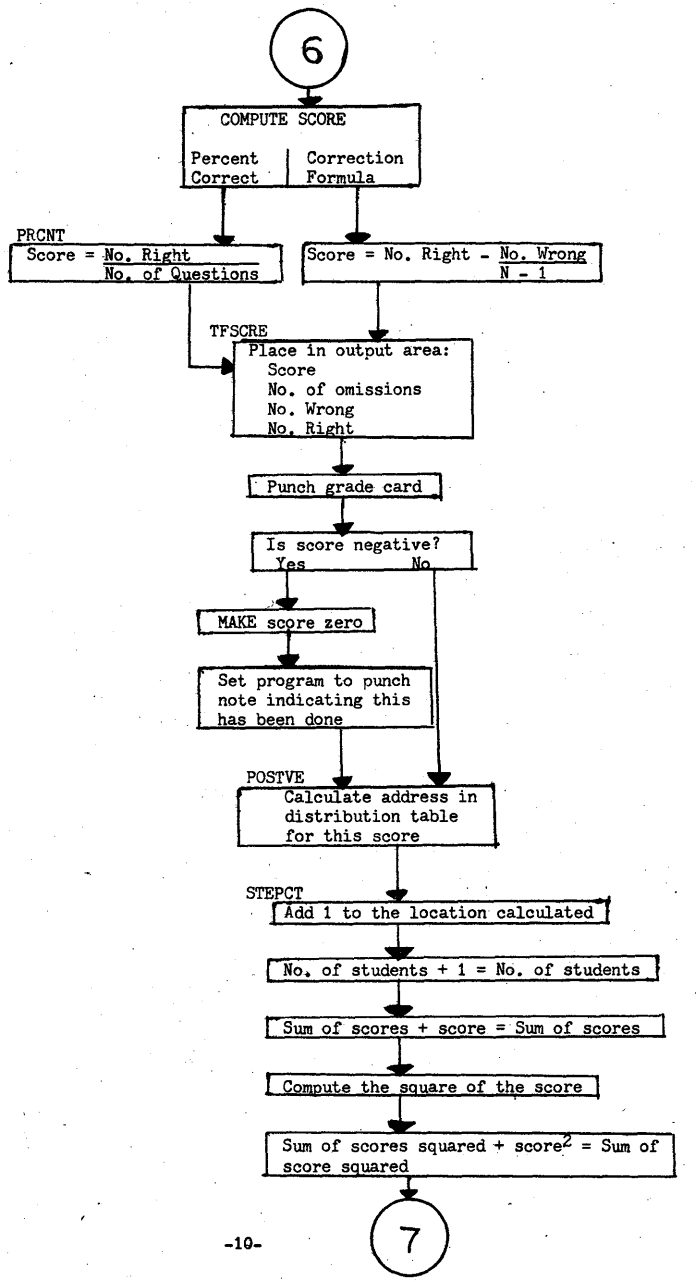


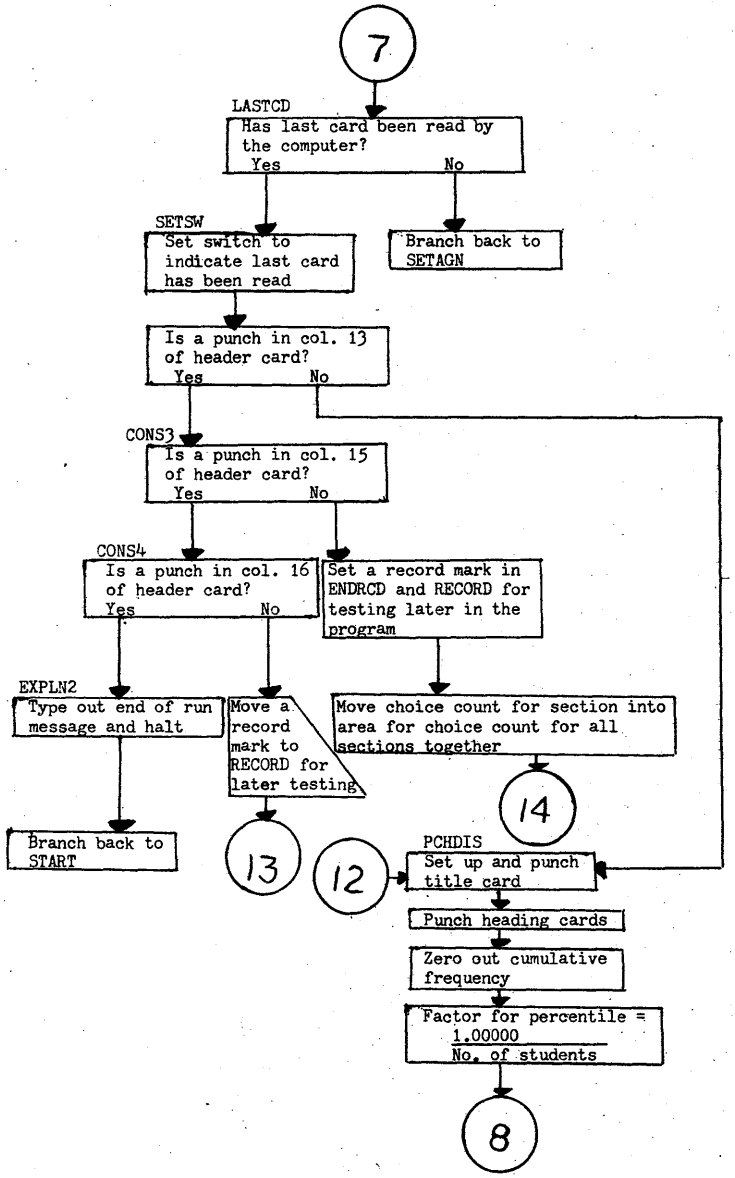

2
ZROCHO
Zero table of count of choices kept for each exam section
ZRODIS
Zero table of grade distribution kept for each exam section
SETAGN
Clear output area. Initialize program for computing a student's grade
FLGTST
Is change-in-section number switch on?
Yes
No
Turn switch off
READ
Read an exam card
3
Is student no. blank?
Yes
No
Is card a no. 1 card?
Yes
No
LC
Is this the last card?
Yes
No
Is a punch in col. 13 on header card?
Yes
No
ERROR1
Type out error message
LSTBLK
Set switch to indicate that the last card has been read
12
CMZ
Is course no. in output area zero?
Yes
No
Is section no. in card read just the same as section no. in output area?
Yes
No
3
Is course no. in output area equal to course no. in card just read?
Yes
No
Is section no. in output area zero?
Yes
No
Are section nos. the same?
Yes
No
PCHDST
Turn change in section no. switch on
PCHDST
Turn change in section no. switch on
PCHHED
Punch heading cards
12
12

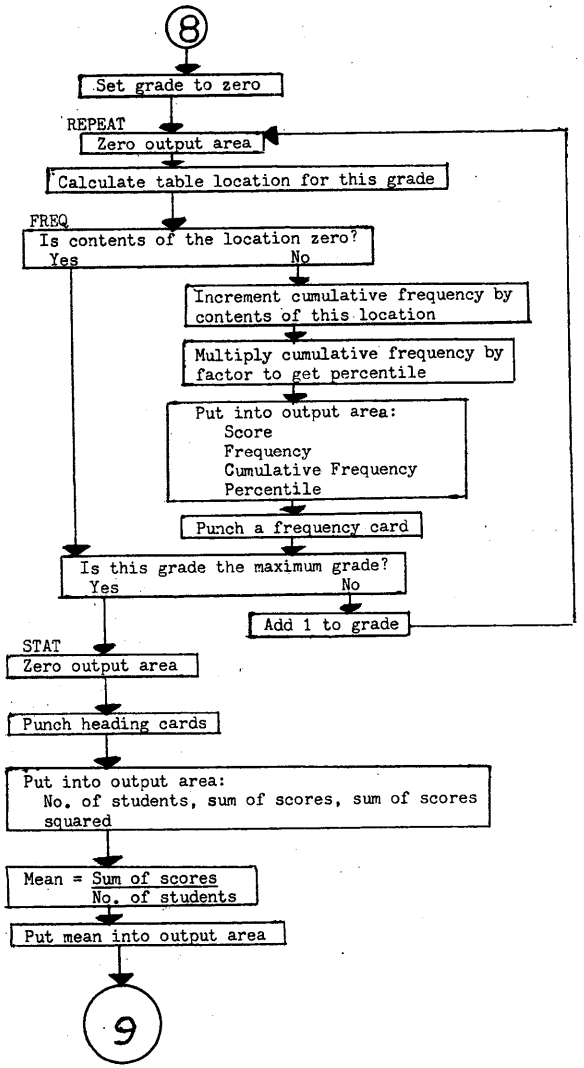

3
ZNR
Zero number right
Zero number wrong
Zero number omitted
Move student number to output area
Is console switch 1 on?
Yes
No
Move student's name to output area
Move section no. and course, to output area
Is student no. 99999?
Yes
No
KEY1
Move key answers from input area to key answer area
Move answers to exam questions from input area to work area
Is the number of cards per student 1?
Yes
No
Is the number of cards per student 1?
Yes
No
5
SETRD2
Branch back to READ
Setting instructions for reading subsequent cards
READ2
Read a card
Is card number correct?
Yes
No
Branch to ERROR1
4

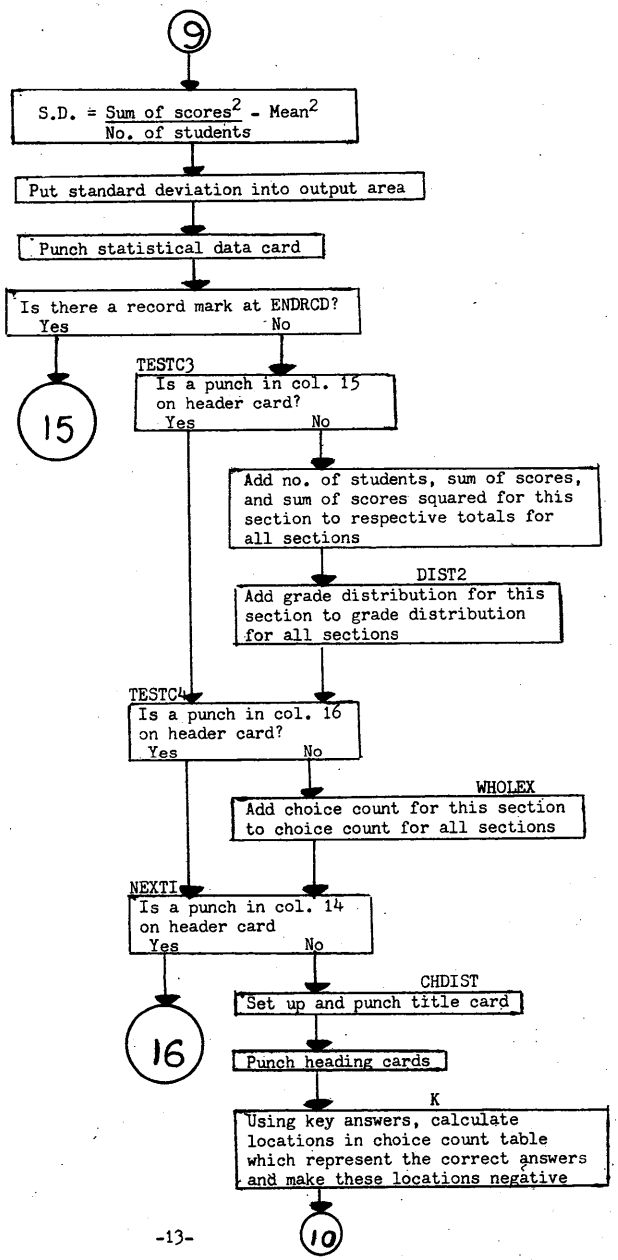

4
Is student number the same as the student number on the 1st card?
Yes
No
Is student no. 99999?
Yes
No
ERROR2
Type out error message
KEY2
Move answers from input area to key answer area
Move answers from input area to work area
Branch to SETAGN
Is this the last key card?
Yes
No
Is this the last card for this student?
Yes
No
Branch back to READ
5
Step instructions to read the next card
Branch back to READ2

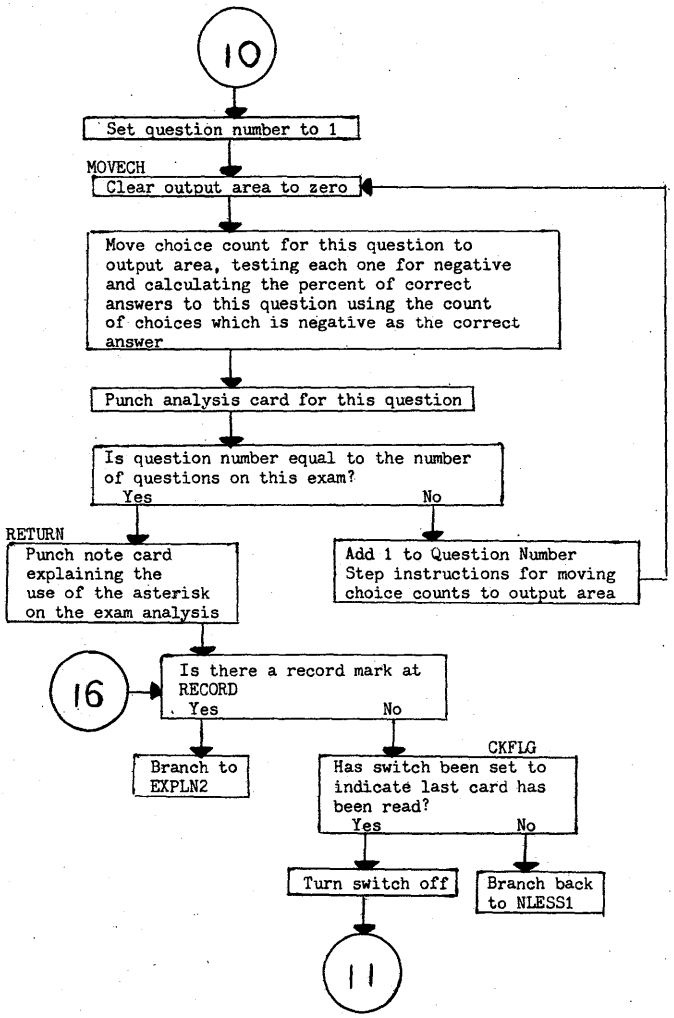

5
MOVE
Move one answer to a temporary location
QOUT
Is key answer to this question blank?
Yes
No
INCLDE
Is answer a zero?
Yes
No
COMPAN
Is answer correct?
Yes
No
OMIT
No. omitted +1=No. omitted
RIGHT
No. right +1=No. right
No. wrong +1=no. wrong
STEPA
Branch to subroutine to compute location for this choice for this question
Set computed location into P address of instruction
Is this an adjustment due to an illegal punch on data card?
Yes
No
REDUCE
Decrease count for this choice
CH
Increase count for this choice
Increment constant used for computing location for choice made by student
TEST3
Has last question been corrected?
Yes
No
Step instructions to correct next question
6

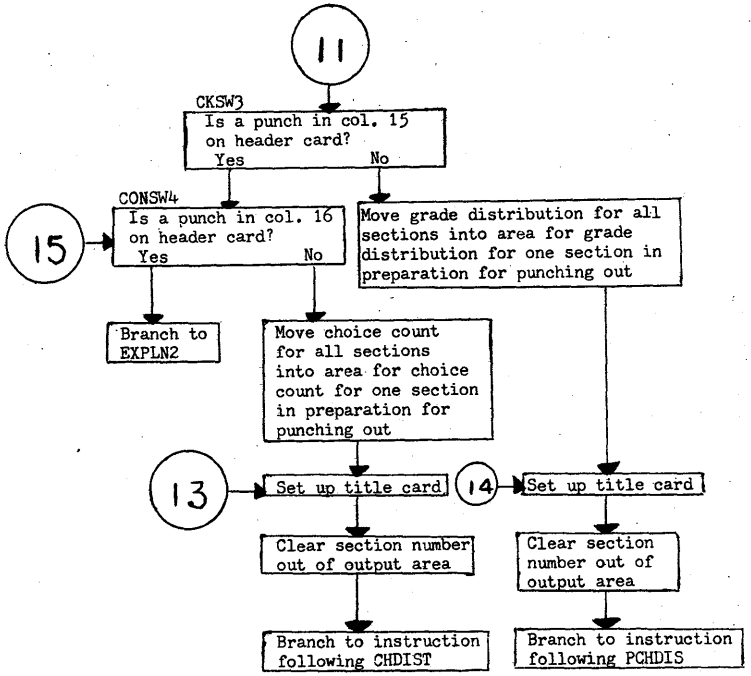

6
COMPUTE SCORE
Percent Correct
Correction Formula
PRCNT
Score = No. Right / No. of Questions
Score = No. Right - No. Wrong / N - 1
TFSCRE
Place in output area:
Score
No. of omissions
No. Wrong
No. Right
Punch grade card
Is score negative?
Yes
No
MAKE score zero
Set program to punch note indicating this has been done
POSTVE
Calculate address in distribution table for this score
STEPCT
Add 1 to the location calculated
No. of students + 1 = No. of students
Sum of scores + score = Sum of scores
Compute the square of the score
Sum of scores squared + score² = Sum of score squared
7


7
LASTCD
Has last card been read by the computer?
Yes
No
SETSW
Set switch to indicate last card has been read
Branch back to SETAGN
Is a punch in col. 13 of header card?
Yes
No
CONS3
Is a punch in col. 15 of header card?
Yes
No
CONS4
Is a punch in col. 16 of header card?
Yes
No
Set a record mark in ENDRCD and RECORD for testing later in the program
EXPLN2
Type out end of run message and halt
Branch back to START
Move a record mark to RECORD for later testing
13
Move choice count for section into area for choice count for all sections together
14
12
PCHDIS
Set up and punch title card
Punch heading cards
Zero out cumulative frequency
Factor for percentile = 1.00000 / No. of students
8

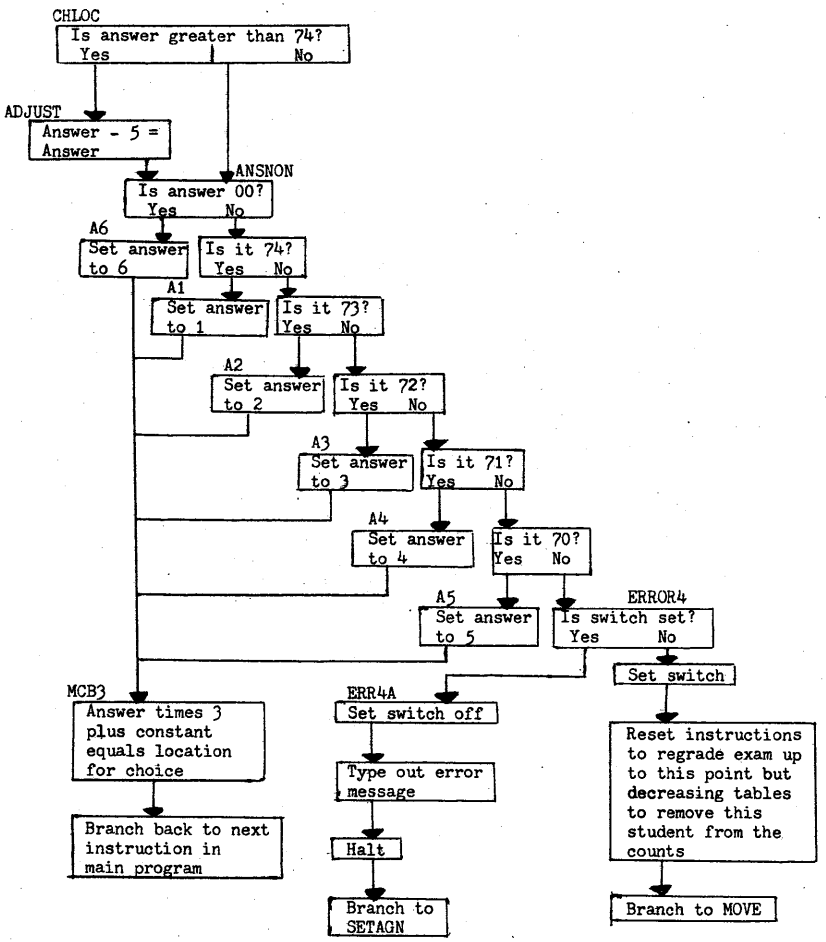

8
Set grade to zero
REPEAT
Zero output area
Calculate table location for this grade
FREQ
Is contents of the location zero?
Yes
No
Increment cumulative frequency by contents of this location
Multiply cumulative frequency by factor to get percentile
Put into output area:
Score
Frequency
Cumulative Frequency
Percentile
Punch a frequency card
Is this grade the maximum grade?
Yes
No
Add 1 to grade
STAT
Zero output area
Punch heading cards
Put into output area:
No. of students, sum of scores, sum of scores squared
Mean = Sum of scores / No. of students
Put mean into output area
9


9
S.D. = Sum of scores^2 / No. of students - Mean^2
Put standard deviation into output area
Punch statistical data card
Is there a record mark at ENDRCD?
Yes
No
15
TESTC3
Is a punch in col. 15 on header card?
Yes
No
Add no. of students, sum of scores, and sum of scores squared for this section to respective totals for all sections
DIST2
Add grade distribution for this section to grade distribution for all sections
TESTC4
Is a punch in col. 16 on header card?
Yes
No
WHOLEX
Add choice count for this section to choice count for all sections
NEXTI
Is a punch in col. 14 on header card
Yes
No
16
CHDIST
Set up and punch title card
Punch heading cards
K
Using key answers, calculate locations in choice count table which represent the correct answers and make these locations negative
10

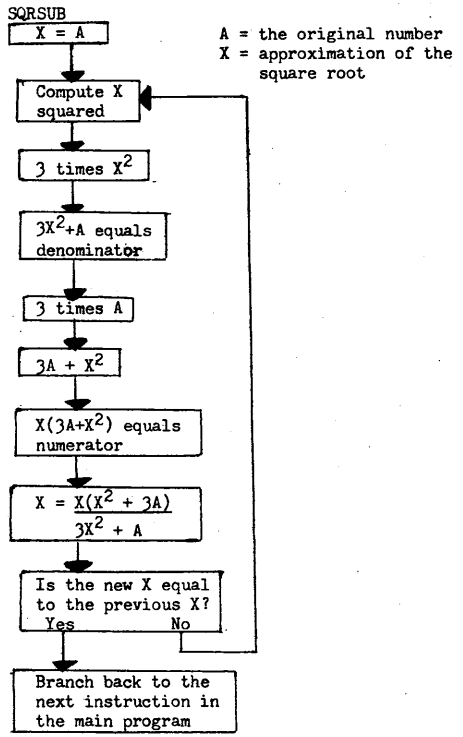

10
Set question number to 1
MOVECH
Clear output area to zero
Move choice count for this question to output area, testing each one for negative and calculating the percent of correct answers to this question using the count of choices which is negative as the correct answer
Punch analysis card for this question
Is question number equal to the number of questions on this exam?
Yes
No
RETURN
Punch note card explaining the use of the asterisk on the exam analysis
Add 1 to Question Number
Step instructions for moving choice counts to output area
16
Is there a record mark at RECORD
Yes
No
Branch to EXPLN2
CKFLG
Has switch been set to indicate last card has been read?
Yes
No
Turn switch off
Branch back to NLESS1
11


11
CKSW3
Is a punch in col. 15 on header card?
Yes
No
CONSW4
15
Is a punch in col. 16 on header card?
Yes
No
Move grade distribution for all sections into area for grade distribution for one section in preparation for punching out
Branch to EXPLN2
Move choice count for all sections into area for choice count for one section in preparation for punching out
13
Set up title card
14
Set up title card
Clear section number out of output area
Clear section number out of output area
Branch to instruction following CHDIST
Branch to instruction following PCHDIS

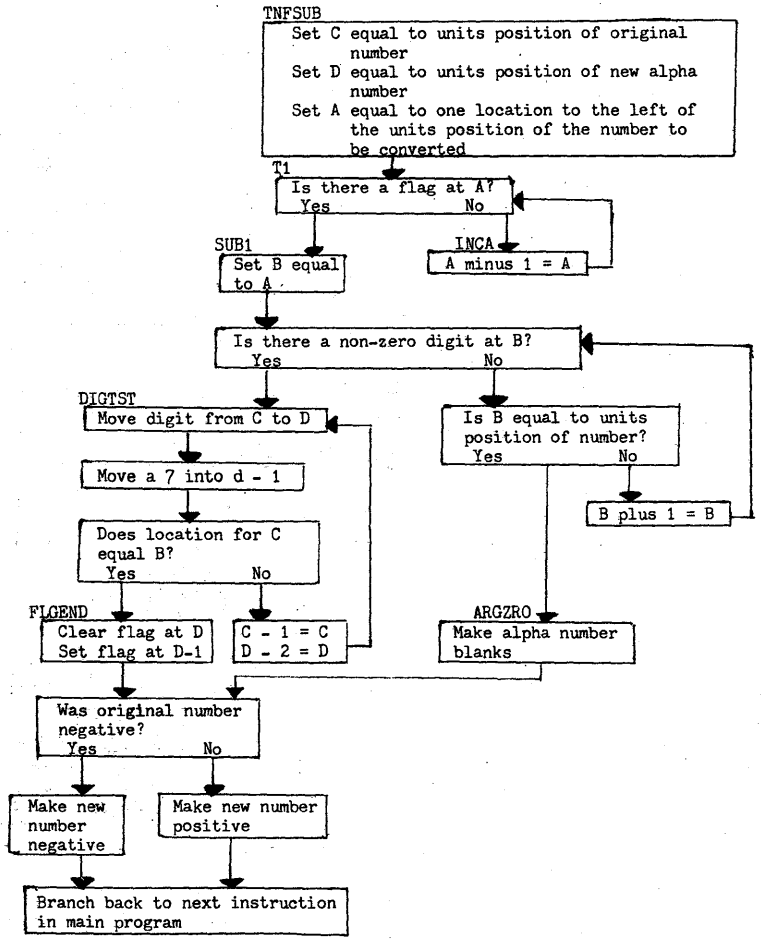
SUBROUTINE TO CALCULATE LOCATION IN TABLE FOR STUDENT'S CHOICE TO A QUESTION



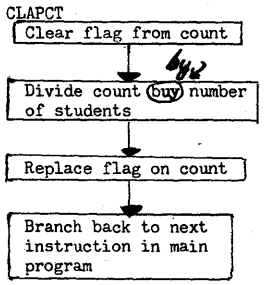
SQUARE ROOT SUBROUTINE (BAILEY'S METHOD)



NUMERIC TO ALPHANUMERIC FILL SUBROUTINE



SUBROUTINE TO CALCULATE PERCENT OF CORRECT ANSWERS



ITEMS WHICH DO NOT APPEAR IN THE FLOW CHART

There are two items which the program does quite often which have been deliberately omitted from the flow chart. It was felt that they would only unnecessarily lengthen it and would not contribute towards the understanding of the workings of the program.

The first of these is that all punch-out is done by alphabetic punch commands and consequently all answers are converted from their numerical form to their alphanumerical equivalent before being put in the output area. This conversion is done by a subroutine so that the program can be run on machines which do not have the transmit numerical fill additional feature on them.

The second omission concerns division. The program was written to be run on a 1620 with automatic divide. However, by changing one constant the program can be run on machines without automatic divide. Whenever the program is about to perform a divide operation, a test is made for this constant and, depending upon the results, the division is performed by automatic divide or by the divide subroutine. The inclusion of this step in the flow chart would have made it more involved than is necessary.

INPUT

1. Condensed program deck consists of 288 cards.
2. Program deck is followed by a heading card as follows:

Card Columns	Data
1-2	Number of exam cards per student
3-5	Number of questions on the exam
6-7	Number of choices per question
8-9	Grading method: 01 for grade as percent of correct answers 02 for grade as RIGHTS $-(\frac{WRONGS}{N-1})$ where N is the number of choices per question
10-12	Number of question which are not to be graded. (May be left blank if there are none.)
*13	1 means suppress the grade distribution and exam analysis by section
*14	1 means suppress the exam analysis only by section
*15	1 means suppress the grade distribution for all sections totaled together
*16	1 means suppress the exam analysis for all sections totaled together
* These columns should be left blank if the user does not wish to suppress the output effected by each column.	
17-80	Must be blank

3. Key for exam

The format for the key is exactly the same as the format for the student's answer cards as described in 4 on following page. However, the name field is ignored and, therefore, may be blank or contain anything the user wishes. In addition the student number for the key (card columns 1-5) MUST BE 99999. It is by the five 9's that the program recognizes the key card as such. (Consequently, no student should have number 99999.)

Input

4. Student answer cards

Card Columns	Data
1-5	Student number
6-23	Student name
24-25	Section number
26-29	Course number (must be all numeric)
30	Card number
31-80	Student's answers

OUTPUT

1. Student's grade card

1-2	Section number
3-6	Course number
7-33	Student's name
34-38	Student number
45-47	Number of correct answers
55-57	Number of incorrect answers
64-66	Number of questions omitted
75-77	Score

2. Grade distribution cards

1-2	Section number
3-6	Course number
35-37	Score
44-46	Frequency
54-56	Cumulative frequency
66-68	Percentile

Output

3. Statistical card

Card Columns	Data
1-2	Section Number
3-6	Course Number
37-39	Number of students
44-49	Sum of scores
54-59	Sum of scores squared
68-69	Mean
78-79	Standard Deviation

4. Exam analysis cards

1-2	Section number
3-6	Course number
11-13	Question number
17-19	Number of choice A's
27-29	Number of choice B's
37-39	Number of choice C's
47-49	Number of choice D's
57-59	Number of choice E's
67-69	Number of omissions
77-79	Percent of correct answers to this question

Listing of input cards which produced the output on the following pages.

```
99999KEY CARD                    1869897797799688797979868641 24422212232232133133242
99999KEY CARD                    27978789 997969798987797874123422223232233133233242
99999KEY CARD                    3869897797799688797979868641 24422212232232133133242

00300NAME REMOVED        01889918998977897796887979798689412342222323223313323242
00300NAME REMOVED        01889927977989999796679868798689412342222323223313323242
00300NAME REMOVED        01889938998977897796887979798689412342222323223313323242

02530NAME REMOVED        01889918868677966986687869798989432121214123223213123344 1
02530NAME REMOVED        01889929988689696787679998798689412342222323223313323242
02530NAME REMOVED        01889938868677966986687869798989432121214123223213123344 1

02560NAME REMOVED        01889918898977979999668797879768742232221132323322334332 42
02560NAME REMOVED        01889927978789898767979998898989432121214123223213123344 1
02560NAME REMOVED        01889938898977979999668797879768742232221132323322334332 42

02740NAME REMOVED        01889916996977989996687779688689422142221223223213113324 2
02740NAME REMOVED        01889927678799899796979968797687423222113232332233433242
02740NAME REMOVED        01889936996977989996687779688689422142221223223213113324 2

03770NAME REMOVED        01889918698977979988879797986894324422111232232133423242
03770NAME REMOVED        01889929988789996767999998888689422142221223223213113324 2
03770NAME REMOVED        01889938698977979988879797986894324422111232232133423242

05370NAME REMOVED        02889918898997978998677979798686413142441232223313313324 2
05370NAME REMOVED        02889927978889999996697998798689432442211123223213342324 2
05370NAME REMOVED        02889938898997978998677979798686413142441232223313313324 2

07850NAME REMOVED        02889918898677977896687979688689412122221223223213141324 2
07850NAME REMOVED        02889929986799996796979798798686413142441232223313313324 2
07850NAME REMOVED        02889938898677977896687979688689412122221223223213141324 2

09900NAME REMOVED        02889918687777779976687699798688432142211224244113113314 3
09900NAME REMOVED        02889927986669969668777898888689412122221223223213141324 2
09900NAME REMOVED        02889938687777779976687699798688432142211224244113113314 3

11050NAME REMOVED        02889918698 777779968879 97986864 21222214234233121134242
11050NAME REMOVED        02889927978888999796977866798688432142211224244113113314 3
11050NAME REMOVED        02889938698 777779968879 97986864 21222214234233121134242

11750NAME REMOVED        02889918898777998996887778788686412142221223233313331344 2
11750NAME REMOVED        02889926877778799978686979879868 21222214234233121134242
11750NAME REMOVED        02889938898777998996887778788686412142221223233313331344 2
```


-	NAME	STUDENT NUMBER	NUMBER RIGHT	NUMBER WRONG	NUMBER OMITTED	SCORE
01 8899	NAME REMOVED	00300	119	28		81
01 8899	NAME REMOVED	02530	93	54		63
01 8899	NAME REMOVED	02560	101	46		69
01 8899	NAME REMOVED	02740	108	39		73
01 8899	NAME REMOVED	03770	116	31		79

-GRADE DISTRIBUTION BY SECTION

	SCORE	FREQ.	CUM FREQ.	PERCENTILE
01 8899	63	1	1	20
01 8899	69	1	2	40
01 8899	73	1	3	60
01 8899	79	1	4	80
01 8899	81	1	5	100

	N.	SUM OF SCORES	SUM OF SCORES SQUARED	MEAN	S.D.
01 8899	5	365	26861	73	7

-EXAM ANALYSIS BY SECTION

	QUESTION NUMBER	A	B	C	D	E	OMISSIONS	PERCENT CORRECT
01 8899	1		4*		1			80
01 8899	2	2	2		1*			20
01 8899	3	4*			1			80
01 8899	4		4*		1			80
01 8899	5	4*			1			80
01 8899	6			5*				100
01 8899	7			5*				100
01 8899	8	4*	1					80
01 8899	9	1	1	2*	1			40
01 8899	10	2		2*	1			40
01 8899	11	4*		1				80
01 8899	12	4*	1					80
01 8899	13		1		4*			80
01 8899	14		2*		3			40
01 8899	15		5*					100
01 8899	16			5*				100
01 8899	17	3*	1	1				60
01 8899	18			4*	1			80
01 8899	19	4*	1					80
01 8899	20			4*	1			80
01 8899	21	4*	1					80
01 8899	22		4*	1				80
01 8899	23	1			4*			80
01 8899	24		5*					100
01 8899	25	4		1	*			100
01 8899	26	5*						
01 8899	27	THIS QUESTION NOT GRADED BY REQUEST OF THE INSTRUCTOR						
01 8899	28			5*				100
01 8899	29	1*	2		2			20
01 8899	30	3*		2				60
01 8899	31			4*	1			80
01 8899	32			5*				100
01 8899	33			2*	3			40
01 8899	34	1		1	3*			60
01 8899	35		2	1*	2			20
01 8899	36			5*				100

01 8899	37		5*			100
01 8899	38			5*		100
01 8899	39		1	4*		80
01 8899	40		5*			100
01 8899	41		1	4*		80
01 8899	42			1	4*	80
01 8899	43		5*			100
01 8899	44		3*		2	60
01 8899	45	2		2	1*	20
01 8899	46		4*	1		80
01 8899	47		5*			100
01 8899	48	1		4*		80
01 8899	49	5*				100
01 8899	50			4*	1	80
01 8899	51	2		3*		60
01 8899	52	4*			1	80
01 8899	53		2	3*		60
01 8899	54		4*	1		80
01 8899	55	1		3*	1	60
01 8899	56	1	4*			80
01 8899	57	5*				100
01 8899	58	THIS QUESTION NOT GRADED BY REQUEST OF THE INSTRUCTOR				
01 8899	59	5*				100
01 8899	60	2*	1		2	40
01 8899	61			5*		100
01 8899	62	2*	1		2	40
01 8899	63			3	2*	40
01 8899	64	3*			2	60
01 8899	65	1		4*		80
01 8899	66	5*				100
01 8899	67	4	1*			20
01 8899	68	3*			2	60
01 8899	69		5*			100
01 8899	70		2	3*		60
01 8899	71	4	1	*		
01 8899	72	*	4	1		
01 8899	73	1		*	4	
01 8899	74		5*			100
01 8899	75	4		1*		20
01 8899	76	5*				100

01 8899	77		1	2	2*	40
01 8899	78			5*		100
01 8899	79		3*		2	60
01 8899	80	3*		2		60
01 8899	81			4*	1	80
01 8899	82			5*		100
01 8899	83			3*	2	60
01 8899	84	1		2*	2	40
01 8899	85		3*	1	1	60
01 8899	86			5*		100
01 8899	87		5*			100
01 8899	88			5*		100
01 8899	89		1	4*		80
01 8899	90		5*			100
01 8899	91		2*	3		40
01 8899	92			1	4*	80
01 8899	93		5*			100
01 8899	94		3*		2	60
01 8899	95	1		3*	1	60
01 8899	96		5*			100
01 8899	97		5*			100
01 8899	98	1		4*		80
01 8899	99	5*				100
01 8899	100			4*	1	80
01 8899	101		4*		1	80
01 8899	102	2	2		1*	20
01 8899	103	4*			1	80
01 8899	104		4*		1	80
01 8899	105	4*			1	80
01 8899	106			5*		100
01 8899	107			5*		100
01 8899	108	4*	1			80
01 8899	109	1	1	2*	1	40
01 8899	110	2		2*	1	40
01 8899	111	4*		1		80
01 8899	112	4*	1			80
01 8899	113		1		4*	80
01 8899	114		2*		3	40
01 8899	115		5*			100
01 8899	116			5*		100

01 8899	117	3*	1	1			60
01 8899	118			4*	1		80
01 8899	119	4*	1				80
01 8899	120			4*	1		80
01 8899	121	4*	1				80
01 8899	122		4*	1			80
01 8899	123	1			4*		80
01 8899	124		5*				100
01 8899	125	4		1	*		
01 8899	126	5*					100
01 8899	127	THIS QUESTION NOT GRADED BY REQUEST OF THE INSTRUCTOR					
01 8899	128			5*			100
01 8899	129	1*	2		2		20
01 8899	130	3*		2			60
01 8899	131			4*	1		80
01 8899	132			5*			100
01 8899	133			2*	3		40
01 8899	134	1		1	3*		60
01 8899	135		2	1*	2		20
01 8899	136			5*			100
01 8899	137		5*				100
01 8899	138			5*			100
01 8899	139		1	4*			80
01 8899	140		5*				100
01 8899	141		1	4*			80
01 8899	142			1	4*		80
01 8899	143		5*				100
01 8899	144		3*		2		60
01 8899	145	2		2	1*		20
01 8899	146		4*	1			80
01 8899	147		5*				100
01 8899	148	1		4*			80
01 8899	149	5*					100
01 8899	150			4*	1		80

ASTERISK (*) INDICATES THE CORRECT ANSWER.

-	NAME	STUDENT NUMBER	NUMBER RIGHT	NUMBER WRONG	NUMBER OMITTED	SCORE
02 8899	NAME REMOVED	05370	103	44		70
02 8899	NAME REMOVED	07850	104	43		71
02 8899	NAME REMOVED	09900	86	61		59
02 8899	NAME REMOVED	11050	103	40	4	70
02 8899	NAME REMOVED	11750	99	47	1	67

-GRADE DISTRIBUTION BY SECTION

	SCORE	FREQ.	CUM FREQ.	PERCENTILE
02 8899	59	1	1	20
02 8899	67	1	2	40
02 8899	70	2	4	80
02 8899	71	1	5	100

	N	SUM OF SCORES	SUM OF SCORES SQUARED	MEAN	S.D.
02 8899	5	337	22811	67	4

-EXAM ANALYSIS BY SECTION

	QUESTION NUMBER	A	B	C	D	E	OMISSIONS	PERCENT CORRECT
02 8899	1		5*					100
02 8899	2		3		2*			40
02 8899	3	4*	1					80
02 8899	4		4*	1				80
02 8899	5	1*		2	1		1	20
02 8899	6	1		4*				80
02 8899	7			5*				100
02 8899	8	3*		2				60
02 8899	9	1		4*				80
02 8899	10	1	2	2*				40
02 8899	11	4*	1					80
02 8899	12	4*		1				80
02 8899	13		1		4*			80
02 8899	14		2*		3			40
02 8899	15		4*	1				80
02 8899	16			5*				100
02 8899	17	3*		1	1			60
02 8899	18	1		3*			1	60
02 8899	19	4*	1					80
02 8899	20			4*	1			80
02 8899	21	3*	2					60
02 8899	22		5*					100
02 8899	23				5*			100
02 8899	24		5*					100
02 8899	25	1	1		3*			60
02 8899	26	5*						100
02 8899	27	THIS QUESTION NOT GRADED BY REQUEST OF THE INSTRUCTOR						
02 8899	28		1	4*				80
02 8899	29	*			5			
02 8899	30	3*		2				60
02 8899	31			5*				100
02 8899	32	1		4*				80
02 8899	33	1		3*	1			60
02 8899	34				5*			100
02 8899	35	1		4*				80
02 8899	36		1	4*				80
02 8899	37	1	3*	1				60

02 8899	38	1		4*				80
02 8899	39	1	1	3*				60
02 8899	40	1	4*					80
02 8899	41		3	1*	1			20
02 8899	42				5*			100
02 8899	43		4*	1				80
02 8899	44		2*		3			40
02 8899	45	1	1		3*			60
02 8899	46		3*		2			60
02 8899	47	1	4*					80
02 8899	48	1		3*	1			60
02 8899	49	5*						100
02 8899	50		1	4*				80
02 8899	51	1		3*	1			60
02 8899	52	4*	1					80
02 8899	53		2	3*				60
02 8899	54		2*	1	2			40
02 8899	55		2	2*	1			40
02 8899	56	1	3*		1			60
02 8899	57	3*	1	1				60
02 8899	58	THIS QUESTION NOT GRADED BY REQUEST OF THE INSTRUCTOR						
02 8899	59	4*			1			80
02 8899	60	4*			1			80
02 8899	61	1		3*	1			60
02 8899	62	3*	1		1			60
02 8899	63		1		4*			80
02 8899	64	2*	1	1	1			40
02 8899	65	1		3*	1			60
02 8899	66	2*		3				40
02 8899	67	1	2*	2				40
02 8899	68	4*			1			80
02 8899	69		4*		1			80
02 8899	70		1	4*				80
02 8899	71	4	1	*				
02 8899	72	*	5					
02 8899	73			*	5			
02 8899	74		5*					100
02 8899	75	2	1	*	2			
02 8899	76	5*						100
02 8899	77		2		2*		1	40

02 8899	78		1	4*				80
02 8899	79	1	*		4			
02 8899	80	3*		2				60
02 8899	81			5*				100
02 8899	82	1		4*				80
02 8899	83	1		2*	2			40
02 8899	84			*	5			
02 8899	85	1	*	3	1			
02 8899	86		1	4*				80
02 8899	87	1	3*	1				60
02 8899	88	1		4*				80
02 8899	89	1		4*				80
02 8899	90	1	4*					80
02 8899	91		2*	2	1			40
02 8899	92				5*			100
02 8899	93		4*	1				80
02 8899	94		2*		3			40
02 8899	95	2		*	3			
02 8899	96		3*	1	1			60
02 8899	97	1	4*					80
02 8899	98			4*	1			80
02 8899	99	5*						100
02 8899	100		1	4*				80
02 8899	101		5*					100
02 8899	102		3		2*			40
02 8899	103	4*	1					80
02 8899	104		4*	1				80
02 8899	105	1*		2	1		1	20
02 8899	106	1		4*				80
02 8899	107			5*				100
02 8899	108	3*		2				60
02 8899	109	1		4*				80
02 8899	110	1	2	2*				40
02 8899	111	4*	1					80
02 8899	112	4*		1				80
02 8899	113		1		4*			80
02 8899	114		2*		3			40
02 8899	115		4*	1				80
02 8899	116			5*				100
02 8899	117	3*		1	1			60

02	8899	118	1		3*		1	60
02	8899	119	4*	1				80
02	8899	120			4*	1		80
02	8899	121	3*	2				60
02	8899	122		5*				100
02	8899	123				5*		100
02	8899	124		5*				100
02	8899	125	1	1		3*		60
02	8899	126	5*					100
02	8899	127	THIS QUESTION NOT GRADED BY REQUEST OF THE INSTRUCTOR					
02	8899	128		1	4*			80
02	8899	129	*			5		
02	8899	130	3*		2			60
02	8899	131			5*			100
02	8899	132	1		4*			80
02	8899	133	1		3*	1		60
02	8899	134				5*		100
02	8899	135	1		4*			80
02	8899	136		1	4*			80
02	8899	137	1	3*	1			60
02	8899	138	1		4*			80
02	8899	139	1	1	3*			60
02	8899	140	1	4*				80
02	8899	141		3	1*	1		20
02	8899	142				5*		100
02	8899	143		4*	1			80
02	8899	144		2*		3		40
02	8899	145	1	1		3*		60
02	8899	146		3*		2		60
02	8899	147	1	4*				80
02	8899	148	1		3*	1		60
02	8899	149	5*					100
02	8899	150		1	4*			80

ASTERISK (*) INDICATES THE CORRECT ANSWER.

-GRADE DISTRIBUTION - ALL SECTIONS

	SCORE	FREQ.	CUM FREQ.	PERCENTILE
8899	59	1	1	10
8899	63	1	2	20
8899	67	1	3	30
8899	69	1	4	40
8899	70	2	6	60
8899	71	1	7	70
8899	73	1	8	80
8899	79	1	9	90
8899	81	1	10	100

	N	SUM OF SCORES	SUM OF SCORES SQUARED	MEAN	S.D.
8899	10	702	49672	70	6

-EXAM ANALYSIS - ALL SECTIONS

	QUESTION NUMBER	A	B	C	D	E	OMISSIONS	PERCENT CORRECT
8899	1		9*		1			90
8899	2	2	5		3*			30
8899	3	8*	1		1			80
8899	4		8*	1	1			80
8899	5	5*		2	2		1	50
8899	6	1		9*				90
8899	7			10*				100
8899	8	7*	1	2				70
8899	9	2	1	6*	1			60
8899	10	3	2	4*	1			40
8899	11	8*	1	1				80
8899	12	8*	1	1				80
8899	13		2		8*			80
8899	14		4*		6			40
8899	15		9*	1				90
8899	16			10*				100
8899	17	6*	1	2	1			60
8899	18	1		7*	1		1	70
8899	19	8*	2					80
8899	20			8*	2			80
8899	21	7*	3					70
8899	22		9*	1				90
8899	23	1			9*			90
8899	24		10*					100
8899	25	5	1	1	3*			30
8899	26	10*						100
8899	27	THIS QUESTION NOT GRADED BY REQUEST OF THE INSTRUCTOR						
8899	28		1	9*				90
8899	29	1*	2		7			10
8899	30	6*		4				60
8899	31			9*	1			90
8899	32	1		9*				90
8899	33	1		5*	4			50
8899	34	1		1	8*			80
8899	35	1	2	5*	2			50
8899	36		1	9*				90
8899	37	1	8*	1				80

8899	38	1		9*				90
8899	39	1	2	7*				70
8899	40	1	9*					90
8899	41		4	5*	1			50
8899	42			1	9*			90
8899	43		9*	1				90
8899	44		5*		5			50
8899	45	3	1	2	4*			40
8899	46		7*	1	2			70
8899	47	1	9*					90
8899	48	2		7*	1			70
8899	49	10*						100
8899	50		1	8*	1			80
8899	51	3		6*	1			60
8899	52	8*	1		1			80
8899	53		4	6*				60
8899	54		6*	2	2			60
8899	55	1	2	5*	2			50
8899	56	2	7*		1			70
8899	57	8*	1	1				80
8899	58	THIS QUESTION NOT GRADED BY REQUEST OF THE INSTRUCTOR						
8899	59	9*			1			90
8899	60	6*	1		3			60
8899	61	1		8*	1			80
8899	62	5*	2		3			50
8899	63		1	3	6*			60
8899	64	5*	1	1	3			50
8899	65	2		7*	1			70
8899	66	7*		3				70
8899	67	5	3*	2				30
8899	68	7*			3			70
8899	69		9*		1			90
8899	70		3	7*				70
8899	71	8	2	*				
8899	72	*	9	1				
8899	73	1		*	9			
8899	74		10*					100
8899	75	6	1	1*	2			10
8899	76	10*						100
8899	77		3	2	4*		1	40

8899	78		1	9*			90
8899	79	1	3*		6		30
8899	80	6*		4			60
8899	81			9*	1		90
8899	82	1		9*			90
8899	83	1		5*	4		50
8899	84	1		2*	7		20
8899	85	1	3*	4	2		30
8899	86		1	9*			90
8899	87	1	8*	1			80
8899	88	1		9*			90
8899	89	1	1	8*			80
8899	90	1	9*				90
8899	91		4*	5	1		40
8899	92			1	9*		90
8899	93		9*	1			90
8899	94		5*		5		50
8899	95	3		3*	4		30
8899	96		8*	1	1		80
8899	97	1	9*				90
8899	98	1		8*	1		80
8899	99	10*					100
8899	100		1	8*	1		80
8899	101		9*		1		90
8899	102	2	5		3*		30
8899	103	8*	1		1		80
8899	104		8*	1	1		80
8899	105	5*		2	2	1	50
8899	106	1		9*			90
8899	107			10*			100
8899	108	7*	1	2			70
8899	109	2	1	6*	1		60
8899	110	3	2	4*	1		40
8899	111	8*	1	1			80
8899	112	8*	1	1			80
8899	113		2		8*		80
8899	114		4*		6		40
8899	115		9*	1			90
8899	116			10*			100
8899	117	6*	1	2	1		60

8899	118	1		7*	1	1	70
8899	119	8*	2				80
8899	120			8*	2		80
8899	121	7*	3				70
8899	122		9*	1			90
8899	123	1			9*		90
8899	124		10*				100
8899	125	5	1	1	3*		30
8899	126	10*					100
8899	127	THIS QUESTION NOT GRADED BY REQUEST OF THE INSTRUCTOR					
8899	128		1	9*			90
8899	129	1*	2		7		10
8899	130	6*		4			60
8899	131			9*	1		90
8899	132	1		9*			90
8899	133	1		5*	4		50
8899	134	1		1	8*		80
8899	135	1	2	5*	2		50
8899	136		1	9*			90
8899	137	1	8*	1			80
8899	138	1		9*			90
8899	139	1	2	7*			70
8899	140	1	9*				90
8899	141		4	5*	1		50
8899	142			1	9*		90
8899	143		9*	1			90
8899	144		5*		5		50
8899	145	3	1	2	4*		40
8899	146		7*	1	2		70
8899	147	1	9*				90
8899	148	2		7*	1		70
8899	149	10*					100
8899	150		1	8*	1		80

ASTERISK (*) INDICATES THE CORRECT ANSWER.

OPERATING INSTRUCTIONS

A. Console Switches

PARITY	STOP
I/O	STOP
OVERFLOW	STOP

PROGRAM SWTICH NO. 1
OFF Punch student's name in answer (grade) card
ON Omit student's name in answer (grade) card
PROGRAM SWITCHES NO. 2,3, and 4
Not interrogated by the program

B. Operational Procedure
1. Preparation of data cards
a. Student exam cards

The student exam cards are prepunched with the student number (card columns 1-5), the student's name (c.c. 6-23), the section number or instructor number, if any, (c.c. 24-25), the course number (c.c. 26-29), and the card number (c.c. 30). These prepunched cards are interpreted on the top of the card in the appropriate areas. The cards are then delivered to the instructor or exam monitor who distributes them (with the exam questions) to the student whose name is printed on the top of the card. The student then makes his choice for each question and marks that choice on the card USING A MARK-SENSE PENCIL. He must be cautioned to mark only one choice for each question and not to make any extraneous check marks or light marks on the card as they may be picked up as answers. If either of the above restrictions is violated, that particular student's exam will not be accepted for grading by the computer. When the student does mark his answer he should use a heavy black mark. After the exam is completed the cards are returned to the computer section where they are fed through a mark-sense reproducer and the marks that the students have made are read and put into the cards as punched holes. Because of the layout of the exam card, there are two questions in each mark sense column (this was done to get a maximum number of cards the student must handle). When these marks are translated into punches it is necessary to separate them and put the punch for each question in a separate card column. This is done by wiring mark-sense brushes 3 to 27 into the common of 25 co-selector positions. The normal side of these co-selectors is wired to punch into card columns 56 to 80. The transferred side of the co-selectors is wired to punch into card columns 31 to 55. These co-selectors are picked up on a "half after 4" impulse on every card cycle.

Accordingly, the top half of the card (0-4) which contains the answers for questions 26-50 is punched in card columns 56-80. At "half after 4" time the co-selectors are picked up and the marks on the lower half of the card (5-9) representing the answers to questions 1-25 are punched in card columns 31-55. Therefore, when the card is punched it will have the answers to 50 questions in columns 31-80 of the exam card. By using the double punch detection feature and off set stacking device, the cards can be checked for double punches. Cards containing double punches can be offset and then removed from the deck before the exams get to the computer. Due to the limited number of checking positions it may be necessary to check part of the field as the cards are punched and the remainder of the card on a second pass, which will be making the check for double punches and nothing else. The exam cards are then put in order by sorting on card number (col. 30), student number (col. 1-5), section number (col. 24 and 25), and course number (col. 29-26) (if there is more than one course number in the group). These cards are now ready for the computer.

b. Preparation of heading card

A heading card must be at the beginning of each set of exam cards which is fed into the 1620 for grading. This card supplies the program with certain variable information about the exam. This card must be key punched as indicated below:

Card Columns	Data to be punched
1-2	Number of cards per student
3-5	Number of questions on this exam
6-7	Number of choices per question
8-9	Grading method desired: 01 means score is percent right 02 means score is RIGHTS - $(\frac{WRONGS}{N-1})$
10-12	Number of questions not to be graded (if any). (This may be left blank if there are none)
13	Blank - provide grade distribution by section 1 - suppress grade distribution by section
14	Blank - provide exam analysis by section 1 - suppress exam analysis by section

Card Columns	Data to be punched
15	Blank - provide grade distribution of all sections totaled together 1 - suppress grade distribution of all sections totaled together
16	Blank - provide exam analysis of all sections totaled together 1 - suppress exam analysis of all sections totaled together
17-80	Must be blank

c. Preparation of key for exam being graded

The key of correct answers is prepared in the same way that the student's exam cards are prepared. The only difference is that the student number on the key card must be 99999. The program recognizes this student number as the key card and consequently none of the students should be assigned the number 99999. The name field in the key card may be blank or may have information punched in it. This field is ignored by the program. All other columns must be the same as the students' exam cards. If any of the questions on the exam is not given a correct choice on the key card (i.e., it is left blank) that particular question will not be graded and the exam analysis will have a notation indicating that this has happened. This feature of the program permits the elimination from the grading questions which are discovered to be ambiguous.

2. Running the program on the computer

Put blanks cards in 1622 punch hopper.
Put test scoring program in 1622 read hopper followed by (1) heading card, (2) key cards, and (3) students' answer cards.
Set switches as indicated above.
Press Reset on the console.
Press Load on the 1622 card reader.
Program will be read in. When the program is completely loaded the computer will halt with 48 in the operation register.
Press Start on the console and Punch Start on the 1622.
Program will process the exam punching out grade cards as they are computed and a grade distribution and/or exam analysis when the section number changes if either has been asked for on the heading card.
When the last card starts into the reader the computer will stop.
Press reader start on the 1622 and the last student exam card will be processed. Then the grade distribution and/or exam analysis for all sections totaled together will automatically punch out if either has been asked for on the heading card.

The following errors are detected by the program and when one of them occurs a typeout will explain the action required to correct the error.

1. Exam card out of order
2. Missing exam card
3. Too many exam cards
4. Student answer which is a non-numerical punch (caused by a double mark on the card)

One error which can not be detected by the program is a reader check caused by an illegal double punch in a card column which might occur when a student marks two choices for a question. When this happens, remove the cards from the read hopper, run out the cards using the non-process run out, remove the card or cards for the student which has the error. Then press Reset, Insert, Release and Start on the console. This will branch the program and prepare it to read the next student's exam. Place the unprocessed exams in the read hopper and press reader start. (This means that there are instructions starting in location 00000 and if the operator inserts any information into memory from the typewriter he will erase these instructions and this restart procedure will not work. The rest of the program, however, will not be effected.) These illegal punches should be detected when the cards are punched, but these provisions have been included in the program for those instances where they slip through the checking device of the reproducing punch.

When the processing is completed a message will be typed out indicating the end.
Remove the unused blanks from the punch hopper.
Press non-process run out on the punch side of the 1622.
The last two cards in the punch stacker should be blanks and can be removed.
The other cards in the punch stacker are the results and can be printed on a 407 80-80 board. Heading cards are included in the output. An "X" punch has been put in column 5 on the first heading card of each group so that each group may be started on a new page by wiring column 5 first reading to "X" carriage skip, channel one.

3. It may be desirable to run section numbers 1, 2, and 3 as one section; sections 4, 5, and 6 as another section; 7, 8, and 9 as another; etc. This can be accomplished by punching a 1 in column 13 on the header card. This will suppress the grade distribution punch out whenever the section number which is punched in the cards changes. A blank card is then placed between the groups (e.g., a blank after section 3, after section 6, after section 9, etc.). When the program reads a blank it will punch out the grade distribution for the sections processed up to that point, will clear the section totals and then proceed with the next group. A blank must be placed at the end of all the input cards in order to get the punch out for the last group. Then, if columns 15 and 16 have been left blank on the header card the total distribution will punch out for all sections. While this permits getting a grade distribution for several sections together, heading cards will still be punched out between the grade cards for each section so that each section must be all together within each group.

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                                        *NORTHEASTERN UNIVERSITY TEST SCORING PROGRAM
00402                                         DORG00402Z
00402 46 00414 00900                  START BLC  *+12Z
00414 45 00864 18627                        BNR  SETSUB,AUTODV+1Z
00426 26 07983 15145                  RTN   TF   OUTPUT+10*2-2,ALPHAO+10*2-2Z
00438 26 00011 18623                        TF   11,BRANCH+11Z
00450 13 18625 00002                        MM   QPERC,2,9Z
00462 26 02407 00099                        TF   T+11,99Z
00474 26 02383 00099                        TF   UPDATE+23,99Z
00486 45 00810 18626                        BNR  DVIDE8,AUTODVZ
00498 18 00099 00±50                        LDM  99,150,9Z
00510 29 00098 18625                        D    100-2,QPERCZ
00522 14 00099 00000                  ANYREMCM   99,0,10Z
00534 46 00558 01200                        BE   *+24Z
00546 11 00097 00001                        AM   99-2,1,10Z
00558 26 00689 00097                        TF   MAX+11,99-2Z
00570 25 17067 00097                        TD   E3+53*2-2,99-2Z
00582 25 17065 00096                        TD   E3+52*2-2,99-3Z
00594 36 16577 00500                  RDMASTRNCDMASTER-8,,,READ MASTER INFORMATIONZ
00606 33 03290 00000                        CF   SETSWZ
00618 32 16584 00000                        SF   MASTER-1Z
00630 32 16582 00000                        SF   MASTER-3Z
00642 32 16579 00000                        SF   MASTER-6Z
00654 32 16577 00000                        SF   MASTER-8Z
00666 32 16586 00000                        SF   MASTER+1Z
00678 14 16578 00003                  MAX   CM   MASTER-7,3,10Z
00690 46 07586 01100                        BH   ERROR3Z
00702 26 16656 16581                        TF   MASK,MASTER-4Z
00714 22 16656 16588                        S    MASK,MASTER+3Z
00726 14 16585 00001    0                   CM   MASTER,1,10,TEST FOR GRADING METHODZ
00738 47 00884 01200    0                   BNE  CODE2Z
00750 16 03963 00±00                        TFM  NONE+11,100,9Z
00762 16 02726 02808    0                   TFM  GRADE+6,PRCNTZ
00774 16 00922 07802    0             PRESETTFM  CLRFLG+6,DATA-1,,SET INST TO CLEAR ALL FLAGSZ
00786 16 01038 07960    0                   TFM  SETFLG+6,DATA+80*2-3Z
00798 49 00916 00000    0                   B    CLRFLGZ
00810 16 18651 00845                  DVIDE8DIV  ONE50,QPERC,1,2Z
      16 18759 16671
      49 18640 18625
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      00099 00098
00856 49 00522 00000                        B    ANYREMZ
00864                                       DORG*-3Z
00864 26 06015 18639                  SETSUBTF   CHLOC+11,BRCH+11Z
00876 49 00426 00000                        B    RTNZ
00884                                       DORG*-3Z
00884 16 02726 03410    0             CODE2 TFM  GRADE+6,FOMULAZ
00896 16 03963 00±50                        TFM  NONE+11,150,9Z
00908 49 00774 00000    0                   B    PRESETZ
00916                                       DORG*-3Z
00916 33 07802 00000    0             CLRFLGCF   DATA-1,,2,CLEAR ALL FLAGSZ
00928 14 00922 07961    0                   CM   *-6,DATA+158Z
00940 46 00972 01200    0                   BE   OTHRSZ
00952 11 00922 00001    0                   AM   CLRFLG+6,1Z
00964 49 00916 00000    0                   B    CLRFLGZ
00972                                       DORG*-3Z
00972 32 07802 00000    0             OTHRS SF   DATA-1,,,SET REQUIRED FLAGSZ
00984 32 07860 00000    0                   SF   DATA+30*2-3Z
00996 32 07852 00000    0                   SF   DATA+26*2-3Z
01008 32 07848 00000    0                   SF   DATA+24*2-3Z
01020 32 07812 00000                        SF   DATA+6*2-3Z
01032 32 07960 00000    0             SETFLGSF   DATA+80*2-3,,2Z
1 01044 14 01038 07862  1                   CM   *-6,DATA+31*2-3Z
1 01056 46 01088 01200  1                   BE   CLRZ
1 01068 12 01038 00002  1                   SM   *-30,2Z
1 01080 49 01032 00000  1                   B    SETFLGZ
01088                                       DORG*-3Z
01088 16 01106 ±1453                  CLR   TFM  CLR+18,ENTIREZ
01100 16 11453 00000                        TFM  ENTIRE,0,9Z
01112 14 01106 ±4150                        CM   CLR+18,ENTIRE+150*18-3Z
01124 46 01156 01200                        BE   CLR2Z
01136 11 01106 00003                        AM   CLR+18,3,10Z
01148 49 01100 00000                        B    CLR+12Z
01156                                       DORG*-3Z
01156 16 01174 ±4629                  CLR2  TFM  CLR2+18,SCRCT2Z
01168 16 14629 00000                        TFM  SCRCT2,0,9Z
01180 14 01174 ±5079                        CM   CLR2+18,SCRCT2+150*3Z
01192 46 01224 01200                        BE   CLR3Z
01204 11 01174 00003                        AM   CLR2+18,3,10Z
01216 49 01168 00000                        B    CLR2+12Z
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                01224                                       DORG*-3Z
                01224 16 14153 00000            CLR3  TFM S1,0,9Z
                01236 16 15082 00000                  TFM N1,0,9Z
                01248 26 15088 15131                  TF  SUM3,ALPHAO+3*2-2Z
                01260 26 15097 15134                  TF  SUM4,ALPHAO+5*2-3Z
                01272 15 11450 00000                  TDM S+1,0Z
                01284 15 14626 00000                  TDM SUM2+1,0Z
                01296 33 04070 00000                  CF  NOTEZ
              1 01308 26 16661 16583    1   NLESS1TF  DENOM,MASTER-2,,COMPUTE N-1Z
              1 01320 12 16661 00001    1         SM  DENOM,1,10Z
              1 01332 26 16666 16671    1         TF  HOLD,ONE50,,COMPUTE LOCATION FOR LAST ANSWER OF STUDENTZ
              1 01344 22 16666 16581    1         S   HOLD,MASTER-4,,Z
              1 01356 13 16666 00002    1         MM  HOLD,2,10Z
              1 01368 16 16666 08737    1         TFM HOLD,KEYANSZ
                01380 32 00095 00000                  SF  00099-4Z
              1 01392 22 16666 00099    1         S   HOLD,00099Z
              1 01404 26 02719 16666    1         TF  TEST3+11,HOLDZ
                01416 26 05065 16666                  TF  TEST30+11,HOLDZ
                01428 32 07654 00000                  SF  ERROR4Z
                01440 16 03970 04094                  TFM NONE+18,STATZ
                01452 16 01470 08749    0         TFM ZROCHO+6,CHOICTZ
              1 01464 16 08749 00000    1   ZROCHOTFM CHOICT,0,9, ZERO COUNT OF CHOICESZ
              1 01476 14 01470 11446    1         CM  ZROCHO+6,CHOICT+150*18-3Z
              1 01488 46 01520 01200    1         BE  ZROSZ
              1 01500 11 01470 00003    1         AM  ZROCHO+6,3,10Z
              1 01512 49 01464 00000    1         B   ZROCHOZ
                01520                                       DORG*-3Z
                01520 16 11449 00000    0   ZROS  TFM S,0,9, ZERO COUNT OF STUDENTSZ
                                        0   * USED FOR PERCENT OF CORRECT ANSWERS TOZ
                                        0   * EACH QUESTIONZ
                01532 16 01586 14157    0   SETZAGTFM ZRODIS+6,SCRCTZ
                01544 16 14610 00000    0         TFM N,0,9, ZRO COUNT OF STUDENTS THATZ
              1                         1   * IS USED FOR COMPUTING THE MEANZ
              1 01556 26 14616 15131    1         TF  SUM1,ALPHAO+3*2-2Z
              1 01568 26 14625 15134    1         TF  SUM2,ALPHAO+5*2-3Z
              1 01580 16 14157 00000    1   ZRODISTFM SCRCT,0,29,ZERO GRADE DISTRIBUTIONZ
              1 01592 14 01586 14607    1         CM  ZRODIS+6,SCRCT+150*3Z
              1 01604 46 01636 01200    1         BE  SETAZ
              1 01616 11 01586 00003    1         AM  ZRODIS+6,3,10Z
              1 01628 49 01580 00000    1         B   ZRODISZ
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                01636                                       DORG*-3Z
                01636 16 07967 00000            SETA  TFM OUTPUT+2*2-2,0,10Z
                01648 26 07977 15133                  TF  OUTPUT+7*2-2,ALPHAO+4*2-2Z
                01660 39 15281 00400    0         WACDHEAD1AZ
                01672 39 15443 00400    0         WACDHEAD2AZ
                01684 31 07984 15126            SETAGNTR  OUTPUT+11*2-3,ALPHAO-1Z
                01696 16 02539 08438                  TFM QOUT+11,KEYANS-299Z
                01708 16 02527 08137    0         TFM MOVE+11,ANS-298Z
                01720 16 02583 08439    0         TFM COMPAN+11,KEYANS-298Z
                01732 16 15115 08746    0         TFM CONST1,CHOICT-3Z
                01744 44 01776 01744            FLGTSTBNF READ,FLGTSTZ
                01756 33 01744 00000                  CF  FLGTSTZ
                01768 49 02000 00000                  B   ZNRZ
                01776                                       DORG*-3Z
                01776 37 07803 00500    0   READ  RACDDATAZ
                01788 24 07811 15135                  C   DATA+5*2-2,ALPHAO+5*2-2Z
                01800 46 03250 01200                  BE  LCZ
                01812 14 07861 00071    0         CM  DATA+58,71,10,IS CARD A NO. 1 CARDZ
                01824 47 07450 01200    0         BNE ERROR1Z
                01836 43 01904 16589                  BD  CMZ,MASTER+4Z
                01848 24 07851 07967                  C   DATA+25*2-2,OUTPUT+2*2-2Z
                01860 46 02000 01200                  BE  ZNRZ
                01872 14 07967 00000                  CM  OUTPUT+2*2-2,0,10Z
                01884 46 02000 01200                  BE  ZNRZ
                01896 49 03544 00000                  B   PCHDSTZ
                01904                                       DORG*-3Z
                01904 24 07977 15133            CMZ   C   OUTPUT+7*2-2,ALPHAO+4*2-2Z
                01916 46 02000 01200                  BE  ZNRZ
                01928 24 07859 07977            COMCRSC   DATA+29*2-2,OUTPUT+7*2-2Z
                01940 47 03544 01200                  BNE PCHDSTZ
                01952 24 07851 07967                  C   DATA+25*2-2,OUTPUT+2*2-2Z
                01964 46 02000 01200                  BE  ZNRZ
                01976 39 15281 00400            PCHHEDWACDHEAD1AZ
                01988 39 15443 00400                  WACDHEAD2AZ
                02000 16 15101 00000    0   ZNR   TFM NORITE,0,9Z
              1 02012 16 15104 00000    1         TFM WRONG,0,9Z
              1 02024 16 15107 00000    1         TFM OMISON,0,9Z
                02036 26 08039 07811                  TF  OUTPUT+38*2-2,DATA+5*2-2,,MOVE STUDENT NUMBERZ
                02048 46 02072 00100                  BC1 *+24Z
                02060 26 08023 07847                  TF  OUTPUT+30*2-2,DATA+23*2-2,,MOVE NAME TO OUTPUT AREAZ
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1 02072 26 07967 07851    1         TF   OUTPUT+ 2*2-2,DATA+25*2-2,,MOVE SEC NO.Z
1 02084 26 07977 07859    1         TF   OUTPUT+ 7*2-2,DATA+29*2-2,,MOVE COURSE NO.Z
1 02096 24 07811 08135    1         C    DATA+5*2-2,NINE+5*2-2Z
1 02108 46 02428 01200    1         BE   KEY1Z
1 02120 31 08136 07862    1         TR   ANS-299,DATA+59,,1ST 50 ANSWERSZ
1 02132 14 16578 00001    1   CARD1 CM   MASTER-7,1,10, IS NO OF CDS PER STUDENT 1Z
1 02144 46 02516 01200    1         BE   MOVEZ
  02156 16 02263 00072        SETRD2TFM  READ2+23,72,10Z
  02168 16 02330 08136              TFM  CARD2-6,ANS-299Z
  02180 21 02330 02407              A    CARD2-6,T+11Z
  02192 16 02347 00002              TFM  CARD2+11,2,10Z
  02204 16 02478 08438              TFM  KEY2+6,KEYANS-299Z
  02216 21 02478 02407              A    KEY2+6,T+11Z
  02228 16 02495 00002              TFM  KEY2+23,2,10Z
  02240 37 07803 00500        READ2 RACDDATAZ
  02252 14 07861 00072              CM   DATA+58,72,10Z
  02264 47 07450 01200              BNE  ERROR1Z
  02276 24 07811 08039              C    DATA+5*2-2,OUTPUT+38*2-2Z
  02288 47 07518 01200              BNE  ERROR2Z
  02300 24 07811 08135              C    DATA+5*2-2,NINE+5*2-2Z
  02312 46 02472 01200              BE   KEY2Z
  02324 31 08236 07862              TR   ANS-199,DATA+59,,MOVE ANSWERSZ
  02336 14 16578 00002        CARD2 CM   MASTER-7,2,10Z
  02348 46 02516 01200              BE   MOVEZ
  02360 11 02263 00001        UPDATEAM   READ2+23,1,10Z
  02372 11 02330 00100              AM   CARD2-6,100,9Z
  02384 11 02495 00001              AM   KEY2+23,1,10Z
  02396 11 02478 00100        T     AM   KEY2+6,100,9Z
  02408 11 02347 00001              AM   CARD2+11,1,10Z
  02420 49 02240 00000              B    READ2Z
  02428                             DORG*-3Z
  02428 31 08438 07862    0   KEY1  TR   KEYANS-299,DATA+59,,1ST 50 KEY ANSWERSZ
  02440 14 16578 00001              CM   MASTER-7,1,10Z
  02452 46 01776 01200              BE   READZ
  02464 49 02156 00000              B    SETRD2Z
  02472                             DORG*-3Z
  02472 31 08538 07862        KEY2  TR   KEYANS-199,DATA+59Z
  02484 14 16578 00002              CM   MASTER-7,2,10Z
  02496 46 01776 01200              BE   READZ
  02508 49 02360 00000              B    UPDATEZ
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  02516                             DORG*-3Z
1 02516 26 08741 08137    1   MOVE  TF   TEMP,ANS-298,7,MOVE ONE ANS TO TEMP LOCATIONZ
  02528 43 02548 08438        QOUT  BD   INCLDE,KEYANS-299Z
  02540 49 02696 00000              B    CH+12Z
  02548                             DORG*-3Z
1 02548 14 08741 00000    1   INCLDECM   TEMP,0,10, IS ANS A ZEROZ
1 02560 46 02636 01200    1         BE   OMITZ
1 02572 24 08741 08439    1   COMPANC    TEMP,KEYANS-298,7, IS ANS CORRECTZ
1 02584 46 02616 01200    1         BE   RIGHTZ
2 02596 11 15104 00001    2         AM   WRONG,1,10, INCREMENT NUMBER OF WRONG ANSWERSZ
  02608 49 02648 00000    0         B    STEPAZ
  02616                             DORG*-3Z
  02616 11 15101 00001    0   RIGHT AM   NORITE,1,10, INCREMENT NUMBER OF RIGHT ANSWERSZ
  02628 49 02648 00000    0         B    STEPAZ
  02636                             DORG*-3Z
  02636 11 15107 00001    0   OMIT  AM   OMISON,1,10, INCREMENT NUMBER OF OMISSIONSZ
  02648 27 06004 15115    0   STEPA BT   CHLOC,CONST1Z
1 02660 26 02690 00099    1         TF   CH+6,00099Z
  02672 44 02776 07654              BNF  REDUCE,ERROR4Z
1 02684 11 00000 00001    1   CH    AM   00000,1,10Z
1 02696 21 15115 08746    1         A    CONST1,QLGTHZ
1 02708 14 02583 08737    1   TEST3 CM   COMPAN+11,KEYANS ,,HAS LAST QUESTION BEEN REACHEDZ
1 02720 46 02808 01200    1   GRADE BE   PRCNTZ
1 02732 11 02527 00002    1         AM   MOVE+11,2,10Z
1 02744 11 02583 00002    1         AM   COMPAN+11,2,10Z
  02756 11 02539 00002              AM   QOUT+11,2,10Z
1 02768 49 02516 00000    1         B    MOVEZ
  02776                             DORG*-3Z
  02776 26 02794 02690        REDUCETF   REDUCE+18,CH+6Z
  02788 12 00000 00001              SM   00000,1,10Z
  02800 49 02696 00000              B    CH+12Z
  02808                             DORG*-3Z
  02808 45 03164 18626        PRCNT BNR  DVIDE1,AUTODVZ
  02820 28 00096 15101              LD   00099-3,NORITEZ
1 02832 29 00096 16656    1         D    00096,MASKZ
1 02844 11 00096 00005    1   RND1  AM   00099-3,5,10Z
1 02856 26 15110 00095    1         TF   SCORE,00099-4Z
  02868 27 06584 15110    0   RDYPCHBT   TNFSUB,SCOREZ
  02880 43 03218 06583              BD   NEGSCR,ARGZ
  02892 26 08119 06583    0   TFSCRETF   OUTPUT+78*2-2,ARGZ
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  02904 27 06584 15107    0          BT   TNFSUB,OMISONZ
  02916 26 08097 06583    0          TF   OUTPUT+67*2-2,ARGZ
1 02928 27 06584 15104    1          BT   TNFSUB,WRONGZ
1 02940 26 08079 06583    1          TF   OUTPUT+58*2-2,ARGZ
1 02952 27 06584 15101    1          BT   TNFSUB,NORITEZ
1 02964 26 08059 06583    1          TF   OUTPUT+48*2-2,ARGZ
1 02976 39 07965 00400    1          WACDOUTPUT,,,PUNCH GRADE CARDZ
1 02988 44 03036 15110    1          BNF  POSTVE,SCOREZ
2 03000 16 15110 00000    2          TFM  SCORE,0,9Z
  03012 16 03970 04070               TFM  NONE+18,NOTEZ
  03024 32 04070 00000               SF   NOTEZ
  03036 13 15110 00003    0  POSTVEMM  SCORE,3,10Z
  03048 11 00099 14157    0          AM   00099,SCRCTZ
  03060 26 03078 00099    0          TF   STEPCT+6,00099Z
  03072 11 00000 00001    0  STEPCTAM  00000,1,10Z
  03084 11 11449 00001    0          AM   S,1,10Z
  03096 11 14610 00001    0          AM   N,1,10Z
  03108 21 14616 15110    0          A    SUM1,SCOREZ
  03120 23 15110 15110    0          M    SCORE,SCOREZ
  03132 21 14625 00099    0          A    SUM2,00099Z
  03144 46 03290 00900       LASTCDBLC  SETSWZ
  03156 49 01684 00000               B    SETAGNZ
  03164                              DORG*-3Z
  03164 16 18651 03199       DVIDE1DIV  NORITE,MASK,0,4Z
        16 18759 15101
        49 18640 16656
           00096 00096
  03210 49 02844 00000               B    RND1Z
  03218                              DORG*-3Z
  03218 15 06583 00000       NEGSCRTDM  ARG,0Z
  03230 15 06582 00002               TDM  ARG-1,2Z
  03242 49 02892 00000               B    TFSCREZ
  03250                              DORG*-3Z
  03250 46 03270 00900       LC      BLC  LSTBLKZ
  03262 49 03556 00000               B    PCHDISZ
  03270                              DORG*-3Z
  03270 32 03290 00000       LSTBLKSF   SETSWZ
  03282 49 03556 00000               B    PCHDISZ
  03290                              DORG*-3Z
  03290 32 03290 00000       SETSW   SF   SETSWZ
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  03302 43 03322 16589               BD   CONS3,MASTER+4Z
  03314 49 03556 00000               B    PCHDISZ
  03322                              DORG*-3Z
  03322 43 03378 16591       CONS3   BD   CONS4,MASTER+6Z
  03334 25 14626 00400               TD   ENDRCD,400Z
  03346 25 11450 00400               TD   RECORD,400Z
  03358 31 11451 08747               TR   ENTIRE-2,CHOICT-2Z
  03370 49 05842 00000               B    CKSW3+24Z
  03378                              DORG*-3Z
  03378 43 05954 16592       CONS4   BD   EXPLN2,MASTER+7Z
  03390 25 11450 00400               TD   RECORD,400Z
  03402 49 05922 00000               B    CONSW4+24Z
  03410                              DORG*-3Z
  03410 45 03490 18626       FOMULABNR  DVIDE2,AUTODVZ
  03422 28 00098 15104               LD   00099-1,WRONGZ
1 03434 29 00096 16661    1          D    00096,DENOMZ
1 03446 11 00097 00005    1  RND2    AM   00097,5,10Z
1 03458 26 15110 15101    1          TF   SCORE,NORITEZ
  03470 22 15110 00096               S    SCORE,00099-3Z
2 03482 49 02868 00000    2          B    RDYPCHZ
  03490                              DORG*-3Z
  03490 16 18651 03525       DVIDE2DIV  WRONG,DENOM,2,4Z
        16 18759 15104
        49 18640 16661
           00098 00096
  03536 49 03446 00000               B    RND2Z
  03544                              DORG*-3Z
  03544 32 01744 00000    0  PCHDSTSF   FLGTSTZ
  03556 26 17487 17763       PCHDISTF   TITLE1+39*2-2,BYSEC+15*2-2Z
  03568 39 17411 00400               WACDTITLE1Z
  03580 39 15605 00400               WACDHEAD3AZ
  03592 39 15767 00400               WACDHEAD4AZ
  03604 16 15104 00000    0          TFM  WRONG,0,9Z
  03616 45 03996 18626               BNR  DVIDE3,AUTODVZ
1 03628 28 00099 15124    1          LD   00099   ,INTEGRZ
1 03640 29 00092 14610    1          D    00092,NZ
1 03652 26 16681 00096    1  R3      TF   FACTR,00099-3Z
1 03664 16 15110 00000    1          TFM  SCORE,0,9Z
  03676 31 07984 15126       REPEATTR   OUTPUT+11*2-3,ALPHAO-1Z
1 03688 13 15110 00003    1          MM   SCORE,3,10Z
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1 03700 11 00099 14157     1          AM   00099  ,SCRCTZ
1 03712 26 03735 00099     1          TF   FREQ+11,00099Z
1 03724 26 15101 00000     1  FREQ    TF   NORITE,00000Z
1 03736 14 15101 00000     1          CM   NORITE,0,9Z
1 03748 46 03952 01200     1          BE   NONEZ
2 03760 21 15104 15101     2          A    WRONG,NORITEZ
  03772 23 15104 16681     0          M    WRONG,FACTRZ
  03784 11 00095 00005     0          AM   00099-4,5,10Z
  03796 32 00092 00000     0          SF   00099-7Z
  03808 26 15107 00094     0          TF   OMISON,00099-5Z
  03820 27 06584 15110     0          BT   TNFSUB,SCOREZ
  03832 24 15131 06581                C    ALPHAO+3*2-2,ARG-2Z
  03844 46 04050 01200                BE   NOSCRZ
  03856 26 08039 06583     0          TF   OUTPUT+38*2-2,ARGZ
  03868 27 06584 15101     0  XFREQ   BT   TNFSUB,NORITEZ
  03880 26 08057 06583     0          TF   OUTPUT+47*2-2,ARGZ
1 03892 27 06584 15104     1          BT   TNFSUB,WRONGZ
1 03904 26 08077 06583     1          TF   OUTPUT+57*2-2,ARGZ
1 03916 27 06584 15107     1          BT   TNFSUB,OMISONZ
1 03928 26 08101 06583     1          TF   OUTPUT+69*2-2,ARGZ
1 03940 39 07965 00400     1          WACDOUTPUTZ
1 03952 14 15110 00150     1  NONE    CM   SCORE,150,9Z
1 03964 46 04094 01200     1          BE   STATZ
1 03976 11 15110 00001     1          AM   SCORE,1,9Z
1 03988 49 03676 00000     1          B    REPEATZ
  03996                               DORG*-3Z
  03996 16 18651 04031          DVIDE3DIV INTEGR,N,7,8Z
        16 18759 15124
        49 18640 14610
           00099 00092
  04042 49 03652 00000                B    R3Z
  04050                               DORG*-3Z
  04050 16 08039 07000          NOSCR TFM OUTPUT+38*2-2,7000,8Z
  04062 49 03868 00000                B    XFREQZ
  04070                               DORG*-3Z
  04070 39 16685 00400          NOTE  WACDNOTE1Z
  04082 16 03970 04094                TFM NONE+18,STATZ
  04094 26 08097 15131          STAT  TF   OUTPUT+67*2-2,ALPHAO+3*2-2Z
  04106 26 08077 15131                TF   OUTPUT+57*2-2,ALPHAO+3*2-2Z
  04118 26 08057 15131                TF   OUTPUT+47*2-2,ALPHAO+3*2-2Z
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  04130 26 08039 15131                TF   OUTPUT+38*2-2,ALPHAO+3*2-2Z
  04142 39 15929 00400     0          WACDHEAD5AZ
  04154 39 16091 00400     0          WACDHEAD6AZ
  04166 27 06584 14610     0          BT   TNFSUB,NZ
  04178 26 08043 06583     0          TF   OUTPUT+40*2-2,ARGZ
  04190 27 06584 14616     0          BT   TNFSUB,SUM1Z
  04202 26 08063 06583     0          TF   OUTPUT+50*2-2,ARGZ
  04214 27 06584 14625     0          BT   TNFSUB,SUM2Z
  04226 26 08083 06583     0          TF   OUTPUT+60*2-2,ARGZ
  04238 45 04558 18626                BNR  DVIDE4,AUTODVZ
  04250 28 00096 14616                LD   00099-3,SUM1Z
  04262 29 00094 14610                D    00094,NZ
  04274 26 15279 00096          RND4  TF   MEAN,00099-3Z
  04286 11 00094 00005                AM   00099-5,5,10Z
  04298 27 06584 00093                BT   TNFSUB,00099-6Z
1 04310 26 08103 06583     1          TF   OUTPUT+70*2-2,ARGZ
  04322 45 04612 18626                BNR  DVIDE5,AUTODVZ
  04334 28 00096 14625                LD   00099-3,SUM2Z
  04346 29 00093 14610                D    00100-7,NZ
  04358 11 00096 00005          RND5  AM   00099-3,5,10Z
  04370 32 00090 00000                SF   90Z
  04382 26 15273 00095                TF   SUBTRA,00099-4Z
  04394 11 15279 00005                AM   MEAN,5,10Z
  04406 23 15278 15278                M    MEAN-1,MEAN-1Z
  04418 11 00098 00005                AM   00099-1,5,10Z
  04430 26 00099 00097                TF   00099,00099-2Z
  04442 33 00090 00000                CF   00099-9Z
  04454 32 00092 00000                SF   00099-7Z
  04466 32 00099 00000                SF   00099Z
  04478 21 00099 15273                A    00099,SUBTRAZ
  04490 27 07016 00099                BT   SQRSUB,00099Z
1 04502 27 06584 07015     1          BT   TNFSUB,AAAZ
1 04514 26 08123 06583     1          TF   OUTPUT+80*2-2,ARGZ
1 04526 39 07965 00400     1          WACDOUTPUTZ
  04538 45 04666 14626                BNR  TESTC3,ENDRCDZ
  04550 49 05898 00000                B    CONSW4Z
  04558                               DORG*-3Z
  04558 16 18651 04593          DVIDE4DIV SUM1,N,2,6Z
        16 18759 14616
        49 18640 14610
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          00096 00094
04604 49 04274 00000            B    RND4Z
04612                           DORG*-3Z
04612 16 18651 04647       DVIDE5DIV SUM2,N,4,8Z
      16 18759 14625
      49 18640 14610
          00096 00092
04658 49 04358 00000            B    RND5Z
04666                           DORG*-3Z
04666 43 04806 16591       TESTC3BD  TESTC4,MASTER+6Z
04678 21 15082 14610            A    N1,NZ
04690 21 15088 14616            A    SUM3,SUM1Z
04702 21 15097 14625            A    SUM4,SUM2Z
04714 16 04744 ‡4629            TFM  DIST2+6,SCRCT2Z
04726 16 04749 ‡4157            TFM  DIST2+11,SCRCTZ
04738 21 14629 14157       DIST2 A    SCRCT2,SCRCTZ
04750 14 04749 ‡4607            CM   DIST2+11,SCRCT+150*3Z
04762 46 04806 01200            BE   TESTC4Z
04774 11 04744 00003            AM   DIST2+6,3,10Z
04786 11 04749 00003            AM   DIST2+11,3,10Z
04798 49 04738 00000            B    DIST2Z
04806                           DORG*-3Z
04806 43 04922 16592       TESTC4BD  NEXTI,MASTER+7Z
04818 21 14153 11449            A    S1,SZ
04830 16 04860 ‡1453            TFM  WHOLEX+6,ENTIREZ
04842 16 04865 08749            TFM  WHOLEX+11,CHOICTZ
04854 21 11453 08749       WHOLEXA   ENTIRE,CHOICTZ
04866 14 04865 ‡1446            CM   WHOLEX+11,CHOICT+150*18-3Z
04878 46 04922 01200            BE   NEXTIZ
04890 11 04860 00003            AM   WHOLEX+6,3,10Z
04902 11 04865 00003            AM   WHOLEX+11,3,10Z
04914 49 04854 00000            B    WHOLEXZ
04922                           DORG*-3Z
04922 43 05762 16590       NEXTI BD   RETURN+12,MASTER+5Z
04934 26 17639 17763       CHDISTTF   TITLE2+34*2-2,BYSEC+15*2-2Z
04946 39 17573 00400            WACDTITLE2Z
04958 39 16253 00400    0       WACDHEAD9Z
04970 39 16415 00400    0       WACDHEAD10Z
04982 16 15115 08746            TFM  CONST1,CHOICT-3Z
04994 16 05017 08439            TFM  K+11,KEYANS-298Z
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05006 26 08741 08439       K    TF   TEMP,KEYANS-298Z
05018 27 06004 15115            BT   CHLOC,CONST1Z
05030 26 05048 00099            TF   CRCTAN+6,00099Z
05042 32 00000 00000       CRCTANSF  00000Z
05054 14 05017 08737       TEST30CM  K+11,KEYANSZ
05066 46 05110 01200            BE   GOZ
05078 21 15115 08746            A    CONST1,QLGTHZ
05090 11 05017 00002            AM   K+11,2,10Z
05102 49 05006 00000            B    KZ
05110                           DORG*-3Z
05110 16 15101 00001    0  GO   TFM  NORITE,1,9Z
05122 16 05241 08749    0       TFM  CHOIA+11,CHOICTZ
05134 16 05301 08752    0       TFM  CHOIB+11,CHOICT+3Z
05146 16 05361 08755    0       TFM  CHOIC+11,CHOICT+6Z
1 05158 16 05421 08758  1       TFM  CHOID+11,CHOICT+9Z
1 05170 16 05481 08761  1       TFM  CHOIE+11,CHOICT+12Z
1 05182 16 05541 08764  1       TFM  CHOIF+11,CHOICT+15Z
05194 31 07984 15126       MOVECHTR  OUTPUT+11*2-3,ALPHAO-1Z
1 05206 27 06584 15101  1       BT   TNFSUB,NORITEZ
1 05218 26 07991 06583  1       TF   OUTPUT+14*2-2,ARGZ
05230 26 15110 08749       CHOIA TF   SCORE,CHOICTZ
05242 44 05266 15110            BNF  TFA,SCOREZ
05254 17 06424 00000            BTM  CALPCT,0,10Z
05266 27 06584 15110       TFA  BT   TNFSUB,SCOREZ
05278 26 08003 06583            TF   OUTPUT+20*2-2,ARGZ
05290 26 15110 08752       CHOIB TF   SCORE,CHOICT+3Z
05302 44 05326 15110            BNF  TFB,SCOREZ
05314 17 06424 00000            BTM  CALPCT,0,10Z
05326 27 06584 15110       TFB  BT   TNFSUB,SCOREZ
05338 26 08023 06583            TF   OUTPUT+30*2-2,ARGZ
05350 26 15110 08755       CHOIC TF   SCORE,CHOICT+6Z
05362 44 05386 15110            BNF  TFC,SCOREZ
05374 17 06424 00000            BTM  CALPCT,0,10Z
05386 27 06584 15110       TFC  BT   TNFSUB,SCOREZ
05398 26 08043 06583            TF   OUTPUT+40*2-2,ARGZ
05410 26 15110 08758       CHOID TF   SCORE,CHOICT+9Z
05422 44 05446 15110            BNF  TFD,SCOREZ
05434 17 06424 00000            BTM  CALPCT,0,10Z
05446 27 06584 15110       TFD  BT   TNFSUB,SCOREZ
05458 26 08063 06583            TF   OUTPUT+50*2-2,ARGZ
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05470 26 15110 08761          CHOIE TF  $CORE,CHOICT+12Z
05482 44 05506 15110                BNF TFE,SCOREZ
05494 17 06424 00000                BTM CALPCT,0,10Z
05506 27 06584 15110          TFE   BT  TNFSUB,SCOREZ
05518 26 08083 06583                TF  OUTPUT+60*2-2,ARGZ
05530 26 15110 08764          CHOIF TF  SCORE,CHOICT+15Z
05542 44 05574 15110                BNF TFF,SCOREZ
05554 31 07996 18482                TR  OUTPUT+17*2-3,NOTE3-1Z
05566 49 05622 00000                B   WRITEZ
05574                               DORG*-3Z
05574 27 06584 15110          TFF   BT  TNFSUB,SCOREZ
05586 26 08103 06583                TF  OUTPUT+70*2-2,ARGZ
05598 27 06584 16576                BT  TNFSUB,XAMANLZ
05610 26 08123 06583                TF  OUTPUT+80*2-2,ARGZ
05622 39 07965 00400    0     WRITE WACDOUTPUTZ
05634 24 15101 16581    0           C   NORITE,MASTER-4Z
05646 46 05750 01200    0           BE  RETURNZ
1 05658 11 15101 00001  1           AM  NORITE,1,10Z
1 05670 11 05241 00018  1           AM  CHOIA+11,18Z
1 05682 11 05301 00018  1           AM  CHOIB+11,18Z
1 05694 11 05361 00018  1           AM  CHOIC+11,18Z
1 05706 11 05421 00018  1           AM  CHOID+11,18Z
1 05718 11 05481 00018  1           AM  CHOIE+11,18Z
1 05730 11 05541 00018  1           AM  CHOIF+11,18Z
1 05742 49 05194 00000  1           B   MOVECHZ
05750                               DORG*-3Z
05750 39 17249 00400          RETURNWACDEXPLN1Z
05762 16 07989 00000                TFM OUTPUT+13*2-2,0,8Z
05774 45 05794 11450                BNR CKFLG,RECORDZ
05786 49 05954 00000                B   EXPLN2Z
05794                               DORG*-3Z
05794 44 01308 03290          CKFLG BNF NLESS1,SETSWZ
05806 33 03290 00000                CF  SETSWZ
05818 43 05898 16591          CKSW3 BD  CONSW4,MASTER+6Z
05830 31 14155 14627                TR  SCRCT-2,SCRCT2-2Z
05842 26 17487 17793                TF  TITLE1+39*2-2,OVERAL+15*2-2Z
05854 16 07967 00000                TFM OUTPUT+2*2-2,0,8Z
05866 44 05890 04070                BNF *+24,NOTEZ
05878 16 03970 04070                TFM NONE+18,NOTEZ
05890 49 03568 00000                B   PCHDIS+12Z
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05898                               DORG*-3Z
05898 43 05954 16592          CONSW4BD  EXPLN2,MASTER+7Z
05910 31 08747 11451                TR  CHOICT-2,ENTIRE-2Z
05922 26 17639 17793                TF  TITLE2+34*2-2,OVERAL+15*2-2Z
05934 16 07967 00000                TFM OUTPUT+2*2-2,0,8Z
05946 49 04946 00000                B   CHDIST+12Z
05954                               DORG*-3Z
05954 34 00000 00102          EXPLN2RCTY Z
05966 39 18347 00100                WATYNOTE2Z
05978 48 00000 00000                H     Z
05990 49 00402 00000                B   STARTZ
05998                               DORG*-3Z
                                    *SUBROUTINE TO CALCULATE LOCATION FOR A PARTICULAR CHOICEZ
06002     00005                     DS  5Z
06004 14 08741 00074    0     CHLOC CM  TEMP,74,10Z
06016 46 06310 01100    0           BH  ADJUSTZ
06028 14 08741 00000          ANSNONCM  TEMP,0,10,WAS QUESTION NOT ANSWEREDZ
06040 46 06272 01200                BE  A6Z
06052 14 08741 00074    0           CM  TEMP,74,10Z
06064 46 06192 01200    0           BE  A1Z
06076 14 08741 00073    0           CM  TEMP,73,10Z
06088 46 06212 01200    0           BE  A2Z
06100 14 08741 00072    0           CM  TEMP,72,10Z
06112 46 06232 01200    0           BE  A3Z
06124 14 08741 00071    0           CM  TEMP,71,10Z
06136 46 06252 01200    0           BE  A4Z
1 06148 14 08741 00070  1           CM  TEMP,70,10Z
1 06160 47 07654 01200  1           BNE ERROR4Z
1 06172 16 08741 00005  1           TFM TEMP,5,10Z
1 06184 49 06284 00000  1           B   MCB3Z
06192                               DORG*-3Z
1 06192 16 08741 00001  1     A1    TFM TEMP,1,10Z
1 06204 49 06284 00000  1           B   MCB3Z
06212                               DORG*-3Z
1 06212 16 08741 00002  1     A2    TFM TEMP,2,10Z
1 06224 49 06284 00000  1           B   MCB3Z
06232                               DORG*-3Z
1 06232 16 08741 00003  1     A3    TFM TEMP,3,10Z
1 06244 49 06284 00000  1           B   MCB3Z
06252                               DORG*-3Z
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2 06252 16 08741 00004     2  A4     TFM TEMP,4,10Z
2 06264 49 06284 00000     2         B   MCB3Z
  06272                             DORG*-3Z
  06272 16 08741 00006        A6     TFM TEMP,6,10Z
  06284 23 08741 08744     0  MCB3   M   TEMP,SMLGTH,,MULT CHOICE BY 3Z
1 06296 21 00099 06003     1         A   00099,CHLOC-1Z
  06308 42 00000 00000              BB   Z
  06310                             DORG*-9Z
1 06310 12 08741 00005     1  ADJUSTSM  TEMP,5,10Z
2 06322 49 06028 00000     2         B   ANSNONZ
  06330                             DORG*-3Z
  06330 14 08741 00000        CONVT CM   TEMP,0,10Z
  06342 46 06272 01200              BE   A6Z
  06354 12 08741 00070              SM   TEMP,70,10Z
  06366 14 08741 00000              CM   TEMP,0,10Z
  06378 46 07654 01200              BE   ERROR4Z
  06390 14 08741 00006              CM   TEMP,6,10Z
  06402 46 07654 01300              BNL  ERROR4Z
  06414 49 06284 00000              B    MCB3Z
  06422                             DORG*-3Z
                                 *SUBROUTINE TO CALCULATE PERCENT OF CORRECT ANSZ
  06423     00002                   DS   2Z
  06424 33 15110 00000        CALPCTCF   SCOREZ
  06436 45 06510 18626              BNR  DVIDE6,AUTODVZ
  06448 28 00096 15110              LD   00099-3,SCOREZ
  06460 29 00096 11449              D    00096,SZ
  06472 11 00096 00005        RND6   AM  00096,5,10Z
  06484 26 16576 00095              TF   XAMANL,00095Z
  06496 32 15110 00000              SF   SCOREZ
  06508 42 00000 00000              BB   Z
  06510                             DORG*-9Z
  06510 16 18651 06545        DVIDE6DIV  SCORE,S,0,4Z
        16 18759 15110
        49 18640 11449
           00096 00096
  06556 49 06472 00000              B    RND6Z
  06564                             DORG*-3Z
                                 *NUMERIC TO ALPHANUMERIC FILL SUBROUTINEZ
  06583     00020                 ARG  DS   20Z
  06584 16 06643 06582        TNFSUBTFM  T1+11,ARG-1Z
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  06596 16 06746 07007              TFM  DIGTST+6,NUMMFGZ
  06608 16 06751 06583              TFM  DIGTST+11,ARGZ
  06620 16 06758 07006              TFM  DIGTST+18,NUMMFG-1Z
  06632 44 06652 06582        T1    BNF  INCA,ARG-1Z
  06644 49 06672 00000              B    SUB1Z
  06652                             DORG*-3Z
  06652 12 06643 00001        INCA  SM   T1+11,1,10Z
  06664 49 06632 00000              B    T1Z
  06672                             DORG*-3Z
  06672 26 06695 06643        SUB1  TF   BD1+11,T1+11Z
  06684 43 06740 00000        BD1   BD   DIGTST,0Z
  06696 14 06695 06583              CM   BD1+11,ARGZ
  06708 46 06968 01200              BE   ARGZROZ
  06720 11 06695 00001              AM   BD1+11,1,10Z
  06732 49 06684 00000              B    BD1Z
  06740                             DORG*-3Z
  06740 25 07007 06583        DIGTSTTD   NUMMFG,ARGZ
  06752 15 07006 00007              TDM  NUMMFG-1,7Z
  06764 24 06751 06695              C    DIGTST+11,BD1+11Z
  06776 46 06832 01200              BE   FLGENDZ
  06788 12 06746 00002              SM   DIGTST+6,2,10Z
  06800 12 06758 00002              SM   DIGTST+18,2,10Z
  06812 12 06751 00001              SM   DIGTST+11,1,10Z
  06824 49 06740 00000              B    DIGTSTZ
  06832                             DORG*-3Z
  06832 26 06862 06758        FLGENDTF   FLGEND+30,DIGTST+18Z
  06844 26 06874 06746              TF   FLGEND+42,DIGTST+6Z
  06856 32 07006 00000              SF   NUMMFG-1Z
  06868 33 07007 00000              CF   NUMMFGZ
  06880 26 06581 07007        THRU  TF   ARG-2,NUMMFGZ
  06892 44 06942 06583              BNF  BB,ARGZ
  06904 15 06582 00001              TDM  ARG-1,1Z
  06916 15 06583 00004              TDM  ARG,4Z
  06928 33 06581 00000              CF   ARG-2Z
  06940 42 00000 00000              BB   Z
  06942                             DORG*-9Z
  06942 15 06582 00000        BB    TDM  ARG-1,0Z
  06954 15 06583 00000        TRARG TDM  ARG,0Z
  06966 42 00000 00000              BB   Z
  06968                             DORG*-9Z
```

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 06968 26 06581 15131        ARGZROTFF  ARG-2,ALPHAO+3*2-2Z
 06980 49 06892 00000              B    THRU+12Z
 06988                             DORG*-3Z
 07007     00020           NUMMFGDS   20Z
                         0   *SQUARE ROOT SUBROUTINEZ
 07015     00008           AAA    DS   8Z
 07016 26 07375 07015     0  SQRSUBTF   X,AAAZ
 07028 23 07375 07375     0         M    X,XZ
 07040 26 07391 00099     0         TF   X2,00099Z
 07052 13 07391 00003     0         MM   X2,3,10Z
 07064 21 00097 07015     0         A    00099-2,AAAZ
 07076 26 07409 00099     0         TF   DIVISR,00099Z
 07088 13 07015 00300     0         MM   AAA,300Z
 07100 33 00087 00000              CF   00099-12Z
 07112 32 00084 00000              SF   00099-15Z
1 07124 21 00099 07391    1         A    00099,X2Z
1 07136 26 07425 00099    1         TF   PAREN,00099Z
 07148 16 00079 00000              TFM  00099-20,0,8Z
1 07160 23 07425 07375    1         M    PAREN,XZ
1 07172 26 07449 00099    1         TF   DVND,00099Z
 07184 16 00079 00000              TFM  00099-20,0Z
 07196 16 00075 00000              TFM  00099-24,0,10Z
 07208 45 07288 18626              BNR  DVIDE7,AUTODVZ
1 07220 28 00099 07449    1         LD   00099,DVNDZ
1 07232 29 00092 07409    1         D    00100-8,DIVISRZ
1 07244 24 07375 00081    1  R7     C    X,00099-18Z
1 07256 46 07342 01200    1         BE   DONEZ
1 07268 26 07375 00081    1         TF   X,00099-18Z
1 07280 49 07028 00000    1         B    SQRSUB+12Z
 07288                             DORG*-3Z
 07288 16 18651 07323        DVIDE7DIV  DVND,DIVISR,7,8Z
       16 18759 07449
       49 18640 07409
          00099 00092
 07334 49 07244 00000              B    R7Z
 07342                             DORG*-3Z
 07342 11 07374 00005        DONE   AM   X-1,5,10Z
 07354 26 07015 07373              TF   AAA,X-2Z
 07366 42 00000 00000              BB   Z
 07368                             DORG*-9Z
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 07375     00008           X      DS   8Z
 07391     00016           X2     DS   16Z
 07409     00018           DIVISRDS   18Z
 07425     00016           PAREN  DS   16Z
 07449     00024           DVND   DS   24Z
 07450 34 00000 00102        ERROR1RCTY  Z
 07462 39 16847 00100              WATYE1Z
 07474 34 00000 00102              RCTY Z
 07486 39 17073 00100              WATYRSTPROZ
 07498 48 00000 00000              H    Z
 07510 49 01684 00000              B    SETAGNZ
 07518                             DORG*-3Z
 07518 34 00000 00102        ERROR2RCTY  Z
 07530 39 16909 00100              WATYE2Z
 07542 34 00000 00102              RCTY Z
 07554 39 17073 00100              WATYRSTPROZ
 07566 48 00000 00000              H    Z
 07578 49 01684 00000              B    SETAGNZ
 07586                             DORG*-3Z
 07586 34 00000 00102        ERROR3RCTY  Z
 07598 39 16963 00100              WATYE3Z
 07610 34 00000 00102              RCTY Z
 07622 39 17073 00100              WATYRSTPROZ
 07634 48 00000 00000              H    Z
 07646 49 00594 00000              B    RDMASTZ
 07654                             DORG*-3Z
 07654 44 07734 07654        ERROR4BNF  ERR4A,ERROR4Z
 07666 33 07654 00000              CF   ERROR4Z
 07678 16 02527 00137              TFM  MOVE+11,ANS-298Z
 07690 16 02583 00439              TFM  COMPAN+11,KEYANS-298Z
 07702 16 02539 00438              TFM  QOUT+11,KEYANS-299Z
 07714 16 15115 00746              TFM  CONST1,CHOICT-3Z
 07726 49 02516 00000              B    MOVEZ
 07734                             DORG*-3Z
 07734 32 07654 00000        ERR4A  SF   ERROR4Z
 07746 26 17871 08039              TF   E4A+38*2-2,OUTPUT+38*2-2Z
 07758 34 00000 00102              RCTY Z
 07770 39 17797 00100              WATYE4AZ
 07782 48 00000 00000              H    Z
 07794 49 01684 00000              B    SETAGNZ
```

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                07802                        DORG*-3Z
                07803   00080          0 DATA  DAS 80Z
                07963   00001          0       DAC 1,-Z
                07965   00080          0 OUTPUTDAS 80Z
                08125   00001          0       DAC 1,-Z
                08127   00005          0 NINE  DAC 5,99999Z
                08435   00300          0 ANS   DS  300Z
                08437   00001          0       DAC 1,-Z
                08737   00300          0 KEYANSDS  300Z
                08739   00001          0       DAC 1,-Z
                08741   00002          0 TEMP  DS  2Z
              1 08744   00003          1 SMLGTHDC  3,3Z
              1 08746   00002          1 QLGTH DC  2,18Z
              1 08749   00003 00900    1 CHOICTDSB 3,150*6Z
                11449   00003            S      DS  3Z
                11450   00001            RECORDDS  1Z
                11453   00003 00900      ENTIREDSB 3,150*6Z
                14153   00003            S1     DS  3Z
                14154   00001                   DC  1,-Z
              2 14157   00003 00151    2 SCRCT DSB 3,151Z
              2 14610   00003          2 N     DS  3Z
              2 14616   00006          2 SUM1  DS  6Z
              2 14625   00009          2 SUM2  DS  9Z
                14626   00001            ENDRCDDS  1Z
              1 14629   00003 00151    1 SCRCT2DSB 3,151Z
                15082   00003            N1     DS  3Z
                15088   00006            SUM3   DS  6Z
                15097   00009            SUM4   DS  9Z
                15098   00001                   DC  1,-Z
                15101   00003            NORITEDS  3,Z
              1 15104   00003          1 WRONG DS  3Z
              1 15107   00003          1 OMISONDS  3Z
              1 15110   00003          1 SCORE DS  3Z
                15115   00005            CONST1DS  5Z
              2 15124   00009          2 INTEGRDC  9,100000000Z
                15127   00050            ALPHAODAC 50,                                        ,Z
                15227   00021                   DAC 21,                    -Z
                15273   00006            SUBTRADS  6Z
                15279   00006            MEAN   DS  6Z
              2 15281   00050          2 HEAD1ADAC 50,    -        NAME                STUDENT     NUMBERZ
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              2 15381   00031          2 HEAD1BDAC 31,    NUMBER  NUMBER             -Z
              2 15443   00049          2 HEAD2ADAC 49,                                NUMBER      RIGHTZ
              3 15541   00032          3 HEAD2BDAC 32,     WRONG   OMITTED     SCORE -Z
                15605   00049            HEAD3ADAC 49,                                   SCORE     FREQ.Z
                15703   00032            HEAD3BDAC 32,     CUM     PERCENTILE         -Z
                15767   00050            HEAD4ADAC 50,                                          -Z
                15864                          DORGHEAD4A+50*2-3Z
                15865   00032            HEAD4BDAC 32,    FREQ.                       -Z
              1 15929   00050          1 HEAD5ADAC 50,                                        SUM OFZ
              1 16029   00031          1 HEAD5BDAC 31,   SUM OF SCORES               -Z
              2 16091   00050          2 HEAD6ADAC 50,                                  N     SCORESZ
              2 16191   00031          2 HEAD6BDAC 31,   SQUARED      MEAN      S.D.-Z
              2 16253   00049          2 HEAD9 DAC 49,        QUESTION  A         B          C         DZ
              2 16351   00032          2       DAC 32,          E  OMISSIONS   PERCENT-Z
              2 16415   00015          2 HEAD10DAC 15,          NUMBERZ
              2 16445   00043          2       DAC 43,                                    -Z
                16528                          DORGHEAD10+58*2-3Z
                16529   00023                  DAC 23,                  CORRECTZ
                16576   00003            XAMANLDS  3Z
              3 16585   00009          3 MASTERDS  9Z
                16656   00071            MASK   DS  71Z
                16659   00003            QNO    DS  3Z
                16661   00002            DENOM  DS  2Z
                16666   00005            HOLD   DS  5Z
                16671   00005            ONE50  DC  5,00150Z
                16681   00010          0 FACTR  DS  10Z
                16683   00002            WAIT   DS  2Z
                16685   00050            NOTE1  DAC 50,NEGATIVE SCORES ARE INCLUDED IN FREQUENCY FOR ZEROZ
                16785   00031                   DAC 31, SCORE.                  -Z
              1 16847   00031          1 E1     DAC 31,ERROR.  INCORRECT CARD NUMBER.-Z
              1 16909   00027          1 E2     DAC 27,ERROR.  CARD OUT OF ORDER.-Z
              1 16963   00050          1 E3     DAC 50,ERROR.  NUMBER OF CARDS PER STUDENT IS IN EXCESS OZ
              1 17063   00005          1        DAC 5,F 3.-Z
              1 17073   00050          1 RSTPRODAC 50,TO RESUME PROCESSING AFTER CORRECTING THE ERROR, PZ
              1 17173   00038          1       DAC 38,RESS THE START BUTTON ON THE CONSOLE.-Z
                17249   00045            EXPLN1DAC 45,   ASTERISK (*) INDICATES THE CORRECT ANSWER.Z
                17339   00036                   DAC 36,                                -Z
                17411   00041            TITLE1DAC 41,    -GRADE DISTRIBUTION                -Z
                17490                          DORGTITLE1+41*2-3Z
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17491     00041                    DAC 41,                                          -Z
17573     00041               TITLE2DAC 41,    -EXAM ANALYSIS                      -Z
17652                              DORGTITLE2+41*2-3Z
17653     00041                    DAC 41,                                          -Z
17735     00016               BYSEC DAC 16,BY SECTION     -Z
17764                              DORGBYSEC+16*2-3Z
17765     00016               OVERALDAC 16,- ALL SECTIONS -Z
17797     00049               E4A   DAC 49,ONE OF THE CARDS FOR STUDENT NO.       HAS AN UNAZ
17895     00049                    DAC 49,CCEPTABLE PUNCH AS AN ANSWER TO A QUESTION.  THISZ
17993     00049                    DAC 49, STUDENT,S EXAM CANNOT BE GRADED BY THE COMPUTER.Z
18091     00049                    DAC 49,  REMOVE THIS STUDENT,S EXAM FROM THE CARD READERZ
18189     00050                    DAC 50, STACKER AND THEN PRESS START ON THE CONSOLE TO REZ
18289     00029                    DAC 29,SUME PROCESSING OF THE EXAM.-Z
18347     00049               NOTE2 DAC 49,GRADING COMPLETED.  PRESS START ON THE CONSOLE TOZ
18445     00019                    DAC 19, START A NEW EXAM.-Z
18483     00050               NOTE3 DAC 50,THIS QUESTION NOT GRADED BY REQUEST OF THE INSTRUCZ
18583     00015                    DAC 15,TOR            -Z
18612 49  01684  00000        BRANCHB   SETAGN,,0Z
18625     00002               QPERC DC  2,50Z
18626     00001               AUTODVDC  1,-Z
18627     00001                    DC   1,-Z
18628 49  06330  00000        BRCH  B   CONVT,,0Z
00402                              DENDSTARTZ
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METHOD OF INCORPORATING CHANGES

1. To run program on machines which do not have automatic divide, remove the record mark from column 3 on card number 262 and put a record mark in card column 4 on the same card (card number 262).

2. To run data cards using a standard mark sense card and not splitting the mark sense columns. In card columns 1 and 2 on card number 262 put Xx where the xx represents the maximum number of questions possible on each data card. In addition remove the record mark from card column 1 on card number 263 and put a record mark in card column 2 on card number 263. Note that the answers on the input data cards must start in column 31 and that there must be at least two questions on each data card. The program is limited to five choices per question and these must be marked in the one to five areas of the marked sense card. Zero should not be used as an answer.

SAMPLE INPUT CARD