K201: The Computer in Business

Final Departmental Exam (C)

December 16, 1981

Signature _____

Name _____

Student Number _____

Instructor's Name _____

Section Number _____

This exam is worth 150 points. Although ample time is allowed, the student is advised to allocate his time wisely. If your response to a question requires more writing area, continue your response on the reverse of the page.

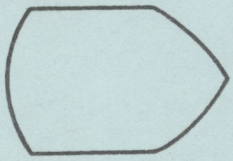
If you require assistance, raise your hand and a proctor will assist you at your seat.

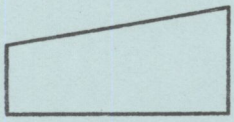
The following 17 questions are worth 3 points each.

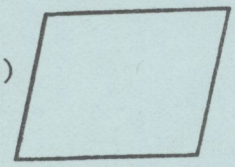
_____ 1. A programmer who develops support software is called:

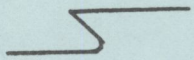
a) a systems analyst.
b) a systems programmer.
c) a support programmer.
d) an applications programmer.
e) none of the above.

_____ 2. In a system flowchart the symbol used to represent a terminal used to input data is

a) 

c) 

b) 

d) 

e) none of the above.

_____ 3. If the number 127.48 is stored in the computer as the value for the variable AMT, the output that would result when the variable AMT is printed according to the format specification F5.2 is:

a) *****
b) 127.4
c) 127.5
d) 127.48
e) none of the above.

_____ 4. Direct access files are maintained on the following type of device.

a) magnetic tape.
b) magnetic access.
c) magnetic character.
d) magnetic disk.
e) none of the above.

_____ 5. Consider FORTRAN execution time diagnostics. The fact that the value of a variable to be printed was calculated by dividing by zero is indicated by printing the following symbol in the output field:

a) @
b) I
c) *
d) X
e) none of the above.

_____ 6. The operating system does not perform the following function:

a) provides access to programs in the program library.
b) translates FORTRAN programs into machine language programs.
c) initiates and terminates jobs.
d) provides access to data in the files.
e) none of the above.

_____ 7. Which of the following constants is <u>invalid</u> in FORTRAN?

a) +523.1
b) 0
c) -.077
d) 5,421
e) none of the above.

_____ 8. In a system using sequential access (magnetic tape) files

a) we use index tables to locate the file record that corresponds to a given control key.
b) we use terminals to inquire about the status of file records.
c) we update a file record, change it, and write it back on the same tape.
d) in order to update the file we must collect a batch of transactions and sort them into the same sequence as the file.
e) none of the above.

_____ 9. When using a direct access file, one must locate the proper record in the file on the basis of a given value for the identification number of the desired record. The method by which the desired record is located is referred to as the file

a) initialization.
b) terminal.
c) organization.
d) conversion.
e) none of the above.

_____ 10. In a table, the function is:

a) the array that stores the values of the data element by which the table is entered.
b) the variable that is obtained from the table to be used in subsequent calculations.
c) the array that stores the values that are obtained from the table.
d) the variable that represents the value that is used to locate the desired line in the table.
e) none of the above.

_____ 11. Which of the following is an invalid FORTRAN variable name?

a) X100
b) K-201
c) ND4SK
d) ST1NG
e) none of the above.

____ 12. Consider the following program segment.

```
   K=0
 9 READ(5,10)QZ
10 FØRMAT(F5.0)
   IF(QZ.GT.20.)GØ TØ 15
   GØ TØ 9
15 K=K+1
```

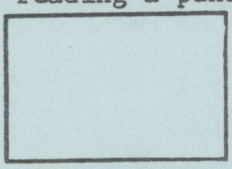
This program segment contains

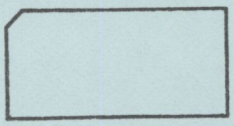
a) an uncontrolled loop.
b) a condition controlled loop.
c) a count controlled loop.
d) an infinite loop.
e) no loop.

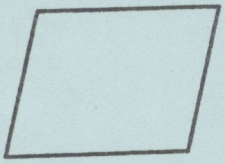
____ 13. When a record in a direct access file is revised or updated

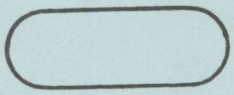
a) the new record is written on an output tape, and the old record on the input tape is available for file reconstruction.
b) a new record is written in a different place in the file.
c) the new record is written in the same place where the old record was located, thus destroying the old record.
d) the data elements to be changed are modified without reading or writing the other data elements in the record.
e) none of the above.

____ 14. In a program flow chart the symbol used to represent the operation of reading a punched card is

a) 

c) 

b) 

d) 

e) none of the above.

____ 15. The language that is used to tell the operating system what to do is called

a) the Data Manipulation language.
b) COBOL.
c) the operating system language.
d) the Job Control language.
e) none of the above.

____ 16. In order to determine the economic feasibility of a data processing system, we must develop a preliminary system design and then decide whether or not

a) the difference between the benefits from using the system minus the cost of running the system is large enough to justify the cost of developing the system.
b) the benefits from the system are greater than the costs of running the system.
c) the benefits from the system are greater than the cost of developing the system.
d) the benefits from the system are greater than the sum of the cost of developing the system plus the cost of running the system.
e) none of the above.

____ 17. Which operation would be performed first when the following FORTRAN expression is executed?

```
M**2-2*K/(3+L)+4
```

a) adding 3 and L
b) exponentiation
c) adding 4
d) dividing by 3+L
e) none of the above.

(3 pts) 18. Evaluate the following expression when I=4 and J=2: M=I**2/3*J

M= _____

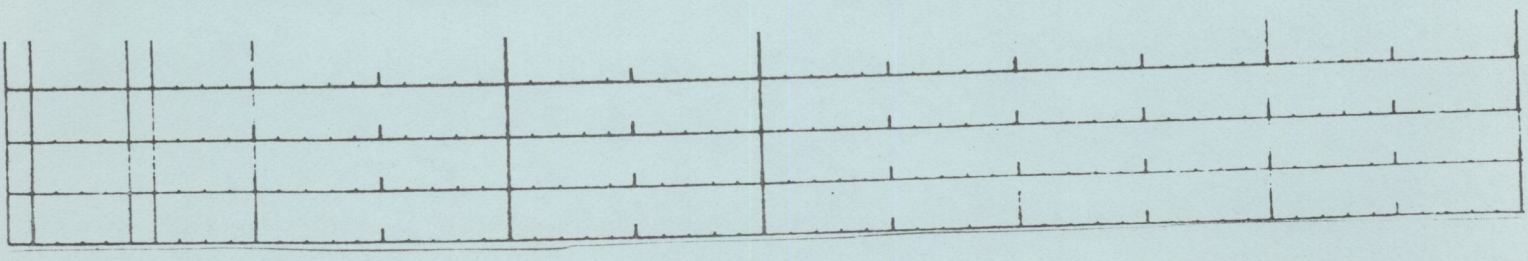
(4 pts) 19. Translate the following mathematical expression into an equivalent FORTRAN expression, taking care not to mix modes.

$$\frac{R^2-2T}{3S}$$

(4 pts) 20. In a previous portion of the program we have calculated the value of the variable AMT. We wish to print the following line

```
AMOUNT OWED IS XXXX.XX
```

where the words AMOUNT OWED begin in print position 40 and there is one blank between the word IS and the amount AMT represented by the XXXX.XX. On the coding form below, write the FORTRAN statements to print this line (single spaced).



21. Consider the array X with 10 elements shown below:

| | |
|---|---|
| X(1)=15. | X(6)=13. |
| X(2)=4. | X(7)=21. |
| X(3)=8. | X(8)=9. |
| X(4)=7. | X(9)=3. |
| X(5)=1. | X(10)=3. |

Provide the value of the indicated variables after each of the following program segments has been executed.

(2 pts) a)
```
I=3
T=X(7-I)
```

T=_____

(3 pts) b)
```
   T=0
   DØ 20 I=1,10,3
20 T=T+X(I)
```

T=_____

I=_____

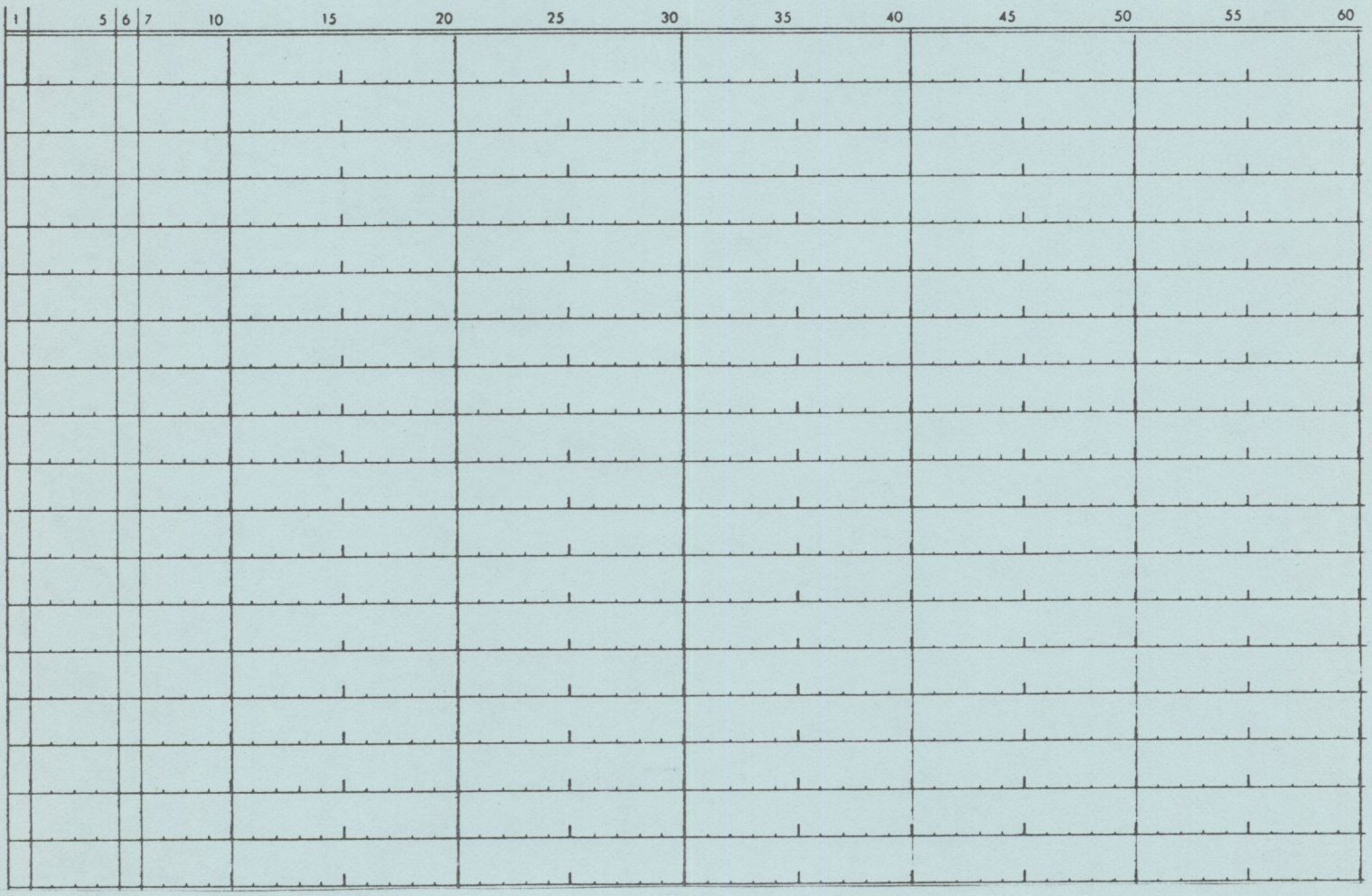
(3 pts) c)
```
   K=1
   DØ 30 I=2,10
   IF(X(K).GT.X(I))K=I
30 CØNTINUE
```

K=_____

(20 pts) 22. Consider a magnetic tape (number 12) containing records with the following layout:

| Positions | Variable Name | Description |
|---|---|---|
| 1-6 | ID | Identification Number |
| 7-30 | (provide your own) | Employee Name (Alpha numeric) |
| 31-33 | IDPT | Department Number |
| 34 | KSX | Sex Code (Female=1, Male=2) |
| 35-36 | NX | Number of exemptions |
| 37-41 | EARN | Weekly earnings (XXX$\wedge$XX) |

Write a complete FORTRAN program to read these records from tape number 12 and copy on tape number 14 those records for females with weekly earnings less than 500.00 per week. Be sure and terminate this program properly. (You may want to prepare a program flow chart before writing this program.)



23. We have student data cards with the following layout:

| Card Columns | Description of field |
|---|---|
| 1-7 | Student Identification Number |
| 8-30 | Student Name |
| 31-32 | State Code (Ind=32) |
| 33-34 | School Code (Bus=05) |
| 41-43 | Hours Completed |
| 44-46 | Quality Points Earned |
| 47-48 | Hours enrolled this semester |

We wish to read these cards and print out a list of all students from Indiana who are not in the Business School, giving name, hours completed, and GPA (Quality points divided by hours completed).

After all the cards have been read, we wish to print out the average hours currently enrolled for students from Indiana, and the average hours currently enrolled for all students from Indiana who are not in the Business School. The end-of-data card has a negative number in columns 1-7.

(20 pts) a) Prepare a detailed program flow chart for this program using the ANSI standard symbols.

(5 pts) b) Describe the test data cards that would be needed in order to debug this program.

(15 pts) 24. The Allcity Insurance Company maintains a punched card for each homeowner's insurance policy containing the following data:

| Card Columns | Description |
|---|---|
| 1-12 | Policy number |
| 13-14 | Coverage code (58 different codes) |
| 15-18 | Location code (500 different codes) |
| 19-20 | Year policy first established |
| 21-22 | Type of construction code (38 codes) |
| 23-25 | Age of building |
| 26-31 | Amount of Insurance (XXXXXX$_{\wedge}$) |
| 32-37 | Yearly premium (XXXX$_{\wedge}$XX) |

We wish to use these cards to prepare the following reports:

YEARLY PREMIUM BY AGE OF BUILDING
YEARLY PREMIUM BY LOCATION

Prepare a system flow chart (using standard symbols and conventions) for a system to prepare the above reports, using sorting to organize the data. You may assume that the cards have been punched and are available in off-line storage. (See following page.)

# FLOW CHART FOR QUESTION 24

25. The MISER credit card company punches the following card for each charge purchase made with one of its credit cards:

| Card Columns | Description |
|---|---|
| 1-12 | Charge card number |
| 13-18 | Merchant account number |
| 19-24 | Amount of charge (XXXX^XX) |

These cards are used to maintain a charge card file containing a record of the amount owed by each person with a charge card and an Accounts Payable file containing a record of the amount that MISER owes each merchant. These files are on magnetic tape.

20 pts) Prepare a system flow chart for a subsystem that updates both of these files and produces a charge card status report and an Accounts Payable status report.