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B.E. (Computer Science Engineering) Fourth Semester (C.B.S.)

System Programming

P. Pages : 3 **NJR/KS/18/4437**

Time : Three Hours * 0 6 0 8 * Max. Marks : 80

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Assume suitable data whenever necessary.
9. Use of non programmable calculator is permitted.

1. a) Illustrate the various instruction formats of IBM 360 with an example of each. **8**

b) What is the advantage of using a base resister for formation of address? What is the limitation of using base register and how can it be resolved? **5**

OR

2. a) i) Which of the following is not true about BALR instruction? **2+2+**

i) BALR is used to load base register. **1=5**

ii) If second operated of BALR is O, the execution proceeds with the next Instruction.

iii) BALR is a RX type of instruction.

a) Only i b) Only ii

c) Only iii d) ii and iii

Justify your answer.

ii) Definition of symbols and literals is done in pass 2 of assembler state true or false. Also justify your answers.

iii) Which of the following is not a static table.

a) Symbol table b) Machine op table

c) Pseudo op table d) None of the above

b) For the following AL code, generate the symbol table, literal table, base table and machine code using the 2 pass assembler algorithm. **8**

```
        START   0
BEGIN   BALR    15, 0
        USING   *, 15
        L       3, OLDOH
        A       3, RECPT
        S       3, ISSUE
        ST      3, NEWOH
OLDOH   DC      F'9'
RECPT   DC      F '4'
ISSUE   DC      F '6'
NEWOH   DS      F
        END     BEGIN
```

3. a) What is the difference between a macro and a subroutine call? **3**

b) Explain the features of a macro facility? **8**

c) List the names of databases used by a microprocessor, alongwith their contents. **3**

OR

4. For the given AL, generate the expanded code (ie. no macros) using an appropriate microprocessor algorithm. Also show the MDT, MNT and ALA after processing. **14**

```
        MACRO
        RTMNU   & Z
        MACRO
        & Z     & N
        AR      4, & N
        ST      1, ALL
        MEND.
        ST      & Z, ALL
        MEND
BEGIN START  O
        USING   *, 15
        RTMNU HELLO
        ST      2,3
        HELLO   FOURTH SEM
FOURTH SEM  EQU   20
ALL         DC    F'5'
            END
```

When does the inner macro get defined in MDT? Does the macro processor algorithm work correctly if macro definition is done after macro call?

5. a) Draw and explain the flowchart for pass-1 of Direct linking loader algorithm. **8**

b) Explain the concept of Dynamic binding. What are the advantages of dynamic binding over other loader schemes. **6**

OR

6. a) Consider the following program and identify each of the address constants below as absolute, simple relocatable or complex relocatable. **7**

```
PROGRAM     START     O
            ENTRY     MATH
            EXTRN     ABS
ONE         EQU       1
             ⋮
LOOP        …
MATH        …
             ⋮
BASE        …
             ⋮
            END
```

Address constants

i) A (ABS)

ii) A (BASE-LOOP+ONE)

iii) A (MATH)
iv) A (ABS-LOOP)
Also explain how the value of each address constant would be calculated and corrected?
(You need not show object deck).

b) How is a Local External Symbol Array (LESA) created? Is it necessary for a loader to create a separate LESA for every segment (Program)? Justify your answer. What is the role of LESA in pass 2 of Direct linking loader algorithm. **7**

7. a) Explain the format of symbol table in an object file. **6**

b) What is the use of symbolic debugger system utility? Illustrate the use of GNU Debugger with a suitable example. (Use various commands of GNU debugger) **7**

OR

8. a) Explain the 'Make' system utility. Illustrate with example various steps of creating and using make file and make command. **7**

b) Explain the source code control system. How is it used for version control? List the commands that are used in source code control system. **6**

9. a) Explain in detail the process for Driver installation on Unix system. **7**

b) Explain the anatomy of device drivers. **6**

OR

10. a) Explain the different types of Unix Device drivers. **8**

b) Compare the device drivers for Unix and windows operating systems. **5**

11. a) What is the significance of a 'Symbol Table' in compiler? Which phases of compiler refer/manipulate the symbol table? **5**

b) Explain the machine independent code optimization techniques of compiler. **8**

OR

12. a) Write a LEX program for counting the number of words in a given input string. Also explain the process of executing a LEX program. **8**

b) Explain each of the following term with an example of each: **5**
i) Pattern. ii) Token.
iii) Lexeme.

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High expectations are the key to everything.

~ Sam Walton