53 (CS 501) SYPR

2017

SYSTEM PROGRAMMING

Paper : CS 501

Full Marks : 100

Time : Three hours

**The figures in the margin indicate
full marks for the questions.**

*Answer **any five** questions.*

1. Answer **any four** from the following :

   (a) Explain the semantic gap and specification gap with diagrams.

   (b) Write down the two groups of system software and explain these all kinds of system software.

   (c) Briefly describe the bootstrap loader with example.

   (d) Mention the Intel 8086 based different types of assembler with their syntax.

   (e) Explain the variants of assembler.

   $4 \times 5 = 20$

2. (a) Describe the absolute loader and provide the solution to overcome the problem in this loader. 4

   (b) Explain the linking loader and linkage editor with the diagram. Mention the use of linking loader and linkage editor. 5

   (c) Explain the different types of BINDING in the linking. 3

   (d) How to recognize the Macro-call and also expand the macro-call ? Define the copy code and parameter substitution expansion with examples. 5

   (e) Mention the macro call, formal and actual parameters in the assembly program given below : 3

```
TEST1      START
           MACRO
&LAB       ADDX   &X1, &X2, &X3   // macro prototype in
                                     the macro definition
&LAB       Load   R4, &X1         // R4 is a register
           Add    R4, &X2
           Store  R4, &X3
           MEND
           ADDX   &D1, &D2, &D
           ADDX   &D, &D1&D2
LOOP       ADDX   &DI, &D2, &D
           ADDX   &D, &D1, &D2
D          DC     F'5'
D2         DC     F'10'
D2         DC     F'15'
           END
```

3. (a) Explain the OVERLAY concepts in details with the overlay tree also.

(b) Define the data structure for memory allocation and de-allocation in compiler, and describe the approach to identify the free memory.

(c) Explain the memory compaction with diagram and also define the techniques for fresh memory allocation.

(d) Explain the program relocation with formula.

(e) Explain the specification of tokens and also parser with the diagram.

5×4=20

4. Answer **any four** from the following :

(a) Explain the evolution and structure of UNIX, and the function of UNIX operating system.

(b) Define the use of environmental variables and also mention its different types.

(c) Explain the features for interacting with the UNIX shell.

(d) Explain the compiler with different phases in a diagram and also mention the list of data structures used in a compiler.

(e) Draw the diagrams of analysis and synthesis phases of a compiler and explain the syntax–directed translation with an example. 4×5=20

5. (a) Draw a UNIX hierarchial file system with details. 4

(b) Match the following given UNIX Commands and their operation in terminal/shell : 6

grep filter ⟶ To record the session

sort filter ⟶ To display the single occurrence

script Command ⟶ One particular field/character is extracted from a file or output of any command

uinq Command ⟶ To search a particular pattern in the file

be Command ⟶ To arrange the input in alphabetical order

Tr Command ⟶ To translate the characters taken from Std I/P or a file to upper case/ lower case

(c) State True **or** False : 10

    (i) Bourne shell was developed by Stephen Bourne.

    (ii) 'Pipes' are temporary files stored in memory.

    (iii) UNIX system consists of O/S that support program and services.

    (iv) Each Matrix is a Macro Calls by Operands of Arguments.

    (v) Terminal table is produced during Syntax analysis.

    (vi) Action routines are done by Lexical analyzer.

    (vii) Assembly code is generated in interpreter.

    (viii) Assignment of addresses to all statements in the program is done in Pass 2.

    (ix) Compiler translates the source code into executable machine code.

    (x) Relocation modifies the absolute addresses in the object program.

6. *(a)* Fill in the blanks with the appropriate words in the given options :

   (i) UNIX shell interacts with the _____ and_____.(*user/ kernel/ computer*)

   (ii) Wild card pattern is used to match a particular _____.(*pattern/ syntax*)

   (iii) Uniform symbol table (UST) is a _____size. (*fixed/ variable*)

   (iv) UNIX is written in_____ language. (*Java/ C/ C++*)

   (v) Lexical and syntactic phases are related to _____.(*Machine independent/ Machine dependent*)

   (vi) A standard name for executable files produced by C compiler is _____. (*a.out/ cc*)

   (vii) The Head command is used as a complement to the _____ command. (*tail/ more*)

   (viii) The _____command is used to display the lines which are duplicate in input file. (*uniq-d/ uniq-u/ Is-d*)

(ix) UST is created by _____. (*Lexical analyzer/Syntax analyzer*)

(x) Environment variables gives about the idea of various setting of _____. (*terminal/shell*)

10

(b) Differentiate between : *(any four)*

2·5×4=10

(i) LEX based compiler and YACC based compiler

(ii) User mode and Kernel mode (Unix System related)

(iii) Compiler-compiler and Cross compiler

(iv) Formal parameter and actual parameter

(v) Boot loader and Unix loader

(vi) Ambiguous grammar and Unambiguous grammar with example.

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