[3663] - 199

T.E.(COMPUTERS) 2003 Course
SYSTEMS PROGRAMMING   (310252)   Sem II

Time: 3hrs]   [Max. Marks :100

INSTRUCTIONS TO CANDIDATES
1) Answer any 3 questions from each section
2) Answers to the two sections should be written in separate books.
3) Neat diagrams must be drawn wherever necessary.
4) Figures to the right indicate full marks
5) Assume suitable data, if necessary.

SECTION –I

Q1.

a) Most assemblers that generate object code do not use chaining, but it can be done. Consider the following two approaches to one pass assembly.

i) All symbols which are undefined in the assembler at the time they are used are simply treated as external symbols, as if they were operands on an EXT directive. When a definition is encountered for a symbol which has previously been treated as an external symbol, that definition is exported, as if it had been the operand of an INT directive. Is this really chaining? Does this require any changes to the object code or linker? How does this change the scope rules of the assembly language?

ii) A new operation is included in the object code, 'follow chain'; this takes, as operands, the address of a link in the chain and the value which is to replace all links in the chain. Is this really chaining? What object code would the assembler generate when it sees a forward reference? How does this change the scope rules of the assembly language?   (10)

b) How are the literals handled in an assembler? Show all the data structures required for processing of literals. Give appropriate examples.   (08)

Q2.

a) Can macro-processor identify invalid instructions? Comment on your answer. **(04)**

b) What do mean by systems programming? Why we need them? **(02)**

c) Enlist the different data structures /data bases used for the design of PASS-II of a two pass macro-processor. Give the format of each one of these. **(06)**

d) What are the different ways in which we can specify arguments to a macro call? Explain with the help of examples **(06)**

Q3.

a) Suppose that a programming language requires an interpreter, what kind of loader scheme is required in this case? Justify your answer. **(04)**

b) How can a linker resolve symbols defined to be synonyms of externally defined symbols? Explain the data structures required for this purpose. **(08)**

c) What are the advantages and disadvantages of compile and go loader scheme? **(04)**

Q4.

a) What is linkage Editor? What is the essential between linkage editor and linking loader? **(08)**

b) Briefly discuss Dynamic linking with and without import. **(08)**

Q5.

  a) Explain the purpose of various phases of compiler. Clearly mention the required input and output generated by each of these phases. **(08)**

  b) What kinds of errors that can be detected in a source program during
    i) SYNTCATIC ANALYSIS   ii) CODE GENERATION **(08)**

Q6.

  a) What is Lexical analysis? Enlist the various databases /data structures used in lexical analyzer. Give the format of each of these. **(10)**

b) Compare the following:
  i) Lexical Phase and Syntax analysis phase
  ii) Machine dependent and machine independent code generation.
  iii) Compiler and Interpreter **(06)**

Q.7.

a) What is an Operating System? Explain basic functions of O.S.? **(08)**

b) For the following set of processes calculate the average waiting time and turn-around time for First Come First Serve, Shortest Job First, Round Robin . Also draw grant chart.

(10)

Process	Arrival Time	Burst Time
1	0	8
2	1	4
3	2	9
4	3	5

OR

Q.8.

a) What are system calls? Explain benefits of using it. **(08)**

b) Write an algorithm for scheduling of jobs using Round Robin method . Use this method to calculate turn around time for following sequence of jobs -

Process	Arrival Time	Burst Time
i	10	2
2	10	1
3	11	1
4	12	1

(10)

Q.9.

a) Explain the best-fit algorithm used for memory allocation. What are the advantages and disadvantages of it? **(08)**

b) Explain the need of paging. **(04)**

c) Differentiate between
   i) virtual address and physical address
   ii) segmentation and paging **(04)**

OR

Q.10.

    a) Given the memory partitions of size 100K, 500K, 200K, 300K and 600K (in order) , how would each of the first-fit, best-fit and worst-fit algorithms place the process of 212 K, 417K, 112K, 426K (in order)? Which algorithm makes the most efficient use of memory? **(10)**

    b) Discuss and compare with example various page replacement policies . **(06)**

Q.11. a) Explain various free space management techniques. **(08)**

    b) With example explain SSTF scheduling algorithm. **(08)**

OR

Q.12. a) Explain in brief :
    i) Programmed I/O   ii) Interrupt driven I/O **(08)**

    b) Explain and compare contiguous and linked allocation of disk space. **(08)**