

Time: 3 Hours

DECEMBER 2013

Max. Marks: 160

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE: There are 9 Questions in all.

- Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.
- The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.
- Out of the remaining EIGHT Questions answer any FIVE Questions, selecting at least TWO questions from each Part. Each question carries 16 marks.
- Any required data not explicitly given, may be suitably assumed and stated.

Q.1 Choose the correct or the best alternative in the following: (2×10)

a. _____ causes changes in the entry numbers of symbols, which interferes with the representation of a symbol in the intermediate code (IC).

- (A) Physical deletion
- (B) Logical deletion
- (C) Transferring the data
- (D) Sorting

b. Name the nonlinear data structure which permits allocation and deallocation of entries in a random order?

- (A) Stack
- (B) Base Pointer
- (C) Heap
- (D) LIFO

c. The lexical components of a source language can be specified by a set of _____.

- (A) Regular grammar
- (B) Regular expressions
- (C) Symbols
- (D) Identifiers

d. Which statement indicates an action to be performed during the execution of the assembled program?

- (A) Imperative statement
- (B) Declarative statement
- (C) Assembler directives
- (D) Program controlling statement

e. A _____ is enclosed between a macro header statement and a macro end statement.

- (A) Macro call
- (B) Macro definition
- (C) Macro pre-processor
- (D) Macro parameters

f. The _____ time of a user job is the time since its submission to the time its results become available to the user.

- (A) Latency (B) Turn-around
(C) Batch monitoring (D) Processing

g. _____ is the technique of temporarily removing inactive programs from the memory of a computer system.

- (A) Swapping (B) Time slicing
(C) Time sharing (D) Program pre-emption

h. OS performs the following actions when a new process is created:

- (i) Allocate the memory and other resources to the process.
(ii) Assign process id and priority
(iii) Create a process control block (PCB) for the process
(iv) Set up the process environment
(v) Initialize resource accounting information for the process.

What would be the correct sequence of the above actions?

- (A) 4, 3, 1, 2, 5
(B) 4, 3, 5, 2, 1
(C) 3, 2, 1, 4, 5
(D) 3, 4, 2, 5, 1

i. Given a set of deadlocked processes D , _____ implies breaking the deadlock to ensure progress for some processes $\{p_i\} \in D$.

- (A) Deadlock avoidance
(B) Deadlock detection
(C) Deadlock resolution
(D) Deadlock prevention

j. A process that is spending most time in paging than execution is called

- (A) Scanning (B) Thrashing
(C) Spooling (D) Swapping

PART A

Answer at least TWO questions. Each question carries 16 marks.

Q.2 a. What is an operating system? Discuss the various functions of operating system. (8)

b. Write the different ways in which the pthread terminates. (4)

c. Explain the various component of Process Control Block.

Q.3 a. List the various tasks involving Process scheduling. (5)

b. Write the actions taken by the time sharing scheduler. (5)

c. Give the algorithm for deadlock detection. Also mention the inputs and data structures used in algorithm. (6)

Q.4 a. Give a solution for reader-writers problem using conditional critical regions. (6)

b. What is a semaphore? Explain binary semaphore with the help of an example. (4)

c. Discuss the following:
(i) FS Actions at Open
(ii) FS Actions at Close (3×2)

Q.5 a. Discuss the two approaches used to identify and reuse free memory areas in a heap? (7)

b. Describe the First fit, Best fit and Worst fit allocation algorithms? Given memory partitions of 100K, 500K, 200K, 300K, and 600K (in order), how would each of the First-fit, Best-fit, and Worst-fit algorithms place processes of 212K, 417K, 112K, and 426K (in order)? Which algorithm makes the most efficient use of memory? (3+6)

PART B

Answer at least TWO questions. Each question carries 16 marks.

Q.6 a. With the help of suitable example, explain forward reference? (5)

b. Define Intermediate Representation? What are the desirable properties of Intermediate Representation? (2+3)

c. Explain the two approaches of collision handling methods? (6)

Q.7 a. Define the following:
(i) Finite state automaton (FSA)
(ii) Deterministic finite state automaton (DFA) (2×2)

b. Discuss LL(1) parser? Show the parser table for an LL(1) parser for Grammar given below.

$E ::= T E'$
 $E' ::= + T E' \mid \epsilon$
 $T ::= V T'$
 $T' ::= * V T' \mid \epsilon$
 $V ::= < id >$ (6)

c. What are the different information's contained by the object module of a program to relocate and link the program with other programs? (6)

- Q.8** a. Explain the following Assembler Directives:- (2)
- (i) ORIGIN
 - (ii) EQU
 - (iii) LTORG
 - (iv) START & END
- b. Discuss the different data structures used during Pass I of the Assembler. (8)
- Q.9** a. Discuss the issues involved that contributes to the semantics gap between a programming language domain and an execution domain? (6)
- b. What are the features used by compiler during implementing function calls? (4)
- c. Compare and contrast the following:
- (i) Static and Dynamic memory allocation
 - (ii) Call by value and Call by reference (3×2)