Code: AC59/AT59   Subject: Operating Systems And Systems Software

AMIETE – CS/IT (NEW SCHEME)

Time: 3 Hours   **DECEMBER 2011**   Max. Marks: 100

NOTE: There are 9 Questions in all.
- **Please write your Roll No. at the space provided on each page immediately after receiving the Question Paper.**
- **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. 'Fork' leads to a _____

      (A) Interrupt   **(B)** Exception
      (C) Child process   **(D)** Suspend process

    b. In pre-emptive scheduling,

      (A) a new request has to wait for its turn in a round robin fashion
      (B) shorter jobs get higher priority during scheduling
      (C) a new request can be serviced before the completion of a request scheduled earlier
      (D) scheduling is according to a pre-determined order

    c. Deadlocks can be avoided if

      (A) all requests for resources are made together and allocated together
      (B) the requested resources are allocated in a round robin fashion
      (C) the requested resources are allocated as and when they become idle
      (D) by changing the status of all the blocked processes to ready state

    d. Processes synchronization means

      (A) all processes start at the same time
      (B) one process starts as soon as another process ends
      (C) a process performs an action only when some other process(es) reach specific points in their execution
      (D) none of the above

e. Memory fragmentation occurs

   (A) when free but unusable memory areas are present in the system
   (B) when "divide by zero" error occurs
   (C) when overflow occurs
   (D) when there are no free memory areas available in the system

f. An assembler converts

   (A) assembly language to machine code
   (B) a high level language to machine code
   (C) it puts different parts of a program in an orderly manner
   (D) none of the above

g. A symbol table contains

   (A) all the symbols of all the programs currently running in the system
   (B) all the symbols of only threads
   (C) the symbols, their types and values pertaining to any one program
        that is being translated
   (D) None of the above

h. Semantic analysis is associated with

   (A) checking for typographical errors
   (B) checking for grammatical rules
   (C) checking if memory allocation is proper or not
   (D) none of the above

i   Linking table (LINKTAB) in an object module of a program P contains
    information pertaining to

   (A) all symbols of all modules P
   (B) Public definitions and external references in P
   (C)   all the linked lists used in P
   (D)   none of the above

j. Expansion of nested macro calls follows

   (A) last in first out (LIFO) rule
   (B) first in first out (FIFO) rule
   (C) it is predetermined by the Macroprocessor depending on the available
        Memory
   (D) User program has to specify the rule

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

Q.2 a. What are the functionalities of an operating system? **(10)**

b. A real time application requires a response time of 2 seconds. Discuss the suitability of a time sharing system for the real time application if the average response time in the system is **(6)**
   (i)   20 seconds,
   (ii) 2 seconds,
   (iii) 0.2 seconds.

Q.3 a. What is meant by scheduling? Explain Round robin scheduling briefly. **(8)**

b. Explain Resource Request and Allocation Graph (RRAG) with an example.**(8)**

Q.4 a. Define a critical section. List the properties of a CS implementation **(8)**

b. What two items of information is determined by File System (FS) when a user program U execute the call "open <file name>"? How FS determines these items of information? **(8)**

Q.5 a. Explain the Buddy system of memory management with an example. **(8)**

b. What do you know about memory compaction? Discuss briefly with an example. **(8)**

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

Q.6 a. Explain Lexical analysis, Syntax analysis and Semantic analysis for the following:
   a:= b* c assuming a,b are real and c is integer . **(12)**

b. Write the Binary search algorithm **(4)**

Q.7 a. Give a regular expression and DFA for a real number with an exponential part **(6)**

b. Write the algorithm for a MACRO expansion. **(10)**

Q.8 a. Discuss various features of assembly languages and techniques used in assemblers. **(8)**

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b. What are assembler directives? Explain different categories giving suitable example from each.   **(8)**

Q.9 a. How do you represent using indirect triples   **(8)**
$$a := p + q * r - s * t \uparrow u \,;$$
$$b := v + q * r$$

b. What is an interpreter? Discuss briefly three main components of the interpreter.   **(8)**