Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

II SEMESTER M.TECH. (SOFTWARE ENGINNERING)

END SEM EXAMINATIONS, APRIL 2018

SUBJECT: SOFTWARE ARCHITECTING AND TESTING [ICT 5222]

REVISED CREDIT SYSTEM

(19/04/2018)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates

- Answer ALL the questions.
- Missing data if any may be suitably assumed.

1A. Draw Control Flow Graph, calculate cyclomatic complexity by using of regions, edges and predicate nodes and identify independent paths. 5

```
int BinSearch (char *item, char *table[], int n)
{ int bot = 0;   int top = n - 1;
  int mid, cmp;
  while (bot <= top) {
    mid = (bot + top) / 2;
    if (table[mid] == item)
      return mid;
    else if (compare(table[mid], item) < 0)
      top = mid - 1;
    else
      bot = mid + 1; }
return -1; // not found }
```

1B. Define ripple effect. How it is related with Modifiability quality attribute? Explain preventive mechanism for same. 3

1C. How does the nature of an enterprise affect the architectures that it develops? How do the architectures affect the nature of the enterprise? 2

2A. Perform statistical usage testing with the following points for the given scenario. 5

The purpose of the Open Access Insurance System is to provide automotive insurance to car owners. Initially, prospective customers fill out an insurance application, which provides information about the customer and his or her vehicles. This information is sent to an agent, who sends it to various insurance companies to get quotes for insurance. When the responses return, the agent then determines the best policy for the type and level of coverage desired and gives the customer a copy of the insurance policy proposal and quote.

i) Identify the user profiles and define the characteristics for the same.

ii) Define the probability to different usage profiles.

iii) Explain two example test cases for all user profiles with the suitable data

2B. Write and explain all portions of scenario for following event: 3

"User initiates 1000 transactions per minute stochastically under normal operations and these transactions are processes with an average latency of two seconds."

2C. How do you know if the result provided by the software system is correct? Explain. 2

3A. With a neat diagram, explain software reconstruction phases in detail. 5

3B. "Consider an autonomous robot running in an office environment. It performs tasks like fetching objects, sending messages, guiding visitors, and night-time surveillance. In so doing, it interacts with human beings and other dynamic entities and acquires potentially useful knowledge of its environment. The robot has to continuously perform three distinct functions: 1) It perceives its dynamic environment in order to move and to get orders from human beings. 2) It reasons in order to interpret the perceived data, solve problems and determine actions to be triggered. 3) It acts on the environment. Different functions to be performed require various expertise. Modules specialized in various domains such as data interpretation or route planning has to be dynamically combined so that the robot can achieve its task." 3

Which architecture pattern is suitable for the above scenario? Justify

3C. What is Verification and Validation? How do they relate to defects? Explain. 2

4A. Draw Use-case diagram and Class diagram for following problem statement: 5

The Home appliance control system is controlled either by a cell phone or a by palm top or by a PC. It controls various appliance such as a microwave, sprinklers etc. The HACS system receives signals from the user either through wireless application protocol (WAP) or through Internet. The system in turn gives command to respective appliances. The system administrator of the HACS system has the ability to add or delete a new appliance and its operations. Also the system administrator can add or delete user. The user can give commands to existing device, get the status of a device and set the operation of a specific appliance. For example if the user wants to operate Microwave then he can give commands like Cook, Warm or Defrost. If the user wants to change his previously specified operation for a particular appliance he simply proceeds with his request. The HACS system in turn stops the current ongoing operation and processes the new request. The HACS system is highly adaptable to changes in environment. For example user can request through system administrator to add a new device to the existing system. He can operate the system using various remote devices, for example when he is out of the house, he can use a cell phone, when at home he can use a simple remote or there will be one remote system near each family member.

4B. Perform UMM based testing for the following problem statement and sensitize all the states and transitions. 3

A web-based application is to be developed in such a way that user can search other users, and after getting search complete, the user can send the friend request to other users. If the request is accepted, then both users are added to the friend list of each other. If one user does not accept the friend request, the second user can send another friend request. The user can also block each other.

4C. Which UML diagram supports for documenting the behavior in Software Architecture and how? 2

5A. Consider the Security and Performance quality attributes for "Online Shopping Website" and write two scenarios and two tactics for each attribute. 5

5B. Consider the program which reads three values in the range [0-200]. These 3 values represent the length of the sides of a triangle. The program displays a message establishes that the triangle is isosceles, equilateral and scalene. For the above triangle classification program: 3

i) Draw the cause effect graph and the decision table.

ii) Write the test cases for testing the program based on the cause effect graph.

5C. Explain the following terms in context of Agile Process in Software Architecting 2

i) Reloadus

ii) Oryzus