MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
A Constituent Institution of Manipal University

V SEMESTER B.TECH. (COMPUTER SCIENCE & ENGINEERING)
END SEMESTER EXAMINATIONS, NOV/DEC 2017

SUBJECT: SOFTWARE ENGINEERING [CSE 3104]
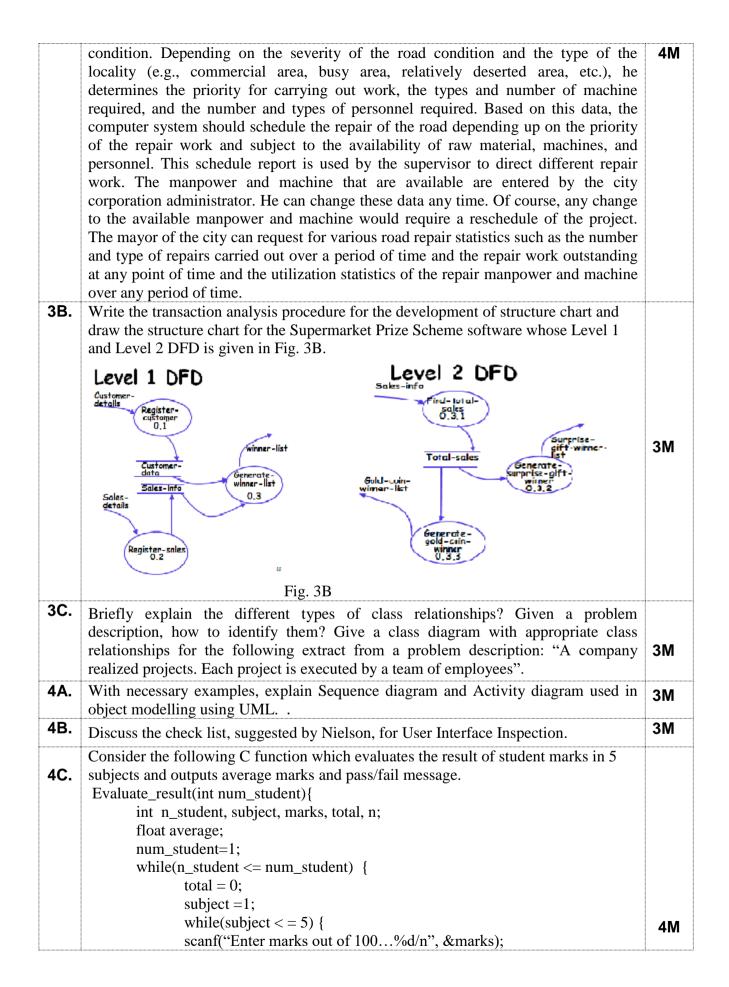### REVISED CREDIT SYSTEM
(20/11/2017)

Time: 3 Hours   MAX. MARKS: 50

Instructions to Candidates:

❖ Answer **ALL FIVE** questions.
❖ Missing data may be suitable assumed.

1A.	With a neat schematic diagram, explain the different phases of Incremental model of Software Development. What are its advantages?	**3M**
1B.	List the important principles behind Agile model. Compare its characteristics with RAD model. How you select a suitable life cycle model for a specific project?	**4M**
1C.	What do you understand by requirements gathering? Name and explain any four requirements gathering techniques that are generally used by an analyst.	**3M**
2A.	How to identify and document the functional requirements? Illustrate by an example with two or more scenarios.	**3M**
2B.	Explain the techniques, decision tree and decision table, used for representing complex logic with necessary examples. Also, distinguish the techniques.	**4M**
2C.	Algebraically specify a data type Point, that supports the following operations: create, xcoord, ycoord, move, movex, movey. The informal meanings of these operations are the following—create takes two integers as its arguments and creates an instance of point type that has the two integers as its x and y coordinate values respectively, xcoord and ycoord return the x and y-coordinates of a given point, move takes a point and two integer values as its argument and sets the x and y-coordinates of point to the specified values, movex takes a point and an integer value as its argument and sets the x-coordinate of the point to the given integer value. Similarly, movey takes a point and an integer value and sets the y-coordinate of point to the given integer value. Reduce the following expression, clearly showing each step and mentioning the reduction rule used. xcoord(movex(create(20,100), ycoord(create(10,50)))	**3M**
3A.	Draw a level 0 and level 1 data flow diagram and corresponding data dictionary for the following RRTS software. Road Repair and Tracking Software (RRTS) to be developed for automating various book keeping activities associated with the road repairing task of the Public Works Department of the Corporation of large city. Road Repair and Tracking System (RRTS): A city corporation has branch offices at different suburbs of the city. Residents raise repair requests for different roads of the city. These would be entered into his computer system by a clerk. Soon after a repair request is raised, a supervisor visits the road and studies the severity of road	

	condition. Depending on the severity of the road condition and the type of the locality (e.g., commercial area, busy area, relatively deserted area, etc.), he determines the priority for carrying out work, the types and number of machine required, and the number and types of personnel required. Based on this data, the computer system should schedule the repair of the road depending up on the priority of the repair work and subject to the availability of raw material, machines, and personnel. This schedule report is used by the supervisor to direct different repair work. The manpower and machine that are available are entered by the city corporation administrator. He can change these data any time. Of course, any change to the available manpower and machine would require a reschedule of the project. The mayor of the city can request for various road repair statistics such as the number and type of repairs carried out over a period of time and the repair work outstanding at any point of time and the utilization statistics of the repair manpower and machine over any period of time.	**4M**
3B.	Write the transaction analysis procedure for the development of structure chart and draw the structure chart for the Supermarket Prize Scheme software whose Level 1 and Level 2 DFD is given in Fig. 3B. Fig. 3B	**3M**
3C.	Briefly explain the different types of class relationships? Given a problem description, how to identify them? Give a class diagram with appropriate class relationships for the following extract from a problem description: "A company realized projects. Each project is executed by a team of employees".	**3M**
4A.	With necessary examples, explain Sequence diagram and Activity diagram used in object modelling using UML. .	**3M**
4B.	Discuss the check list, suggested by Nielson, for User Interface Inspection.	**3M**

4C.	Consider the following C function which evaluates the result of student marks in 5 subjects and outputs average marks and pass/fail message.
	
	Evaluate_result(int num_student){
	    int n_student, subject, marks, total, n;
	    float average;
	    num_student=1;
	    while(n_student <= num_student) {
	        total = 0;
	        subject =1;
	        while(subject < = 5) {
	        scanf("Enter marks out of 100…%d/n", &marks);
		4M

```
                    total = total + marks;
                    subject ++;
                    }
                    average = total / 5;
                    if(average >= 50)
                            printf("PASS..Average marks are %f\n", average;)
                    else
                            printf("FAIL..Average marks are %f\n", average);
                    n_student++;
                }
            Printf("End of Evaluation\n");
        }
```

(a) Determine the cyclomatic complexity metric of the function using all the three methods.

(b) Design a test suite for the function that satisfies the following white-box testing strategies (Show the important steps in your test suite design method).
   i. Statement coverage ii. Branch coverage iii. Multiple Condition coverage
   iv. Path coverage

5A.	Explain the techniques, (i) equivalence class partitioning, (ii) data-flow based testing and (iii) error seeding, used in Testing phase.	**3M**
5B.	(i) List any two shortcomings of LOC metric, in project size estimation, resolved by Function Point(FP) metric. (ii) Explain the different steps used in FP metric computation. (iii) Given a module with 3 inputs(1-simple, 2- average), 3 outputs(1-simple, 1-average, 1-complex), 2 inquiries(both average), 2 files(both complex) and 1 interface(average), determine the function point measure of the module size. Assume that various project characteristics determining the complexity of software development to be average(value = 4).	**4M**

Table 5.B: Refinement of Function Point Entities

Type	Simple	Average	Complex
Input	3	4	6
Output	4	5	7
Inquiry	3	4	6
Files	7	10	15
Interfaces	5	7	10

5C.	With a neat schematic diagram, briefly explain the three software development organization structures. Write one drawback of each organization structure.	**3M**

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