LNMIIT
The LNM Institute of
Information Technology

The LNM Institute of Information Technology
Department: Computer Science and Engineering
Software Engineering (CSE 0326)
End Term Examination

Time: 3 Hours   Date: 07.12.2019   *Ujjawal Kumar*   Max. Marks: 100

17UCS171

Instructions:
1. All the questions are compulsory.
2. Each question carries 20 marks.
3. The first sub-part (a) of each question must be attempted compulsorily.
4. Out of the remaining three sub-parts (b,c,d) in each question, attempt any two questions.
5. Make and state appropriate assumptions, if and when required.

---

1. (a) Which one of the SDLC models suits best for the following applications? Give justification. [4]
    - i. A new system for comparing fingerprints.
    - ii. A satellite launching system where it is not known if the current hardware and software technology is mature enough to achieve the goals.
    - iii. A new missile tracking system.
    - iv. A data entry system for office staff that have never used computers before. The user interface and user friendliness are extremely important.

   (b) Draw the block diagram of Win-Win Spiral model. Explain its three anchor points. Explain the three key advantages of this model. [2+3+3]

   (c) Draw the block diagram of component assembly model. Explain the RAD model with its different phases in brief using its block diagram. [2+4+2]

   (d) Explain in brief about the formal specification based model. Explain the linear sequential model with its block diagram. [2+3+3]

2. (a) Define the terms preliminary design review, critical design review, inspection, and walk-through. [4]

   (b) Explain the three user interface design principles. Explain the milestone activity in brief. [6+2]

   (c) The following information domain characteristics are provided for a project: Number of user inputs=32, number of user outputs=60, number of user inquiries=24, number of user files=8, and number of external interfaces=2. Assume that all the complexity adjustment values are average such that the corresponding weighing factors are 4,5,4,10, and 7 respectively. Assume that the FP computation uses 14 algorithms for counting.
    - i. Draw the table showing the function point computation. [5]
    - ii. Compute the FP value of the project. [3]

SWE

Next page, Please...

(d) Explain the user interface design process with a brief description of the four framework activities included in user interface design. Draw a neat block diagram of user interface design process. [6+2]

3. (a) Draw the neat block diagrams of Democratic Decentralized, Controlled Decentralized, and Controlled Centralized team structures. Define the reactive and proactive risk strategies. [3+1]

(b) Observe the following source code carefully and use Halstead's metrics for further calculations using the notations of the metrics provided herewith.

```
int  i, j, k, l, m;
for(i = 0; i <= 10; i + +)
{
    if(i > 5)
    {
        printf("%d", i);
        break;
    }
}
```

i. Calculate the value of total number of operators (N_1) and operands (N_2), total number of distinct operators (n_1) and operands (n_2), and total number of single appearance of operators (n_1^*) and operands (n_2^*) in the given source code. [3]

ii. Calculate the values of vocabulary (n), program length (N), length equation (N'), program volume (V), potential volume (V^*), program level (L), program level equation (L'), intelligent content (I), effort equation (E), and time equation (T'). Assume that the time taken (s) to understand the source code is 10 seconds. [5]

(c) Explain the 4P's of software project management. [8]

(d) Answer the following.

i. Define the term "software project management". [1]

ii. Explain in brief about the software metrics. Define the size oriented metrics and function oriented metrics. [2+1]

iii. Give examples of four direct and four indirect measures of software metrics. [4]

4. (a) There is a need to develop a CAD application, the task of which is allotted to the development team. The responsibility of the team members is to understand the nature of project and develop it on time. You are one of the team members working on the project. During the development, it is found that the code written is of size 33.2 KLOC. The effort adjustment factor is assumed to be 10.2. Solve the questions by referring the table given below.

Mode/Parameter	a_b	b_b	c_b	d_b	a_i	b_i
Organic	2.4	1.05	2.5	0.38	3.2	1.05
Semi-detached	3.0	1.12	2.5	0.35	3.0	1.12
Embedded	3.6	1.20	2.5	0.32	2.8	1.20

i. Using the basic COCOMO model, calculate the effort, duration, and number of people involved in the project. Specify the unit of each calculated parameter. [3]

    ii. Using the intermediate COCOMO model, calculate the effort of the team of developers. Specify the unit of effort in your solution. [1]

(b) Answer the following questions.
    i. Explain four point of difference between build, release and version. [4]
    ii. Define the following terms: Testing, Error, Fault, and Failure. [4]

(c) Define the terms 'Verification' and 'Validation'. Explain the two categories of verification. Give four point of difference between verification and validation. [2+2+4]

(d) Define Software Configuration Management. Explain baseline and version control in brief. Differentiate between quality control and quality assurance. Explain the four step process adopted whenever there is a change control necessary during the software configuration management. [1+4+1+2]

5. (a) Observe the flow graph carefully and answer the questions given below.
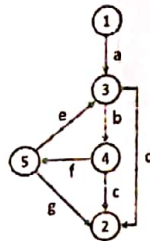
    i. Draw the graph matrix and connection matrix corresponding to the flow graph. [2]
    ii. Calculate the cyclomatic complexity using the connection matrix drawn in the previous question. [2]

(b) The function for finding whether the triangle is scalene, isosceles, equilateral , or not a triangle is given below.

```
void check(int a,int b,int c)
{
  if(a==b&&b==c&&c==a)
    printf("Triangle is equilateral");
  else if(a!=b&&b!=c&&c!=a)
    printf("Triangle is scalene");
  else if(a==b||b==c||c==a)
    printf("Triangle is isosceles");
  else if((a+b)<c||(b+c)<a||(c+a)<b)
    printf("Not a triangle");
}
```

    i. Draw the corresponding flow chart and flow graph for the function. [2+2]
    ii. Calculate the cyclomatic complexity of the problem using all three formulae. [1.5]
    iii. Enlist the independent paths associated with the problem. [2.5]

(c) Draw the block diagram depicting the different software testing strategies. Explain four major categories of maintenance in detail. [4+4]

(d) Define the terms: configuration review, alpha testing, beta testing, recovery testing, security testing, stress testing, performance testing, and smoke testing. [8]