06/12/17

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TCS–302/TIT–302

B. Tech. (CS/IT) (Third Semester)
End Semester EXAMINATION, 2017
SOFTWARE ENGINEERING

Time : Three Hours] [*Maximum Marks : 100*

Note : (i) This question paper contains five questions.

(ii) All questions are compulsory.

(iii) Instructions on how to attempt a question are mentioned against it.

(iv) Total marks assigned to each question are **twenty.**

1. Attempt any *two* questions of choice from (a), (b) and (c). (10×2=20 Marks)

   (a) Describe the concept of Halstead's Software Science. For the following C program estimate the Halstead's length and volume measures :

```
void main( )
{
    float x, y, z, avg, sum = 0;
```

```
scanf("%f%f%f", &x, &y, &z);
sum = x + y + z;
avg = sum/3.0;
printf("average of numbers = %f", avg);
}
```

(b) What did Fred Brooks mean by the terms Accidental and Essential Complexity ? Can you define any recent improvement in terms of essential complexity, post the introduction of the Object Oriented Software Languages ? Any specific case study can be used.

(c) Discuss Requirement Engineering in detail, including in detail, all of the underlying tasks.

2. Attempt any *two* questions of choice from (a), (b) and (c). (10×2=20 Marks)

(a) Why is Cyclomatic Complexity used ? Draw a control flow graph for the program given below :

```
insertion_procedure (int a[ ], int p [ ], int N)
{
    int i, j, k;
    for (i = 0; i < = N; i ++) p [i] = i;
    for (i = 2; i < = N; i ++)
    {
```



```
        k = p [i];
        j = 1;
        while (a[p[j – 1]] > a [k]) {p [j] =
                                    p [j – 1]; j – –)
    p [j] = k;
    }
}
```

Find cyclomatic complexity based on CFG of the above mentioned code section. Assume there is no error in the program.

(b) Discuss all levels of the CMMI Model in detail. Make your answer sound relevant and understandable, not just jargon filled. Analogies should help.

(c) What are the different types of maintenance that a software product might need ? Why are these required ?

3. Attempt any *two* questions of choice from (a), (b) and (c). (10×2=20 Marks)

(a) Describe Function based metrics for measuring the functionality delivered by a system. Consider a project with the following functional unit :

Number of user input = 100
Number of user output = 80
Number of inquiries by user = 70
Number of user files = 12
Number of external interface = 08

Assume all Complexity Adjustment Factors and Weighing Factors as average. Calculate the Function Point for the aforementioned system.

(b) Design a black-box test suite for a function named "quadratic solver". The function accepts three floating point numbers (a, b, c) representing a quadratic equation of the form :

$$a(x)\hat{}2 + bx + c = 0$$

It computes and displays the solution.

(c) What are your views on the usage levels of the software development methodologies in the actual software industry ? Do you believe that developers and testers are really worried about the compliance with the standards of their software development methodoloy ? If yes, why and if no, then why not. Also, do these relevance standards differ for product based organizations and service based organizations. If yes, why and if no, why not ?

4. Attempt any *two* questions of choice from (a), (b) and (c). (10×2=20 Marks)

(a) In a scenario where you are a job aspirant as a developer in a reputed software firm, you

encounter a major MNC hiring for the role of a Software Tester at your campus. You face the question "Why Testing are not development ?" In such a scenario, explain in detail all possible arguments to convience the interviewer that being hired as a tester offers you more opportunities on the technical and financial front.

(b) Write short notes on the following :

(i) Sotware Re-Engineering

(ii) Difference between Cohesion and Coupling

(iii) Automation Test Cases

(iv) Equivalence Class Testing

(c) Discuss the salient points of design engineering in detail. Also differentiate between top down and bottom up approach.

5. Attempt any *two* questions of choice from (a), (b) and (c). (10×2=20 Marks)

(a) "The requirement traceability matrix is an important tool in adjudging the completeness of the flist." Justify this statement. Clarify whether or not the RTM is an evolutionary artifact. Give reasons to support your answer.

(b) Uncover *five* important shortcomings or problems with the AGILE development model in the current industry scenario. Also, discuss, what would in your opinion, be the next big thing in software development methodologies.

(c) Draw a detailed comparison between Classical Waterfall Model and Iterative Waterfall Model. Which one of the two is the more preferred format and why ? Also, discuss the various advantages that the category of "Iterative" models enjoy in general.