INSTITUTE OF INFORMATION TECHNOLOGY
JAHANGIRNAGAR UNIVERSITY
SECOND SEMESTER M.SC. FINAL EXAMINATION 2018
[IN INFORMATION TECHNOLOGY]

Time: 3 Hours IT 5205: Software Project Management and Quality Assurance Full Marks: 60

Answer any FIVE (05) from the following questions. Figures at the right indicate the marks.

1. a) What is a project? "Software projects are different from other projects", do you agree with this statement? Justify your answer. [3]

   b) Define the word "stakeholder" in relation to an IT development project. Suppose, you work for a small research organization. It is part of a group of similar research organizations, each operating in a different part of the country. At the moment each of these organizations uses a different main computersystem. It has been decided that the computer system used by your organization should be extended and then used by all of the other organizations, to replace their existing systems. A network would be set up linked to the main server, which would be located in your organization'soffices. List at least three different types of stakeholder in this new project. Identify their main concerns and their stake in the project. [5]

   c) Briefly describe how rapid prototyping can be used with the waterfall model to address its major weakness. [4]

2. a) How strategic assessment and program management is related? Explain in brief. [2]

   b) Initial investment for project A, B and C is $40,000; $40,000 and $200,000 respectively. Assume a discount rate of 5%. Which project would you now select for development based on the value of NPV and ROI? [4]

Table 1: Projected cash flow for project A, B and C

Year	Project A($)	Project B($)	Project C ($)
1	5,000	20,000	55,000
2	10,000	25,000	55,000
3	15,000	15,000	55,000
4	25,000	10,000	55,000
5	20,000	5,000	55,000

   c) What do you mean by Risk evaluation? Suppose, You're doing a prototype for your project, but you're not sure whether to proceed with this prototype. If you do the prototype, it will cost you $100,000; and, of course, if you don't pursue it, there will be no cost. If you do the prototype, there is 30 percent chance that the prototype might fail, and for that the cost impact will be $50,000. However, if the prototype succeeds, the project will make $500,000. If you do not do any prototype, you're already taking a risk, the chance of which is 80 percent with a failure impact of $250,000. But, again, without a prototype, should you succeed, the project will make the same money as mentioned before. What should you do? Explain with decision tree risk analysis. [6]

3. a) The following two sets of C code represent three LOC each. Discuss the problem associated with counting each set the same when doing cost estimation. [2]

```
for(i=0; i<10; i++) x = x + 12;
if(x > 120) printf ("Error, overload!\n");
x = 0;
```

```
if((a < b && c > d ) || (cos(x)*tan(y) >= sqrt(sin(x)*cos(y))))w+=2;
for(j=0,k=0,l=0; j<10, k>-10, l>=-20; j++, --k, --l) x=j+2*k+4*l;
while(a > b && c < d) sum(fun1(12),fun2(13),a,c);
```

ven project has 5 user inputs, 10 user outputs, 7 inquiries, 5 files, and 3 external interfaces. All of these are average complexity except 2 of the inputs are complex, two of the outputs are complex, and one of the outputs is simple. Complexity factors are all moderate except that the system will require a significant amount of online data entry, and it is essential that the code is designed with reuse in mind. Calculate the number of Function Points for this system.

Complexity factors adjustment weight is given below:

Degree of Influence	Weight
Not present	0
Incidental	1
Moderate	2
Average	3
Significant	4
Essential	5

c) Given the following COCOMO constants table: [3×2=6]

Application	a	b	c	d
Organic	2.4	1.05	2.5	0.38
Semi-Detached	3.0	1.12	2.5	0.35
Embedded	3.6	1.20	2.5	0.32

Assume that you are using Cocomo cost estimation model in your project. A person on your team who has done this before estimates the total lines of code to be 400,000 LOC. Required software reliability is very high, product complexity is high, memory constraint high, all the members on your team are very inexperienced and new and analyst capability is high. The program must be written in C and nobody on your team has written a C program in the last year. The team is very fluent in Linux. All other factors can be considered to be nominal.

i. Calculate total effort needed for this project.

ii. Calculate the total duration of this project in months.

4. a) Your company is expanding rapidly and has decided to buy in and install an off-the shelf (O-T-S) ledger package to replace the existing manual system. This will need new equipment and network cabling throughout the offices. You are to manage this project. You have drawn up an outline project plan to include the following main tasks. Draw a work breakdown structure (WBS) diagram for the project, to show all the planned tasks. This WBS should contain at least two levels. [3]

Activity	Task	Weeks	Labour
A	Interview accounts staff, draw up and agree a list of main requirements	6	3
B	Assess alternative O-T-S packages and select the most appropriate.	6	2
C	Specify and order all the required new hardware and communications equipment.	3	4
D	Test and install all the new hardware and equipment.	9	3
E	Modify and test the package software.	15	4
F	Install the package software	1	2
G	Specify and obtain the accounts data required to implement the system	6	4
H	Draw up a training plan.	3	2
I	Train the users	9	2
J	Draw up an acceptance test plan	3	3
K	Acceptance testing	4	4
L	Load data and implement the new system.	3	2

b) Draw the network diagram for the project, showing all dependencies and floats and highlighting the critical path according the dependencies between the 12 tasks listed above are: [6]

- B depends on A
- C, E, H and J all depend on B
- D depends on C
- F depends on D and E
- G depends on E
- I depends on H
- K depends on F, I and J
- L depends on G and K

c) In the above network manually level your resource so that you may not use more than 10 laborers per day at any time. [3]

5. a) Why rational is important for software development? [3]

b) You have buy a toy for a 5 years old boy. You have three options like soft toys, picture puzzles and video games. Your criteria for choosing are cost, age suitability and boy's likeness. Find the best choice. [4]

c) How issue model works? [3]

d) Write the correct term for the given statements: [½×4=2]

i. The required attributes of a product or process playing an important role in quality management.

ii. It is concerned with deriving a numeric value for an attribute of a software product or process.

iii. The correctness, completeness, and consistency of the requirements model will have a strong influence on the quality of all work products that follow.

iv. It sets out the desired product qualities and how these are assessed and defines the most significant quality attributes.

6. a) How agile makes project planning and scheduling simple? What is the most complicated part in agile process? [4]

b) Define the following terms: [2×3=6]

i. Black box testing

ii. White box testing

iii. Coverage based testing

c) Mention the risk identification factors. [2]

7. a) Table 2 showing Tasks, durations, and dependencies of a project. Draw an activity bar chart using today's date as starting date. Find the finish date. [5]

Table 2: Task Dependencies

Task	Effort (person-days)	Duration (days)	Dependencies
T_1	15	10	
T_2	8	15	
T_3	20	15	T_1 (M_1)
T_4	5	10	
T_5	5	10	T_2, T_4 (M_3)
T_6	10	5	T_1, T_2 (M_4)
T_7	25	20	T_1 (M_1)
T_8	75	25	T_4 (M_2)

b) Write the expression for algorithmic cost model and empirical cost model. If for any project size (LOC) of the product is 33,200, B=0.34, P= 620 and the duration of the project is 3 month; then find the estimated efforts. If Burdened labor rate is 20000tk per month, then find the estimated cost. [5]

c) Write the planning activities. [2]