UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

BACHELOR OF SCIENCE IN COMPUTER SCIENCE

Third Year Examination – Semester I – 2017

SCS3108– Software Project Management

TWO (2) HOURS

To be completed by the candidate

Examination Index No: _____

Important Instructions to candidates:

1. The medium of instruction and questions is **English**.
2. Note that questions appear on both sides of the paper.
   If a page or a part of the question paper is not printed, please inform the supervisor immediately.
3. Write your index number on each and every page of the question paper.
4. This paper has **04** questions **in 12 pages**.
5. Answer **ALL** questions within the space provided in the question paper
6. Any electronic device capable of storing and retrieving text including electronic dictionaries and mobile phones are **not allowed**.
7. **Non-Programmable** calculators are **allowed.**

For Examiner's use only	
Question No	**Marks**
1	
2	
3	
4	
Total	

1. (a) A web-based system (BLOG) for a large software developing organization to support the staff of all categories to communicate with each other in order to carry out their daily work, has been requested.

The organization carries out many projects simultaneously and the staff of all categories work for these projects. The proposed system is required to cater all the requirements to carry out projects smoothly without having to face any conflict in resource scheduling.

Assume that you have been assigned to develop and implement this project.

(i) State **three** major client requirements this project must address.

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(03 marks)

(ii) If the organization uses email facilities to communicate at present, give two advantages of the proposed system over the use of email.

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(02 marks)

(iii) Explain how you would explore training requirements for this project.

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(02 marks)

(b) A newly established company has a large warehouse which stores a variety of products received from different importers and distributes to wholesale centres situated island wide. The company needs to fully automate all its activities with some extra features such as CCTV and sensor based monitoring and security systems for gates and the warehouse in addition to the barcode based product identification system at the warehouse.

(i) State three characteristics specific to this project.

- .....

- .....
- .....

(03 marks)

(c) In each of the following projects, identify

(i) two main stakeholders.

(ii) one major issue/problem encountered by either the project team in carrying out the project or the client of the system after implementation.

(iii) the most suitable deployment method with justification.

Project: Introducing a smartcard for the public transport system (initially for buses) to replace the payment of cash to purchase the bus ticket.

(i) .....

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(ii) .....

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(iii) .....

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Project: Introducing an ownership certificate using a land database for land owners to replace the existing manual deed-based system.

(i) .....

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(ii) .....

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(iii) .....

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Project: Automate the issuing of the National Identity Card by initiating the process at the Grama Niladhari office.

(i) .....

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(ii) .....

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(iii) .....

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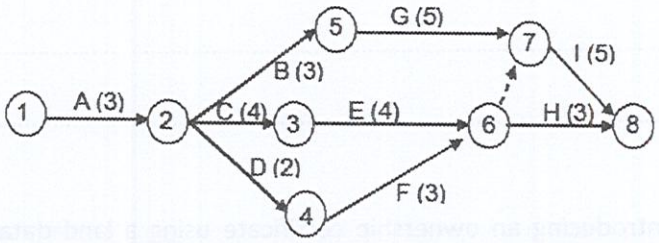
(05x3=15 marks)

2. (a) An Activity-on-Arrow network diagram related to a software project is given below with activity duration within brackets after the activity Identifier.



(i) Complete the table below by extracting information from the above diagram.

Serial Number	Activity Id.	Duration (wk)	Precedence

(05 marks)

(ii) Identify and explain the **two** most important events in this project.

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(02 marks)

(iii) What are the alternative paths in the network diagram?

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(02 marks)

(b) The list of activities of a software project with their durations and precedences are given in the following table:

Serial No.	Activity Id.	Activity description	Duration (wk)	Precedence
1	A	Feasibility Study	3	-
2	B	Requirement Gathering & Analysis	3	A
3	C	Documentation	10	A
4	D	Software Specification	3	B
5	E	Hardware Specification	2	B
6	F	Software development & Quality Assurance	7	D, E
7	G	Hardware Acquisition & Installation	6	D, E
8	H	Software Installation & Testing	2	F, G
9	I	User Training	1	C, H
10	J	Project Deployment	1	I

(i) Draw a complete Activity-on-Node diagram for the above project.

Use the last page (Page No. 12) to draw the Activity-on-Node diagram

(08 marks)

(ii) State the critical path and the project duration.

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(03 marks)

(iii) Prioritize the activities based on the total float.

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(03 marks)

(iv) What activity/activities need the most attention without considering external factors?

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(02 marks)

3. (a) A project with five activities has the following information for the possibilities for crashing:

Activity	Precedence	Duration (wk)		Cost (Rs. Thousand)	
		Normal	Crashed	Normal	Crashed
P	-	3	2	35	70
Q	P	3	2	25	80
R	P	2	2	20	20
S	Q, R	4	1	30	120
T	S	3	1	15	75

(i) Draw an Activity-on-Arrow diagram for the above project.

(02 marks)

(ii) Determine the normal duration of the project.

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(01 mark)

(iii) Determine the duration when all possible activities are crashed.

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(02 marks)

(iv) Activity R is not selected for crashing. Give **one** reason.

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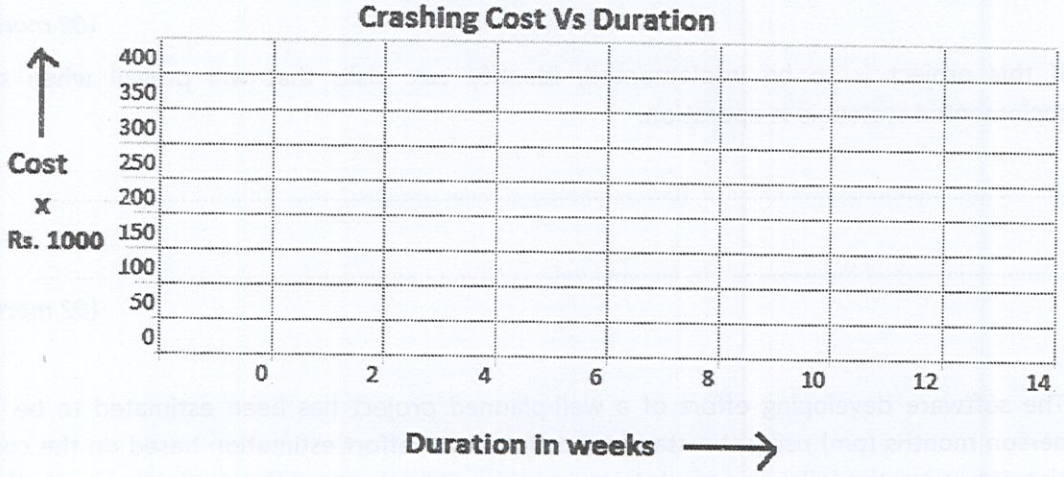
(01 mark)

(v) Plot a line graph to present the crashing cost Vs duration in the grid given below. Select the points for the line graph as (1) normal (2) only P crashed (3) only P and Q crashed (4) only P, Q and S crashed (5) all P, Q, S and T crashed.



(05 marks)

(b) The client of an on-going project has requested to crash the 27 weeks of project duration by four (4) weeks. When considering this request, give **two** (2) key points that the software developer should focus on with respect to each of the following:

(i) individual activities within the project

- .....
- .....

(ii) overall project

- .....
- .....

(04 marks)

(c) In order to improve the existing Tax System, it has been proposed to build a database of all retail shops/owners including hotels in the country. A steering committee has been appointed to initiate and monitor the progress of the proposed project.

(i) What would be the main activity of this system when implemented?

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(02 marks)

(ii) Identify **two** main risks (issues) which need to be considered even before a feasibility study is conducted for the proposed project.

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(02 marks)

(iii) If this project is to be implemented, identify **two** risks that will prevail when the implemented system is in operation.

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(02 marks)

(d) The software developing effort of a well-planned project has been estimated to be 54 person months (pm) using the standard equation for effort estimation based on the code size. However, the following needs to be considered further to estimate the required effort more accurately:

(i) fulfilling the three non-functional requirements, reliability, availability and security

(ii) experience and capabilities of software developing staff

Explain a mechanism to include the above two factors to adjust the overall effort of the project.

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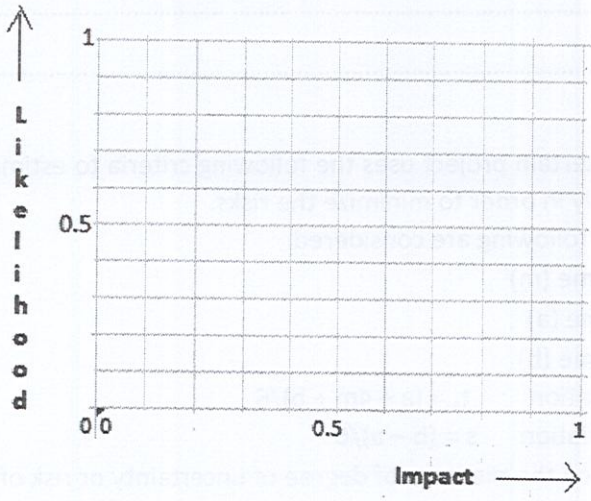
(04 marks)

4. (a) The project team of a large software project identifies several risks and ranks them according to the likelihood and the impact as indicated in the table below.

Risk Id.	Likelihood	Impact
1	0.1	0.7
2	0.4	0.3
3	0.55	0.4
4	0.7	0.8
5	0.65	0.6
6	0.4	0.2
7	0.9	0.9
8	0.2	0.75
9	0.45	0.4
10	0.8	0.3

Plot the above data in the grid given below and classify the above risks into four different zones in order to identify their severity.



(05 marks)

(b) Explain briefly how you would negotiate the following cases without leaving any room for complaints:

- Reluctance of some staff members of the client's organization to provide requirements.

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- A fellow software engineer refuses to share the code he/she has created in a collaborative work.

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(04 marks)

(b) A large software developing organization needs to purchase computers, other equipment and stationary regularly during the year. At the beginning of each year, the company advertises for suppliers and signs contracts with three shortlisted suppliers. Such registered suppliers are directly contacted to provide the required items when necessary.

(i) Give **two** advantages and **two** disadvantages of this procedure over open advertising.

Advantages:

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Disadvantages:

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(04 marks)

(04 The project manager of a certain project uses the following criteria to estimate the duration of activities more accurately in order to minimize the risks.

For each activity, the following are considered:

- Most likely time (m)
- Optimistic time (a)
- Pessimistic time (b)

(Single) Expected Duration $t_e = (a + 4m + b)/6$

Activity Standard Deviation $\mathbf{s = (b - a)/6}$

$s \propto (b\text{-}a)$ is used to rank the measure of degree of uncertainty or risk of activity.

Several activities of a project has the following values for m, t_e and s:

Activity	m (wk)	t_e (wk)	s (wk)
A	6	6.17	0.50
B	4	4.08	0.25
C	3	3	0.33
D	10	10.15	1.17
E	2	2.08	0.08

Identify the activity which requires the highest priority and explain how this activity is managed to minimize possible risks.

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(04 marks)

(iv) State five best practices in organizing and conducting a meeting of the project team.

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(05 marks)

(v) An on-line revenue license issuing system for vehicles is in operation at present in parallel to the manual over-the-counter issuing system. State **three** requirements that need to be considered if the authority decides to discontinue the manual system completely.

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(03 marks)

Activity-on-Node Diagram (Question No. 2 (b) (i)

(08 marks)

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