INSTITUTE OF TECHNOLOGY TRALEE

AUTUMN EXAMINATIONS AY 2015-2016

Software Engineering

Module Code SWEN61000
CRN 43843

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Duration: 2 Hours

Instructions to Candidates: This paper contains four questions. Answer any ***three*** questions.

Question 1 [40 Marks]

a) What is Prototyping and why is it used in the software engineering process? (4 marks)

b) Discuss the following important factors that should be considered when designing a UI: (8 marks)

- Short-term memory
- Human error
- Physical capabilities
- Interface preferences

c) Explain the difference between static and dynamic information on a UI. Give an example of each from every-day systems we use. (8 marks)

d) What consideration should be given to the following when designing a UI: (15 marks)
- Positioning of controls
- Use of white space
- Images & Icons
- Fonts / Colours

e) What is meant by *usability* of a UI and how is the usability of a UI determined? (5 marks)

Question 2 [40 Marks]

A golf society has invested in a computerised system to allow administration of members and fee payments. The following requirements have been identified and grouped as follows:

Fees:

Membership fees for the society vary depending on the category of membership. Current membership categories are Full, Family, Student and Junior. Details of categories and associated fee are stored in the Fees file.
The system will allow a new membership category to be added to the Fee file.
The system will allow the associated fee for a membership category to be changed.
The system will allow a membership category to be removed ***only*** if no members exist for the membership category.

Applications:

Each application for membership will be stored in the Applications file. An application is for a specific membership category.
The system will allow the amendment of application details.
If an application is withdrawn the details will remain in the Applications file but the application will be assigned a status '*Withdrawn*'.
When an application is approved, the application will be assigned a status '*Approved*' and a letter confirming approval and a request for the required fee will be printed and issued to the applicant.
When the required fee is received from the applicant, the application details will be removed from the Applications file and stored in the Members file with a renewal date one year from date of membership.

Members:

The system will allow member details to be amended.
The system will produce an alphabetical member listing which may be filtered by membership category.

Payments:

When a payment is received from a member, the system will store the payment details in the Payments file, the renewal date for the member is updated by one year and a receipt is printed and issued to the member.
The system will issue a renewal notice to all members whose renewal date is within one month.
The system will issue a reminder to all members whose fees remain unpaid one month after renewal date.

Using Gane & Sarson notation, you are required to produce a system model for the requirements outlined above

- **(a)** List the elements to be represented on system model. **(15 marks)**
- **(b)** Draw a level 0 DFD to represent the system. **(3 marks)**
- **(c)** Draw a level 1 DFD to represent the system. **(10 marks)**
- **(d)** Draw a level 2 DFD for each level 1 process. **(12 marks)**

Question 3 [40 Marks]

(a) Explain two methods of performing requirements analysis. **(2 marks)**

(b) What is *Requirements Specification*? **(2 marks)**

(c) Who are the target readers of a requirements specification document? (4 marks)

(d) Explain the difference between a *User Requirement* and a *System requirement*. **(6 marks)**
Give an example of both.

(e) In relation to the process of ***Requirements Specification*** explain the terms: **(6 marks)**
1. Expected Scenario
2. Alternate Scenario
3. Business Rule

(f) Describe the role of the following UML diagrams in the requirements specification process: **(12 marks)**
1. Use Case diagram
2. Activity Diagram

(g) What is a UML class diagram what does it model and when is it used in the software development process? **(8 marks)**

Question 4 [40 Marks]

(a) In your opinion, what factors can contribute to the success or failure of a software project. **(4 marks)**

(b) What is the fundamental difference between the PERT and CPM network analysis methodologies? **(4 marks)**

(c) Using diagrams where possible, explain the following in relation to the CPM network analysis methodology: **(8 marks)**

(i) Activity
(ii) Dummy activity
(iii) Event
(iv) EET and LET
(v) Critical path

(d) A project has the following tasks and requirements:

Activity	Pre-Activity	Duration (in days)	Resources (people)
A	**-**	**2**	**1**
B	**-**	**3**	**2**
C	**A**	**1**	**1**
D	**A**	**2**	**2**
E	**B**	**2**	**2**
F	**C**	**3**	**1**
G	**D,E**	**2**	**1**
H	**B**	**2**	**2**
I	**H**	**1**	**1**

(i) Draw the network diagram for the above project and determine the critical path. **(12 marks)**

(ii) Represent the project activities on a Gantt chart. **(2 marks)**

(iii) Draw a Resource Aggregation Profile for the project. **(5 marks)**

(iv) If management impose the constraint of a maximum of five people, can the project be completed on time? **(5 marks)**
(Note: Total Float = $LET_H - EET_T$ – Duration).