INSTITUTE OF TECHNOLOGY TRALEE

AUTUMN EXAMINATIONS AY 2014-2015

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 [30 Marks]

Scrum is a framework is commonly used in agile software development.

a) Explain the role of the ***Product Backlog***. **(3 marks)**

b) Explain the term ***Product Backlog Grooming***. **(3 marks)**

c) Explain the Poker Playing estimating technique commonly used in the Scrum framework. **(6 marks)**

d) What is *Sprint Velocity*? **(2 marks)**

e) ***User Stories*** are a method of specifying functional requirements. **(6 marks)**
Describe this methodology. Give an example to illustrate your answer.

f) Discuss the activities of the Sprint Planning process. **(6 marks)**
Your answer should make reference to:
- Task identification
- Task effort
- Acceptance Criteria

g) Describe the role of the Kanban board and the Sprint burn-down chart in the Scrum framework. **(4 marks)**

<u>Question 2</u> [30 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If an application is withdrawn the details will remain in the Applications file but the application will be assigned a status '*Withdrawn*'.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. **(10 marks)**
- **(b)** Draw a level 0 DFD to represent the system. **(3 marks)**
- **(c)** Draw a level 1 DFD to represent the system. **(8 marks)**
- **(d)** Draw a level 2 DFD for each level 1 process. **(9 marks)**

Question 3 [30 Marks]

(a) What is *Requirements Analysis*? **(2 marks)**

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

(c) Using examples, distinguish between functional, non-functional and domain requirements. **(6 marks)**

(d) Explain the difference between a *User Requirement* and a *System requirement*. **(2 marks)**

(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: **(4 marks)**

1. Use Case diagram
2. Activity Diagram

(g) Consider the following requirement for a banking system:

A customer can withdraw money from their account using their ATM card.
The customer inserts their card in the ATM and is prompted for their PIN number. The system verifies the PIN is correct. If an incorrect PIN is entered, the customer is asked if they wish to try again. If three invalid entries are made, the card is retained by the ATM and the customer is informed that they must call to their branch to recover the card. If the correct PIN is entered, the customer is prompted for the amount they wish to withdraw. The system retrieves details of the customer's account and verifies that there is sufficient funds in their account. If there is insufficient funds in the account, the system informs the customer who may either enter a different withdrawal amount or end the transaction. If sufficient funds are available, the system updates the customer's account balance and dispenses the cash to the customer. The customer is then asked if they require a receipt. If a receipt is required, the system prints a receipt. When the transaction ends, the ATM card is dispensed to the customer.

1. What business rules can be identified for this requirement? **(2 marks)**
2. Draw a detailed Activity Diagram to illustrate this requirement **(6 marks)**

Question 4 [30 Marks]

A project has the following tasks and requirements:

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

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

(b) Represent the project activities on a Gantt chart. **(3 marks)**

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

(d) Management have imposed a constraint of a maximum of four people on the project. Show a levelled RAP with this constraint imposed. Will this extend the completion time of the project? **(5 marks)**
(**Note**: Total Float = $LET_H - EET_T$ – Duration).

(e) What is the completion time of this project if only ***three*** people are allocated to the project? **(5 marks)**