University of Ruhuna - Faculty of Technology
Bachelor of Information & Communication Technology Honours Degree
Level 3 (Semester I) Examination, June 2023
Academic year 2021/2022

Course Unit: ICT3162 - Rapid and Agile Software Development (Written)

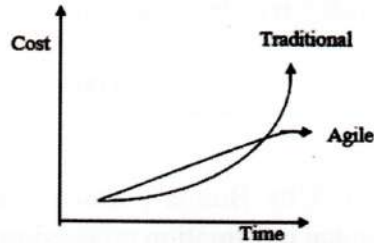**Answer all** four (04) questions.   **Time Allowed: 2 hours.**

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1. The following questions 'a' to 'd' are related to "City Builds", which is a construction company, who are planning to transform their manual information processing activities into an IT based work environment, using custom developed software solutions.

   The background of this project is as follows.

   "City Builds" manages multiple construction projects in parallel, where most of the activities such as purchasing, budgeting, and scheduling occur in a paper-based setting. The set of activities involved in each of their projects differs from one project to another. Furthermore, they work with several business partners in their construction activities. Although the top management of "City Builds" intends to implement a software solution, there is resistance at the ground level due to an aging work force who have worked in a paper-based setting for a long time. Moreover, the workforce is finding it difficult to clearly define their requirements for the software due to the inexperience in IT solutions and the complexity of the activities. Also, the management expects the software to be implemented in a fixed and limited time, as they are hoping to use the solution for their next set of projects, which are to be initiated soon.

   a. Identify four (04) challenges faced by the development team when providing a software solution for the "City Build" company.

      [20 marks]

   b. To face the challenges that you identified in part 'a' above, explain why **agile method** would ideal, compared to the traditional Waterfall model.

      [14 marks]

   c. Extreme Programing (XP) is one of the Agile Methodologies. Write down two (02) other Agile methods which can be used in the above project.

      [10 marks]

   d. Assume that it is proposed to use Agile methodologies in developing a solution for "City Builds" company. Identify and explain two (02) limitations of using such methods in this project.

      [24 marks]

e.

i. The following graph shows the cost of change curve (cost vs. time) for both traditional and agile software development. Briefly explain possible reason(s) for the two curves (Traditional and Agile) to be different.
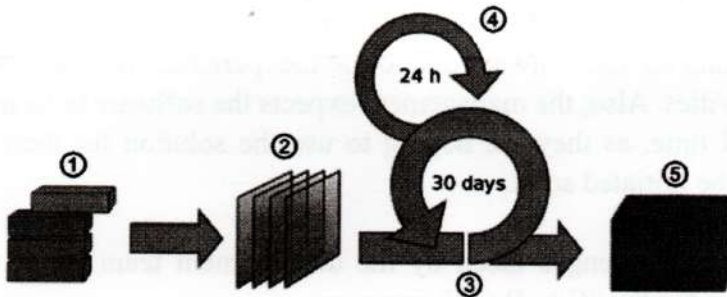

[20 marks]

ii. "Individuals and interactions over processes and tools" is one of the four guiding values of the Agile Manifesto. List down three other values of the Agile Manifesto.

[12 marks]

2.

a.

i. Following is a diagram which shows the basic steps of a Scrum.

Identify what are the most suitable terms to replace the labels from ① to ⑤.

[15 marks]

ii. Briefly explain ① and ② artifacts identified in the above part a (i).

[12 marks]

b. List down three (03) main responsibilities of a Product owner, a Scrum Master and the Development team. Your answer should include three responsibilities for each of these Scrum roles.

[36 marks]

c. "Scrum encourages more frequent and smaller releases." Do you agree with this statement? Justify your answer.

[19 marks]

d. "NextGen Computing" is a popular IT solution provider. "Health First - Health Information System" is the new project that NextGen Computing is going to develop. After evaluating characteristics of the project and capabilities of the company, management has decided to develop this project using Scrum.

Justify how the following characteristics or requirements will be supported by Scrum approach.

i. NextGen Computing have 10 – 12 well experienced and multi-skilled employees.

[6 marks]

ii. "Health First, the health information system" will have several requirement changes during the development life cycle.

[6 marks]

iii. The client of the Health First project needs to use software with urgent functionalities first while other functions can be added later.

[6 marks]

3.

a. Identify the main four (04) phases of Rapid Application Development (RAD) and briefly describe any two (02) phases.

[40 marks]

b. One of the four dimensions (aspects) of rapid application development (RAD) which result in the development speed is considered as "Methodology".
i. Briefly explain how "Methodology" impacts on the development speed.

[10 marks]

ii. Briefly explain the following classic mistakes related to "Methodology".
    A. Requirements gold-plating
    B. Feature creep
    C. Push-me pull-me negotiation.

[30 marks]

c. You are asked to develop an automated system for operating and recording the output of X-Ray machine in a hospital. Your program needs to feed its output to the existing hospital management system as well. Is rapid application development (RAD) suitable for the above project? Justify your answer.

[20 marks]

4.

    a. Analyze the following scenarios and write short answers.

        i. Kasun is a junior developer who recently joined the Falcon team. During the first code review of Kasun several code smells were identified.

        Briefly explain the code smells in the following snippet of Kasun's code and provide solution for each code smell.

```
class BankDetails {
    private String accno;
    private String name;
    private String acc_type;
    private long balance;
    LocalDateTime localDateTime;
    private String NIC;

        public MaintainAccounts (String accno, String name, String acc_type, long
    balance, LocalDateTime localDateTime, String NIC) {
        //Implementation
        }
}

public class CurrentAccount {
    public Transfer makeTransfer(String counterAccount, Money amount)
        throws BusinessException {
        // Implementation
        }
}

public class SavingsAccount {
    public Transfer makeTransfer(String counterAccount, Money amount)
        throws BusinessException {
        // Implementation
        }
}
```

[30 marks]

        ii. Crystal methods are considered and described as "lightweight methodologies". "ABC Pvt Ltd" is responsible for developing software for a nuclear power plant.

        Identify the most suitable type of Crystal methods to be used in the project and briefly explain the common features seen in crystal family using three (03) key points.

[40 marks]

b. Select any two (02) topics from the following and write short descriptions.
    i.   Basic concepts of Atern approach.
    ii.   Challenges or disadvantages of Lean Management.
    iii. MoSCoW prioritization technique in DSDM
    iv.   Agile Software Methodology Vs Traditional.
    v.   Reasons for project failures

[30 marks]

----- End of the Paper -----