



GIFT UNIVERSITY

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(Chartered by the Govt. of the Punjab, Recognized by HEC)

EXA-115

Department of Computer Science

Software Engineering (CS-326)

**Mid Term Examination
Spring 2017**

Lecturer: Faiza Ayub Syed

Time: 70 Minutes

Total Marks: 30

Candidate Name: _____ **Candidate Roll No:** _____

Instructions to Candidates:

- Candidates are required to sit on the seats assigned to them by the invigilators.
- Do not open this question paper until you have been told to do so by the Invigilator.
- Please fill in exam specific details in space provided (both Question Paper and Answer Sheet).
- This is a Closed Book Exam. "Closed book examinations" refer to examinations where the candidate must not bring into the examination room any study materials (including textbooks, study guides, lecture notes, printed web pages, hand written notes and any audio/visual aid).
- There are four questions. Attempt all questions.
- Do not write anything on question paper except Name and Roll Number.

Question 1:

Software is playing a vital role in all the fields of life these days. Discuss any two fields where you find importance of software. (5 Marks)

(3 Marks)

Question 2:

Explain the term "wear-out" with reference to software.

(8 Marks)

Question 3: (2+2+2+2)

Keeping in mind the CMM maturity levels, rank the following organizations software development process on a scale of 1 to 5. Highlight the organizational maturity level as well.

- Organization 'A' often produce work products that satisfy their specified requirements, standards and objectives.
- Organization 'B' focusses on improving the organizational processes through both incremental and innovative technological improvements.
- Organization 'C' produces software work products from time to time, however, they often exceed the budget and schedule of their projects.
- Organization 'D' manages its requirements, processes, work products and services through properly controlled procedures. The status of the work products and the delivery of services are visible to management at defined points. Work products are reviewed with stakeholders and are controlled.

Question 4: (5+5+4)

(14 Marks)

You have been asked to develop a Student Registration System to replace the university's legacy system. The system will allow students to register for courses and view grade reports. Each student has access to his or her course and grade information only and must be authenticated (login should be provided) prior to viewing or updating the information. A course instructor will use the system to view the list of courses he/she is assigned for a given semester or has taught previously, view the list of students registered for the course(s) he or she is teaching and record final grades for each student in the course(s). System will also allow Teaching Assistants (TA) to view students and mark student assignments and quizzes. TA's must be authenticated prior to viewing or updating any information.

The duration for the project is 4 months. Assume current date as the project starting date.

How you will carry out development using

- Traditional/Waterfall Model
- Agile Model
- Draw a Gantt chart showing how the project activities will be aligned with the Waterfall Model and Agile Model

End of Question Paper.



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EXA-115

Department of Computer Science

**Software Engineering II/Software Engineering/Introduction to Software Engineering
(CS-313/CS-326/CS-327)**

**Mid Term Examination
Spring 2016**

Lecturer: Faiza Ayub Syed

Time: 70 Minutes

Total Marks: 40

Candidate Name:

M. Ghani

Candidate Roll No:

13137023

Instructions to Candidates:

- Candidates are required to sit on the seats assigned to them by the invigilators.
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- Attempt all questions.
- Do not write anything on question paper except Name and Roll Number.

Question 1:

Refactor the following chunk of code.

(10 Marks)**Program Source Code:**

```
#include<iostream>
using namespace std;
main()
{
    int x,y;
    cout<<"Enter value of x:";
    cin>>x;
    if(x==54 && x==5)
    {
        y=x*9;
        x=x+1;
    }
    else if(x<54 && x>5)
    {
        y=x*9;
        x=x+1;
    }
    else if(x>54 && x<5)
    {
        cout<<"Invalid value";
    }
    else
    {
        y=1;
    }
    cout<<"Value of y: ";
    cout<<y;
    cout<<"\n";
}
```

Question 2:**(5 Marks)**

Suppose you have been asked to design Semester management and Society's management modules for University Management System by following the agile methodology. The requirements are collected and stored in product backlog. You keep on delivering the module functionality in small number of increments. Through what process you will keep track of module progress? Give brief reasoning.

*Sprint
Backlog*

Question 3:

(3 Marks)

Differentiate between iterative and incremental delivery and apply the concept on the following figure. Highlight the increments and iterations

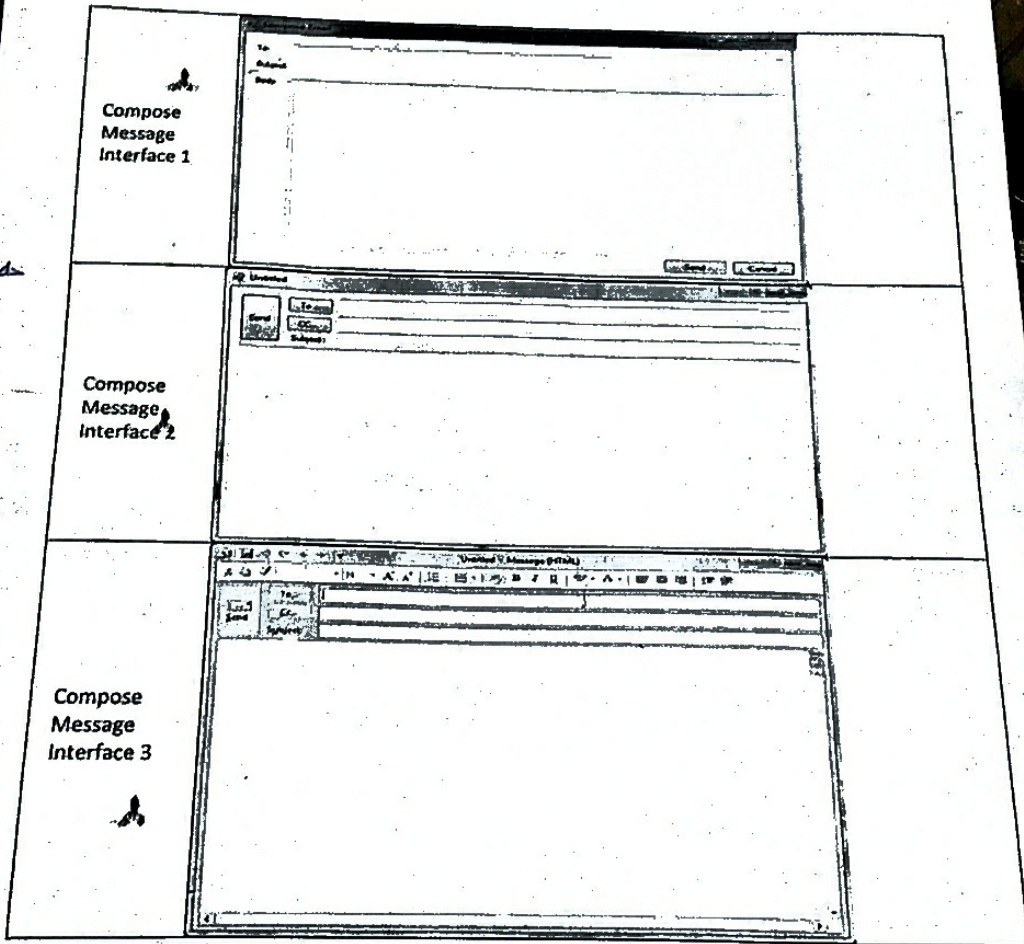


Figure: Interface for composing a message

Question 4:**(5 Marks)**

David is assigned to perform retrospective on the current project. His team is currently working on Sprint 3. How will he perform retrospective?

Task Name	Story	Sprint Ready	Priority	Status
Sprint 1	No	No	High	In Progress
Task 1	Yes	Yes	Medium	Complete
Task 2	Yes	Yes	Medium	Complete
Sprint 2	Yes	Yes	Medium	In Progress
Task 3	Yes	Yes	Low	Complete
Task 4	Yes	Yes	Low	Complete
Task 5	No	No	Medium	Not Started
Sprint 3	Yes	No	Medium	In Progress
Task 6	Yes	No	Low	In Progress
Task 7	No	Yes	Medium	In Progress
Task 8	Yes	No	Medium	In Progress
Task 9	Yes	No	Medium	In Progress

Question 5:**(15 Marks)**

In Agile Development using scrum we say that the crucial requirements of the function are given in first sprints. Identify which sprints you will be delivering at first by creating user stories and assigning them priorities.

You have been asked to design a Student Registration System to replace the university's legacy system. The system will allow students to register for courses and view grade reports. Each student has access to his or her course and grade information only and must be authenticated (login should be provided) prior to viewing or updating the information. A course instructor will use the system to view the list of courses he or she is assigned for a given semester or has taught previously, view the list of students registered for the course(s) he or she is teaching and record final grades for each student in the course(s). System will also allow Teaching Assistants (TA) to view students and mark student assignments and quizzes. TA's must be authenticated prior to viewing or updating any information.

End of Question Paper

Question 1: (5+5)

10 marks

Question 1.a.)

Select the best matched definition for each software model from a set of given definitions.

- | | |
|------------------------------|---|
| (a) Code & Fix | (a) Assess risks at each step |
| (b) Evolutionary Prototyping | (b) Build initial set of requirement specifications for several releases, then design-and-code each in sequence |
| (c) Spiral | (c) Build an initial small requirement specifications, code it, then evolve |
| (d) Incremental | (d) Standard phases as SDLC |
| (e) Waterfall | (e) Write some code, debug it, repeat (i.e. ad-hoc) |

Answer format: Software Model: Model definition.

Question 1.b.)

Describe the two main approaches to Prototyping with example.

Question 2: (2+3+15)

20 marks

Question 2.a.)

Give two reasons for user story writing?

Question 2.b.)

What is the difference between an Epic and a Theme?

Question 2.c.)

Akbar's Kinara is a hotel in Wazirabad approximately 39km from Gujranwala located on the left bank of river Chenab which has a classical background. The hotel management for its revenue maximization wants to charge as much as it can for its halls and rooms. For this purpose the hotel manager wants to set the optimal rate for rooms/halls in the hotel. The charging rates are based on large number of factors such as what other riverside hotels (a defined comparable set of hotels like Tulip Hotel: Jhelum, Arcadian Hotel: Kaghan, Swat View Hotel: Swat) are charging; list of comparable set of hotels can be updated and deleted any time depending upon the requirements, the time of the year (seasonal/non-seasonal), prior year pricing (must be some hard coded figure), any corporate events (e.g. conferences, business meetings, holiday parties), any known local events (e.g. Basant Bahar and Pakistan Day, the rates go up). So, the room/hall rate takes the form of a function that depends on multiple factors.

- Identify the epic from the given scenario.
- Focusing upon the factors break the epic into meaningful user stories. Break down the stories into sub stories where required.

Question 3: (6+4+5+5)

20 marks

Question 3.a.)

Draw a model that reflects the working of Scrum in Agile.

Question 3.b.)

What is the role of Driver and observer in pair-programming?

Question 3.c.)

Refactor the following code by flattening the nested if, the three variables `isFull`, `isPartial` and `isLoan` contains the Boolean value. The goal is to get the pay amount; if all the three conditions get failed the code must return the normal amount.

```
double GetPayAmount()
{
    double result;
    if(isFull)
        result = FullAmount();
    else
    {
        if(isPartial)
            result= PartialAmount();
        else
        {
            if(isLoan)
                result = LoanAmount();
            else
                result = NormalAmount();
        }
    }
    return result;
}
```

Question 3.d.)

Consider the two engineering teams, "Team A" and "Team B" both following Scrum but one team misses practicing the very essence of Scrum, while the other team practices it to the core.

Team A was delivering software using Scrum by having the team, a Scrum Master, and a Product Owner. The team had Scrum artifacts: a product backlog, a sprint backlog, and Scrum ceremonies including sprint planning, a daily Scrum, and a sprint cycle of four weeks. But still the team was struggling to deliver software incrementally that was shippable and could be rolled out to production. For its advantage, Team A was collocated with the product owner and most of its stakeholders on site; thinking that this will reduce their development time and will help them in fast product delivery.

The latest project was then handed out to a virtual team, Team B.

Team B, being virtual, couldn't have daily Scrums because of time constraints, but, using collaboration tools, the team members were able to effectively and efficiently share what they had worked on the previous day, what was their plan was for this working day, and whether there are any impediments. Team B could also communicate robustly with the product owner through collaboration tools about user stories, acceptance criteria, design of the features, and the Definition of Done. Team B did have weekly calls with stakeholders to sync up on the status of the sprint. The team was disciplined in defining its sprint release cycle, including defining such milestones as the sprint planning meeting, code freeze, functional testing, integration testing, sprint reviews, stakeholder sign-off, and sprint retrospectives, each associated with its respective dates.

- Analyze the difference between the scrum methodology followed by given two teams
- Suggest which team is better in delivering most valued features frequently

Question 4: (3+4+2+1+10)

20 marks

Question 4.a.)

Identify the type of testing.

- Testing of a program without executing the program; carried out using inspections, reviews and walkthroughs.
- Testing the internal structures or working of the program.
- Testing a product's Graphical User Interface to ensure that it meets its written specifications

*Answer Format: Name of Testing Type***Question 4.b.)**

Identify the type of Traceability matrix.

- Type matrix is used to check whether the project progresses in the desired direction and for the right product. It makes sure that each requirement is applied to the product and that each requirement is tested thoroughly.
- Type matrix is used to ensure whether the current product remains on the right track. The purpose behind this type of traceability is to verify that we are not expanding the scope of the project by adding code, elements, test or other work that is not specified in the requirements.

*Answer Format: Name of Traceability Type***Question 4.c.)**

Write two disadvantages for not using Requirement Traceability Matrix.

Question 4.d.)What is test bed creation? *Give one line answer***Question 4.e.)**

Consider a program for the determination of grade of a student based on the marks in three subjects, mark range from 0 to 100, and no negative values are acceptable for subject marks.

The grade is calculated according to the following rules:

Marks Obtained (Average) (mark1+mark2+mark3)	Grade
75-100	Grade A
60-74	Grade B
50-59	Grade C
40-49	Grade D
0-39	Fail

Read the program code carefully. Compute the actual output of the program by giving the values as input to the program; mentioned in the test case. Also mention the status of test case either Pass/Fail by comparing expected and actual output.

Test case Id	subject1_marks	subject2_marks	subject3_marks	Expected Output	Actual Output	Status
T01	75	80	85	Grade A		
T02	68	68	68	Grade B		
T03	55	55	55	Grade C		
T04	45	45	45	Grade D		
T05	25	25	25	Fail		
T06	-1	50	50	Invalid marks		

Program Source Code:

```
#include<iostream>
using namespace std;
int main()
{
float mark1, mark2, mark3;
float avg;

cout << "Enter marks for subject 1:" ;
cin >> mark1;
cout << "Enter marks for subject 2:" ;
cin >> mark2;
cout << "Enter marks for subject 3:" ;
cin >> mark3;

avg = (mark1+mark2+mark3)/3;
cout<<avg<<endl;

if (avg<=0 || avg>=100)
    cout<<"invalid input"<<endl;
else if (avg>=60 && avg<=74)
    cout<<"grade B"<<endl;
else if (avg>=50 && avg<=59)
    cout<<"Grade C"<<endl;
else if (avg>=40 && avg<=49)
    cout<<"Grade D"<<endl;
else
    cout<<"Fail"<<endl;

return 0;
}
```

Question 5: (3+2)**Question 5.a.)**

5 marks

Read the following points carefully and associate each point with one of the nine knowledge areas of project management.

- a) Systematic approach used for buying all the goods and services needed for a company to stay sustainable.
- b) Identifying uncertain events or conditions, that if occur, has a positive or negative impact on project's objective.
- c) Project activities are estimated and durations are determined based on the resource utilization for each activity.

Question 5.b.)

Read the following points carefully and highlight which project management skill the project manager is lacking?

- a) The project manager pessimistic outlook towards the project problems leads the team towards failure.
- b) The project manager hesitates to conduct meetings related to project issues with top management.

End of Question Paper.