EAST WEST UNIVERSITY
Department of Computer Science and Engineering
B.Sc. in Computer Science and Engineering Program
Final, Fall 2024 Semester

Course: **CSE430, Section 1&2, Software Quality Assurance and Testing**
Instructor: **Anika Tabassum, Lecturer, CSE Department**
Full Marks: **30**
Time: **1 hour and 15 Minutes**

Note: There are **Five** questions, answer ALL of them. The Mark of each question is mentioned at the right margin.

1. [CO3,C3, Mark: 4+5+ 3= 12]

```
1. #include <stdio.h>
2. #include <complex.h>

3. void check_if_complex(double complex number)
4. {
5.    double real_part = creal(number);
6.    double imag_part = cimag(number);

7.    if (imag_part != 0.0){
8.        if (real_part == 0.0)
9.            printf("The number %.2fi is a purely imaginary complex number.\n",
imag_part);
10.       else if (imag_part > 0)
11.           printf("The number %.2f + %.2fi is a complex number with a positive
imaginary part.\n", real_part, imag_part);
12.       else
13.           printf("The number %.2f - %.2fi is a complex number with a negative
imaginary part.\n", real_part, -imag_part);

14.    }
15.    else{
16.       if (real_part == 0.0)
17.           printf("The number 0 is neither complex nor purely real.\n");
18.       else
19.           printf("The number %.2f is a purely real number.\n", real_part);
20.    }
21. }

22. int main()
23. {
24.     double real, imag;

25.     printf("Enter the real part of the number: ");
26.     scanf("%lf", &real);

27.     printf("Enter the imaginary part of the number: ");
28.     scanf("%lf", &imag);

29.     double complex number = real + imag * I;

30.     check_if_complex(number);

31.     return 0;
32. }
```

a) Draw the DD graph
b) Find the cyclomatic complexity of the given code using decision node and graph matrix.
c) Find all c-use and p-use of the given code.

2 [CO3, C3, Mark: 4]

In the process of developing a new feature for a mobile application, the software company is considering several prevention strategies to ensure the feature meets high-quality standards before release. These strategies include investing in developer training, automated testing tools, mandatory code reviews, UX design improvements, and thorough requirements gathering.

Given the potential costs of each of these **prevention activities**, how should the company allocate its budget for prevention to maximize quality while minimizing future failure costs?

3 [CO2, C4, Mark: 6]

Imagine a scenario in a "Squid Game"-like contest where participants face a challenge with the following variables affecting the outcome of the game:

1. **Game Type (V1)**: 4 possible values
    - ○ Tug of War
    - ○ Marble Game
    - ○ Glass Bridge
    - ○ Red Light, Green Light

2. **Team Size (V2)**: 3 possible values
    - Individual
    - Small Team (2-3 players)
    - Large Team (4+ players)
3. **Difficulty Level (V3)**: 3 possible values
    - Easy
    - Medium
    - Hard
4. **Starting Condition (V4)**: 2 possible values
    - Advantage (e.g., extra time, tools, or clues)
    - No Advantage

Design test cases using pairwise testing techniques for all the conditions.

4 When and why is it important to conduct Non-functional Testing in software development? [CO3, C2, Mark: 3]

5 A software development team is building a hotel management system with the following key modules: [CO3, C3, Mark: 5]

1. **Room Booking Module**: Allows customers to search for available rooms and make reservations.
2. **Payment Module**: Handles payment processing for bookings.
3. **Customer Management Module**: Manages customer profiles and loyalty program details.
4. **Housekeeping Module**: Tracks room cleaning schedules and updates room availability.

The team has completed the development of these modules and is ready to begin testing the system as a whole. Which **Integration Testing technique** should the team decide to proceed with testing after the modules are combined into a single system?