CSE 400 Bütünleme Exam

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I. QUESTION (13 POINTS)

Sort the following testing activities in the correct order: Unit Test, Functional Test, Installation Test, Acceptance Test, Integration Test, Performance Test.

II. QUESTION (18 POINTS)

a) Draw a class diagram representing a book defined by the following statement: "A book is composed of a number of parts, which in turn are composed of a number of chapters. Chapters are composed of sections. A book includes a publisher, publication date, and an ISBN. A part includes a title and a number. A chapter includes a title, a number, and an abstract. A section includes a title and a number".

b) In Part a), note that the Part, Chapter, and Section classes all include title and number attributes. Add an abstract class and inheritance relationship to factor out these two attributes into the abstract class.

c) Draw a class diagram representing the relationship between parents and children. Take into account that a person can have both a parent and a child. Annotate associations with roles and multiplicities.

III. QUESTION (24 POINTS)

Consider the following design goals. For each of them, indicate the candidate patterns (draw UML diagram for each design pattern) you would consider to satisfy each goal:

- Given a legacy banking application, encapsulate the existing business logic component
- Given a chess program, enable future developers to substitute the planning algorithm that decides on the next move with a better one
- Given a chess program, enable a monitoring component to switch planning algorithms at runtime, based on the opposing player's style and response time
- Given a chess program, enable undoing and redoing moves in a game.

IV. QUESTION (12 POINTS)

Consider the following implementation of the numDays() method.

```
public boolean isLeapYear(int year){
  boolean leap;
  if (year % 4 == 0)
    return true;
  return false;
}
public int numDays(int month, int year){
  if (year < 1)
```

```
    throw("Year out of bounds");
  else
    if (month == 1 || month == 3 ||
        month == 5 || month == 7 ||
        month == 10 || month == 12)
      return 31;
    else
      if (month == 4 || month == 6 ||
          month == 9 || month == 11)
        return 30;
    else
      if (month == 2){
        if (isLeapYear(year))
          return 29;
        else
          return 28;
      } else
        throw("Month out of bounds"); }
```

By exercising all possible paths generate example test cases.

V. QUESTION (15 POINTS)

Explain the following architectural styles by giving examples:

- Repository
- Model/View/Controller
- Peer-to-peer

VI. QUESTION (18 POINTS)

Apply the appropriate transformations (map associations to collections) to the following object model:

- A project involves a number of participants
- Participants can take part in a project either as project manager, team leader, or developer.
- Within a project, each developer and team leader is part of at least one team.
- A participant can take part in many projects, possible in different roles. For example, a participant can be a developer in project A, a team leader in project B, and a project manager in project C. However, the role of a participant within a project does not change.

Write the source code needed to manage the associations, including class, field, and method declarations, method bodies, and visibility.