

QUIZ 1

(FALL 2014)

SOEN 343 – Software Design and Architecture

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Duration: 45 minutes

The exam is worth 10% of your grade and is out of 21 marks.

Instructions:

- Closed book and no calculators allowed.
- Clearly state all assumptions.
- Handwriting must be legible. You can use pencil.
- All answers must be written in the **answer book** and not on the question sheet

Part I: Multiple Choice and Fill-in-the-Blanks Questions [4 marks]

Note: Answer all questions in the exam **booklet**!

Question 1: Name the two classes and interface involved in the observer pattern.

Question 2:

SHA1 hash codes are used to _____ commits in git.

Question 3: Which of the following **is** a valid implementation of the class diagram below?



a)

```
class X {
    private int b;
}

class Y {
    private int c;
}
```

b)

```
class X {
    private int b;
    private Y a;
}

class Y {
    private int c;
}
```

c)

```
class X {
    private int b;
}

class Y {
    private int c;
    private Y a;
}
```

d)

```
class X {
    private int b;
    protected Y a;
}

class Y {
    private int c;
}
```

Question 4: Assume that the following code for `A` and `B` is valid. What would be the value of `x.get()` if `x` were declared and initialized as follows: `A x = new B();`

```
class A {
    public String c;

    public A() {
        c = "A";
    }

    public String get() {
        return "A" + c;
    }
}

class B extends A {
    public B() {
        super();
        c="B";
    }

    public String get() {
        return "B" + c;
    }
}
```

- a) AA
- b) BB
- c) AB
- d) BA

Part II: Short Answer [7 marks]

Note: Use the number of marks to guide how much you should write!

Question 1: Summarize Gall's law. What is the implication of Gall's law? What is another way of stating Gall's law? [2 marks]

Question 2: Provide one advantage and one disadvantage to "working off a named stable base" or "a stable release" [2 marks]

Question 3: Mobile Networks [5 marks]

- a) Define and contrast bandwidth and latency. [2 marks]
- b) Why is a low initial congestion window worse for cellphones than on a wired network? [3 marks]

Part III: Design Question [10 marks]

Question 1: GRASP [10 marks]

Consider the given excerpt of a **Player** class from a simple **board game**. The given code shows the fields and method needed to adjust the amount of money in the player's purse after having landed on a particular square of the board.

```
public class Player {
    private String squareKind;

    ...

    private int purse;

    public void spendOrRecieveMoney() {
        if (squareKind.equals("Treasure")) {
            purse += purse * 100;
        } else if (squareKind.equals("Market")) {
            if (purse > 100)
                purse -= 0.20 * purse;
        } else if (squareKind.equals("Normal")) {
            purse += 1;
        } else {
            throw new IllegalStateException("unknown kind");
        }
    }

    ...
}
```

- Has the principle of cohesion or coupling been violated in this above code? Explain. [3 marks]
- Name the design pattern that you would use to improve the design [1 mark]
- Provide a *detailed* class diagram illustrating your solution (show all type, method and constructor parameters, visibility, static/nonstatic, etc.). [6 marks]