

Software Engineering

2nd Midterm Exam

Dec. 28, 2011

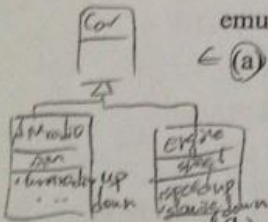
(請按照題號順序作答，以免批改時遺漏)

1. Explain the following terminologies:
 - (a) (5%) Regression testing
 - (b) (5%) Stress testing
2. (9%) Please provide three major advantages of explicitly designing and documenting software architecture.
3. (10%) Please draw a figure for the repository architecture pattern and briefly explain it.
4. (10%) Please explain the Test Driven Development process.

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2/5 失敗 No
4/5 成功 Yes
1/5 成功 Yes
8/5 成功 Yes
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5. (10%) Assume that a program specification states that the program accepts 4 to 8 integer inputs. Use equivalence partitioning method, what kind of test cases will you plan for testing the program? Please list you all your test cases with the expected output results.

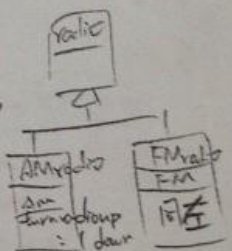
6. Consider that you are asked to write an object to emulate a simplified car. The simplified car only contains an engine and an AM radio. So, the software can emulate the car for speeding up, slowing down, and tuning the radio up and down.



- (a) (5%) Please draw a simple class diagram design for the car using UML showing that the car object is composed of an engine and an AM radio. You should also show the interface design for the required functions provided by the engine and the radio.

- (b) (5%) Please show a sequence diagram when a user tuning up the AM radio on the emulator.

- (c) (6%) If your boss wants to change the AM radio to FM radio, how would you design the radio so that you do not need to change other parts of the software when you replace the radio? Please draw the class diagram of your radio.



- (d) (6%) What object-oriented design techniques do you use in (c)?

- (e) (10%) Now, suppose that you have developed the AM radio class and FM radio class. One year later, your company gets a project which plans to

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develop a car emulator with a radio capable of receiving both AM radio and FM radio. The radio only adds a function in the interface to switch the radio from AM/FM to FM/AM. Can you reuse the design of your AM and FM radio classes? If you can, please draw the class diagram of your design.

7. Assume that you are writing a program to show the statistics collected by a questionnaire. You want to show the results using multiple figures like a bar chart and a pie chart as shown in the following figure.
- (a) (5%) What design pattern is appropriate for this application?
- (b) (15%) Please draw the class diagram of the design using the pattern in (a).

