

Software Engineering, ESOF 322, Fall 2019
Exam 2, Nov. 25

Multiple Choice

1. Which of the following is NOT one of the high level statements of the Agile manifesto, created in 2001 at The Lodge at Snowbird ski resort in the Wasatch Mountains of Utah? (4 pts.)
 - a. Responding to change over following a plan
 - b. Working software over comprehensive documentation
 - c. Customer collaboration over contract negotiation
 - d. **Frequent delivery over bulk deployment**
 - e. Individuals and interactions over processes and tools

2. An I/O unit designed to perform all the different reads and writes to the different devices would best be considered what type of cohesion? (4 pts.)
 - a. Coincidental
 - b. **Logical**
 - c. Temporal
 - d. Procedural
 - e. Functional

3. A print module that accepts a Person entity and retrieves its social security number to construct a message is best considered what type of coupling? (4 pts.)
 - a. Content
 - b. Common
 - c. Control
 - d. **Stamp**
 - e. Data

4. Consider the comment “GetAllUsers returns all users from the database as a list.”

```
// GetAllUsers returns all users from the database as a list.  
func (UserRepo) GetAllUsers() ([]User, error) {  
    users := []User{}  
    if err := db.Select("userId, uName, usernameCAS,  
        activeFlag").Order("userId").Find(&users).Error; err != nil {  
        return nil, err  
    }  
    return users, nil  
}
```

This comment is best classified as which of the following types? (4 pts.)

- a. Repeat of the code
- b. Explanation of the code
- c. Summary of the code
- d. Description of the code intent
- e. Give external references

5. The term “Software crisis” was first used at a NATO conference held in Germany. This was in what year? (4 pts.)

- a. 1968
- b. 1978
- c. 1980
- d. 1990
- e. 2000

6. Which of the following would NOT be considered a verification activity? (4 pts.)

- a. Design review
- b. Screen prototyping review
- c. Code inspection
- d. Test plan review
- e. Integration testing

Short answer

7. For each of the following, tell if the activity is a white box or black box activity.
(5 pts.)

Unit testing – white box

Acceptance testing – black box

Statement coverage– white box

Testing for memory leaks– white box

Equivalence class testing– black box

8. UML diagrams can be split amongst structure, behavior and interaction diagrams. List and describe 2 diagrams in each group. (6 pts.)

Structure diagrams

1. Class diagram, shows the classes and relationships amongst the classes
2. Deployment diagram, shows the configuration of run time processing nodes and the components that live on them

Others: Object, component, composite structure, package diagram

Behavior diagrams

1. Use-case diagram, shows the functionality that the system will provide
2. Activity diagram, shows the activities that will be perform, order and flow

Other: State machine diagram

Interaction diagrams

1. Sequence diagram, shows call sequences for a particular scenario, aligned down the diagram
2. Communication/Collaboration diagram, shows the same interactions as a sequence diagram, but doesn't align the calls down the diagram

Others: Timing, interaction overview diagram

9. The following password field accepts a minimum of 6 characters and a maximum of 10 characters. (5 pts.)

Enter Password:

- a. Describe the process of equivalence partitioning, and give a set of test cases, with expected outcomes, to test entering passwords using equivalence partitioning.

In equivalence partitioning, the set of equivalence classes for the inputs is determined and a test case is written for each:

Equivalence Class	Test Case	Outcome
0-5 characters	3 characters	Not accepted
6-10 characters	7 characters	Accepted
>10 characters	11 characters	Not accepted

- b. Describe the process of boundary value analysis, and given a set of test cases, with expected outcomes, to test entering passwords using boundary value partitioning.

In boundary value partitioning, the set of equivalence classes for the inputs is determined, a test case is written for each equivalence class, and for the boundaries of the equivalence classes.

Considering just the boundaries of 6-10, add to the above, tests for passwords 5,6 & 7 characters long and password 9, 10 & 22 characters long:

Test Case	Outcome
5 characters	Not accepted
6 characters	Accepted
7 characters	Accepted
9 characters	Accepted
10 characters	Accepted
11 characters	Not accepted

More precisely the boundaries for each equivalence class would be tested:

Equivalence Class	Test Case	Outcome
0-5 characters	0 characters	Not accepted
	4 characters	Not accepted
	5 characters	Not accepted
	6 characters	Accepted
6-10 characters	5 characters	Not accepted
	6 characters	Accepted
	7 characters	Accepted
	9 characters	Accepted
	10 characters	Accepted
	11 characters	Not accepted
>10 characters	10 characters	Accepted
	11 characters	Not accepted

Remove any repeats.

10. List the 5 components of software used to estimate unadjusted function points, giving examples of each component taken from the creation of an AbOut web service.
(10 pts.)

Transactions:

External inputs – Request for user with userid = 13.

External outputs – JSON response giving the information associated with user

External inquires – A call to CAS to determine if user can access information

Data entities:

Internal logical files – the AbOut database

External interface files – None (Data would need to reside entirely outside the application boundary)

11. List the 5 steps of test-driven development, describing any step that isn't obvious. (10 pts.)

Test driven development:

1. Write a test case.
2. Verify that the test case fails.
3. Modify the code so that the test case succeeds. (Write the simplest code possible.)
4. Run the test to see it works. Also run previous test cases to see nothing regressed.
5. Refactor code to make it pretty