

COMP 7012
Exam 2
Spring 2018

Name: _____,
Last name First name

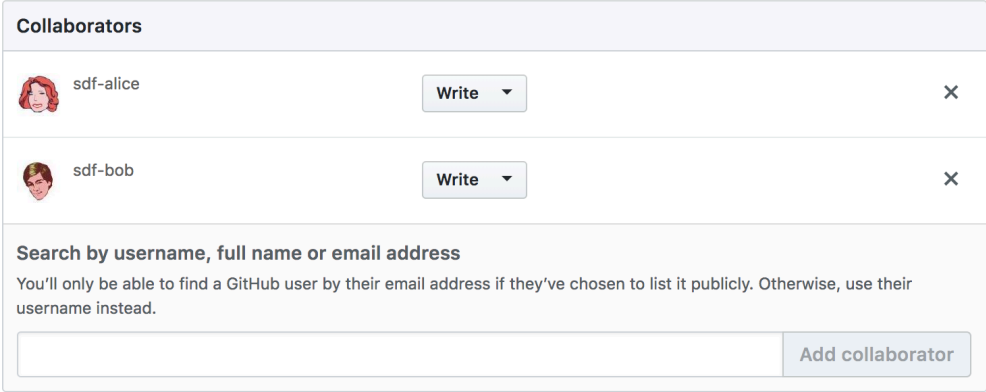
Rules:

- No potty breaks.
- Turn off cell phones/devices.
- Closed book, closed note, closed neighbor.
- WEIRD! Do not write on the backs of pages. If you need more pages, ask me for some.

Reminders:

- Verify that you have all pages.
- Don't forget to write your name.
- Read each question carefully.
- Don't forget to answer every question.

Consider this GitHub repository interface for adding collaborators to a project:



Here is a user story related to the above interface:

AJAX Remove-Collaborator Button
 The Collaborators page must have an "X" button next to each collaborator, and the button must use AJAX such that clicking the button causes the collaborator to be removed immediately.

5. [4pts] Describe two things that make this a poor-quality user story.

6. [2pts] T or F? In general, the larger the estimate, the less likely it is to be accurate.
- a) True
 - b) False
7. [2pts] Which of the following approaches/techniques leverages the collective opinion of a group of individuals rather than that of a single expert? Circle all answers that apply.
- a) Black-box testing
 - b) Planning Poker
 - c) Writing user stories
 - d) Wisdom of the Crowd
 - e) None of the above
8. [2pts] In the agile development process taught in class, the _____ estimate each user story, the _____ decide the priority for each story, and the _____ choose which user stories to implement in the next iteration.
- a) developers; customers; customers
 - b) customers; developers; customers
 - c) customers; customers; developers
 - d) customers; developers; developers
 - e) developers; customers; developers
9. [2pts] Exhaustive testing is _____ and, in general, is _____ performed in practice.
- a) a black-box technique; often
 - b) a white-box technique; never
 - c) writing a test for every possible output; often
 - d) writing a test for every possible input; never
 - e) writing a test for every user story; often

10. [2pts] For each piece of text below, place a “B” or a “W” next to it if it corresponds to *Black-Box* or *White-Box* testing, respectively.

_____ Tests focus on boundary cases

_____ Tests based only on the interface of a component

_____ Tests based on the implementation of a component

_____ Tests aim to achieve particular levels of code-coverage

11. [2pts] For each piece of text below, place a “U” and/or “I” and/or “S” next to it if it corresponds to *Unit* and/or *Integration* and/or *System* tests, respectively.

_____ Tests something less than the whole system

_____ May perform I/O

_____ Should not have non-determinism

_____ Should be fast (less than half a second)

12. [8pts] Using the fragments below, create a functional test (class and method) for the “index” page of a movie-themed web app (which has the typical scaffold layout). The test should do the following in this order (1) retrieve user fixture “one” and sign in the user, (2) simulate an HTTP request for the index page, (3) check that the HTTP response does not report an error, (4) check that the rendered HTML table contains a cell with the most famous shark movie of all time, and (5) check that the correct ERB is rendered (index.html.erb). Some fragments may be used more than once in your solution. Some fragments may not be used at all.

- a) `album = albums(:one)`
 - b) `assert_response :error` _____
 - c) `assert_response :success`
 - d) `assert_select "h1", "Movie"` _____
 - e) `assert_select "td", "Jaws"`
 - f) `assert_template :index` _____
 - g) `assert_template :movies`
 - h) `class Movie < ApplicationRecord` _____
 - i) `class MoviesControllerTest < ActionDispatch::IntegrationTest` _____
 - j) `end`
 - k) `get movies_url` _____
 - l) `get movies_url(@movie)`
 - m) `include Devise::Test::IntegrationHelpers` _____
 - n) `sign_in user`
 - o) `test "should display movies" do` _____
 - p) `user = users(:one)` _____
- _____
- _____
- _____

13. [4pts] Draw a control-flow graph (CFG) for the function in Figure 1. In addition to the usual CFG features, label the nodes with capital letters (A, B, C, etc.), and label the edges with numbers (1, 2, 3, etc.). Don't forget to include entry and exit points.

Use the CFG you created for the function in Figure 1 to answer the following questions.

14. [2pts] Fill in the table below with a test suite that provides statement coverage. In the Covers column, list the letter labels (A, B, C, etc.) of the nodes covered by each test case.

Input		Expected Output	Covers
array	n		

15. [3pts] Fill in the table below with a test suite that provides branch coverage. In the Covers column, list the number labels (1, 2, 3, etc.) of the edges covered by each test case (only true/false edges needed).

Input		Expected Output	Covers
array	n		

16. [4pts] Fill in the table below with a test suite that provides path coverage. Before you fill in the table, first list all the paths to be covered, and label each path (“P1”, “P2”, “P3”, etc.). You need only cover executions that involve at most 1 iteration of each loop (if there are any). In the Covers column, list the path labels covered by each test case.

Paths:

Input		Expected Output	Covers
array	n		

17. [2pts] Which, if any, of your above three test suites would have caught the bug in the function?

Consider the YouTube comment section interface:



18. [2pts] Which of the following attacks might some attempt to perpetrate by adding a public comment? Circle all that apply.

- a) Packet sniffing
- b) Cross-site scripting
- c) Eavesdropping
- d) Man-in-the-middle attack
- e) SQL injection

19. [2pts] How do you prevent the above attack(s)? Circle all that apply.

- a) Sanitize inputs
- b) Redirect requests
- c) Escape input characters
- d) Disable cookies
- e) Authenticate users

20. [6pts] Match the Design Pattern to an example usage of the pattern.

- | | | | |
|-----------|-----------------------|-----------------------|---|
| Observer | <input type="radio"/> | <input type="radio"/> | Your program must support switching among several different foreign language translation libraries (e.g., FrenchToX, HindiTranslatePro, English4Me), but each one has a slightly different interface. |
| Singleton | <input type="radio"/> | <input type="radio"/> | Your point-of-sales application must log data from many different places in its code, but only one Logger object should do the logging for the entire system. |
| Adapter | <input type="radio"/> | <input type="radio"/> | Your <i>Doom</i> program needs to listen for keyboard and mouse clicks to manipulate how a player character moves, shoots, etc. |

(One more question to go on the next page!)

Figures

```

def sum_the_first_n(array, n)
  sum = 0
  i = 0
  while i <= n && i < array.length
    sum = sum + array[i]
    i = i + 1
  end
  return sum
end

```

Figure 1. Buggy function that sums the first n numbers in an array.

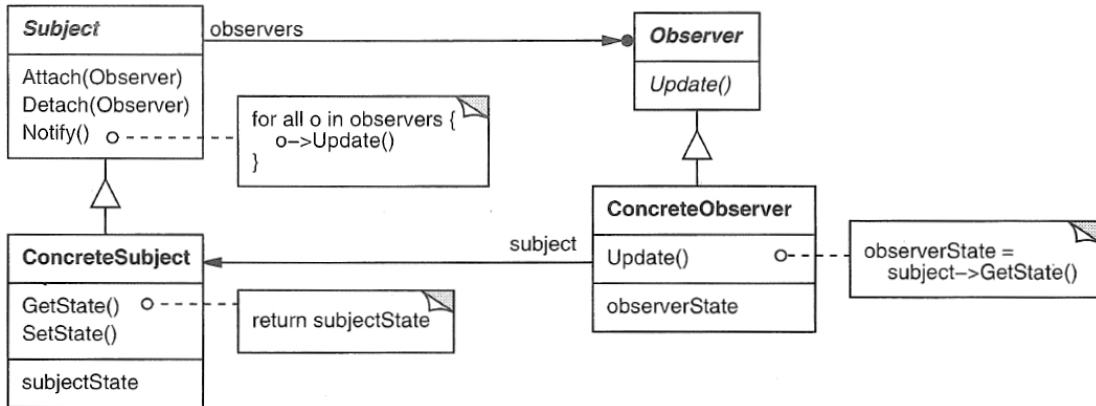


Figure 2. Observer Pattern from the “Gang of Four” book. (Note that the book uses an outdated class diagram notation.)



Figure 3. Classes for investment company web app.