.  Your UCInetID: _____ @ uci.edu        Circle your discussion start time:

| 9:00 am |
| 10:00 am |
| 11:00 am |
| 12:00 pm |
| 1:00 pm |
| 2:00 pm |

# Informatics 43 – Spring, 2015 – Midterm 2

First (given) name: _____ Last (family) name: _____
*Please write your name in* B L O C K *letters, with a slight space between each letter.  Thank you.*

For each question on the following pages, select the best answer.  Mark your answers on this page by circling the letter for each question.  Only turn in this page.

1.   a    b    c    d    e

2.   a    b    c    d    e

3.   a    b    c    d    e

4.   a    b    c    d    e

5.   a    b    c    d    e

6.   a    b    c    d    e

7.   a    b    c    d    e

8.   a    b    c    d    e

9.   a    b    c    d    e

10.  a    b    c    d    e

11.  a    b    c    d    e

12.  a    b    c    d    e

13.  a    b    c    d    e

14.  a    b    c    d    e

15.  a    b    c    d    e

16.  a    b    c    d    e

17.  a    b    c    d    e

18.  a    b    c    d    e

19.  a    b    c    d    e

20.  a    b    c    d    e

21.  a    b    c    d    e

22.  a    b    c    d    e

23.  a    b    c    d    e

24.  a    b    c    d    e

25.  a    b    c    d    e

1. In Open Source Software Development, the distinctive characteristic is that
   a. the developers rely on Wikipedia as the source of information.
   b. the UML "Open Source" diagram is used to drive development.
   c. access to the source code is provided to all people.
   d. the development team is open about its software process model.
   e. anyone who pays a small fee can join the development team.

2. What is "Brooks's Law", as stated in *The Mythical Man-Month*?
   a. Late software projects can be controlled by improved software process models.
   b. Complexity of projects increases with the square of the man-month.
   c. More software projects have gone awry for lack of calendar time than for all other causes combined.
   d. Adding manpower to a late software project makes it later.
   e. The essence of software is its conceptual construct.

3. The word "model" as used in the phrase "software process model" means
   a. a simplified representation.
   b. an ideal version.
   c. a toy.
   d. the latest version.
   e. a prototype.

4. How does Brooks describe "Brooks's Law" in *The Mythical Man-Month*?
   a. Surprisingly accurate.
   b. Incredibly useful.
   c. Naively optimistic.
   d. Outrageously oversimplified.
   e. Complex and invisible.

5. By "conformity", Brooks refers to how
   a. software has to anticipate future needs.
   b. software process models have to incorporate prototyping.
   c. software testing has to verify all use cases.
   d. software has to comply with existing institutions and systems.
   e. all of the above.

6. Brooks uses the analogy of a silver bullet that kills the werewolf to describe something in software that
   a. will have the impact of Ada and other high level languages.
   b. will make digital computer systems conform to the laws of nature.
   c. makes the invisible visible.
   d. provide opportunities for growing designers to interact with and stimulate each other.
   e. provides an order of magnitude improvement in productivity or reliability.

7. The reason for emphasizing "what" over "how" in a requirements specification is
    a. the client is more interested in the "what" aspects.
    b. the "how" aspects are best left to the programmers.
    c. it is important to determine the "what" aspects before spending time on the "how" aspects.
    d. the writers of the requirements specification may not be programmers or designers.
    e. All of the above.

8. Which of the following is *not* a key value of the agile movement, as laid out in the Agile Manifesto?
    a. Planning ahead is more important than reacting to events.
    b. Individuals and interactions are more important than processes and tools.
    c. Working software is more important than comprehensive documentation.
    d. Customer collaboration is more important than contract negotiation.
    e. Responding to change is more important than following a plan.

9. What is the significance of the word "equivalence" in the phrase Equivalence Class Partitioning?
    a. All classes are white box or all classes are black box.
    b. The class is divided into the same number of "what" and "how" subsets.
    c. The UML Class Diagram has only one-to-one relationships.
    d. Each class has the same liklihood of containing a test case with a bug.
    e. For the purposes of testing, every element of the class is the same as the others.

10. Which of the following activities is associated with the upper left hand quadrant of the Spiral model?
    a. Architecture.
    b. Prototyping and resolving risks.
    c. Assigning specific tasks to individuals on the team.
    d. Software product design.
    e. Determining objectives.

11. Which of the following is *not* part of the design phase of software development?
    a. Defining modules and their interfaces.
    b. Selecting programming languages and libraries.
    c. Coding algorithms and data structures.
    d. Developing the specifications in more detail.
    e. All of the above are not part of the design phase.

Here are the seven steps of the Testing Process Model, listed in alphabetical order and labeled P-V:

P. Capture the actual output $A$.
Q. Compare $E$ and $A$. Different? Inform programmer.
R. Decide what to test.
S. Determine the expected output $E$.
T. Loop back to steps 1 or 2, if time permits.
U. Run the system with the test case input.
V. Select a test case input.

12. What are the first, second, and third steps of the Testing Process Model presented in lecture?
    a. U, T, P.
    b. R, V, S.
    c. S, U, V.
    d. P, U, T.
    e. P, S, Q.

13. What are the last two steps of the Testing Process Model?
    a. Q, T.
    b. V, P.
    c. S, Q.
    d. U, T.
    e. R, U.

14. Edsger Dijkstra said, "Testing can show the presence of bugs, but not their absence." Why is this statement generally true?
    a. Because the testing phase, which always is at the end of a project, is never allocated enough time.
    b. Because no silver bullet has yet been discovered.
    c. Because of the limitations of black box testing.
    d. Because software has an effectively infinite number of possible inputs.
    e. Because the essence of software is its complexity.

The terms "error", "failure", and "fault" (listed here in alphabetical order) are given specific definitions in the textbook, and in lecture, to replace the more general term "bug". For the next three questions, match each term with its definition.

| | |
|---|---|
| 15. Error. | a. An inability to make implicit requirements explicit. |
| 16. Failure. | b. A mistake made by a software engineer or programmer. |
| 17. Fault. | c. A defect in source code or in another document, such as a requirements specification. |
| | d. An inconsistency in the test case scenario. |
| | e. The inability of a system to perform the correct function; an incorrect output. |

18. What is the difference between white-box testing and black-box testing?
    a. How they determine whether the output is correct.
    b. Whether they can be used for unit testing.
    c. White-box testing is used with Agile approaches, and black-box is not.
    d. How test cases are selected.
    e. White-box testing is done by a Quality Assurance team, and black-box testing is performed by the programmer.

19. In the "No Silver Bullet" essay, Brooks claims that the complexity of software is
    a. an accident of software, not an essence.
    b. an essential property, not an accidental one.
    c. metaphorically a silver bullet.
    d. due to the difficulty of computer programming.
    e. solvable by high level languages, time sharing, and unified programming environments.

20. What is the primary characteristic of the Waterfall Model of software development?
    a. The process is linear: when one phase is completed, then the next phase begins.
    b. The process is dangerous: people who go over waterfalls are often injured.
    c. The process is circular: when the last phase is completed, then control returns to the first phase.
    d. The process is parallel: multiple phases are performed at the same time.
    e. The process is maximal: all communication paths between nodes are utilized.

21. In *The Mythical Man-Month* Brooks writes that "the man-month as a unit for measuring the size of a job is a dangerous and deceptive myth." What does Brooks think is deceptive about the man-month?
    a. It implies that women cannot be software developers.
    b. It conflicts with the Waterfall Model.
    c. It does not account for the multi-person nature of software engineering.
    d. It does not account for fractional months.
    e. It implies that men and months are interchangeable.

22. Extreme Programming emphasizes refactoring, which takes the place of
    a. customer interaction.
    b. the Waterfall Model.
    c. regression testing.
    d. extensive design.
    e. user stories.

23. Good design and modularization is often said to exhibit
    a. low cohesion and low coupling.
    b. low cohesion and high coupling.
    c. high cohesion and high coupling.
    d. high cohesion and low coupling.
    e. all of the above.

24. In a UML Class Diagram, each box can have three sections. The top section in the box contains
    a. the name of the class.
    b. the primary function of the class.
    c. a list of class attributes.
    d. the name of the user in the use case.
    e. a count of the number of times the class will be used.

25. In testing, the term "oracle" is used to refer to
    a. a system for broadcasting the results of testing.
    b. the database where the test cases are stored.
    c. the senior member of the quality assurance team.
    d. a mechanism for deciding whether a test case execution succeeded or failed.
    e. a collection of testing matrices.