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NPTEL (https://swayam.gov.in/explorer?ncCode=NPTEL) » Software Testing (course)

Course outline

How does an NPTEL online course work?

Pre-requisite Assignment

Week 1

- Lecture 1 - Motivation (unit?unit=17&lesson=18)
- Lecture 2 - Terminologies (unit?unit=17&lesson=19)
- Lecture 3 - Testing based on Models and Criteria (unit?unit=17&lesson=20)
- Lecture 4 - Automation - JUnit as an example (unit?unit=17&lesson=21)
- Week 1 Feedback Form: Software

Week 1: Assignment 1

The due date for submitting this assignment has passed.

Due on 2021-08-18, 23:59 IST.

Assignment submitted on 2021-07-16, 08:49 IST

This assignment is configured as “Match the terms” assignment. Each term on the left side column matches with exactly one term on the right side column.

Match the following

(1)	Regression testing	(a)	Done to evaluate the user interface, aesthetics etc.
(2)	Test automation with JUnit	(b)	Represents a software artifact or its abstraction.
(3)	Black-box testing	(c)	It consists of inputs & expected outputs.
(4)	Usability testing	(d)	A rule or a collection of rules that impose test requirements on test cases.
(5)	Test case	(e)	To find errors in software.
(6)	Reachability	(f)	Every test case that satisfies C1 also satisfies C2.
(7)	Test case models	(g)	The location(s) in the program that contain the fault must be reached.
(8)	Test requirement	(h)	Testing modified software for new errors.
(9)	Criterion C1 subsumes C2	(i)	Usability, performance and stress testing.
(10)	Use of testing	(j)	Command: `assertTrue(boolean)`

1) 1 _____ ***1 point***

- with (a)
- with (c)
- with (h)

- with (g)

Yes, the answer is correct.
Score: 1
Accepted Answers:
with (h)

2) 2 _____ ***1 point***

- with (b)
- with (d)
- with (h)
- with (j)

Yes, the answer is correct.
Score: 1
Accepted Answers:
with (j)

3) 3 _____ ***1 point***

- with (c)
- with (i)
- with (a)
- with (f)

Yes, the answer is correct.
Score: 1
Accepted Answers:
with (i)

4) 4 _____ ***1 point***

- with (a)
- with (b)
- with (c)
- with (d)

Yes, the answer is correct.
Score: 1
Accepted Answers:
with (a)

5) 5 _____ ***1 point***

- with (a)
- with (c)
- with (e)
- with (g)

Yes, the answer is correct.
Score: 1
Accepted Answers:
with (c)

6) 6 _____ ***1 point***

- with (c)
- with (e)

- (g) with (g)
- (i) with (i)

Yes, the answer is correct.
Score: 1

Accepted Answers:
with (g)

7) 7 _____ ***1 point***

- (b) with (b)
- (d) with (d)
- (f) with (f)
- (h) with (h)

Yes, the answer is correct.
Score: 1

Accepted Answers:
with (b)

8) 8 _____ ***1 point***

- (b) with (b)
- (d) with (d)
- (f) with (f)
- (i) with (i)

Yes, the answer is correct.
Score: 1

Accepted Answers:
with (d)

9) 9 _____ ***1 point***

- (j) with (j)
- (i) with (i)
- (h) with (h)
- (f) with (f)

Yes, the answer is correct.
Score: 1

Accepted Answers:
with (f)

10) 10 _____ ***1 point***

- (c) with (c)
- (e) with (e)
- (f) with (f)
- (i) with (i)

Yes, the answer is correct.
Score: 1

Accepted Answers:
with (e)

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Week 2: Assignment 2

The due date for submitting this assignment has passed.

Due on 2021-08-18, 23:59 IST.

Assignment submitted on 2021-08-16, 19:41 IST

1) Which of the following best represents an edge $e = (u, v)$ being reachable in a graph? ***1 point***

- Edge $e = (u, v)$ is reachable if there is a path from one of the initial vertices to the vertex u.
- Edge $e = (u, v)$ is reachable if there is a path from one of the initial vertices to the vertex u and then to the vertex v via the edge e.

Yes, the answer is correct.
Score: 1
Accepted Answers:
Edge $e = (u, v)$ is reachable if there is a path from one of the initial vertices to the vertex u and then to the vertex v via the edge e.

2) A path that begins in one of the initial vertices and ends in a final vertex is called as ***1 point***
. . . .

- A feasible test path.
- An infeasible test path.
- A test path that tours the final vertex.
- A test path.

Yes, the answer is correct.
Score: 1
Accepted Answers:

A test path.

3) Different test cases can execute one single test path. ***1 point***

- (●) True
- ( ) False

Yes, the answer is correct.
Score: 1
Accepted Answers:
True

4) A structural coverage criterion on graph is described by which of the following terms? ***1 point***

- (●) It is defined on a graph model of the software artifact to be tested, purely in terms of vertices and edges.
- ( ) It is defined on a graph model of the software artifact to be tested by using as many details of the artifact that are available in the graph.

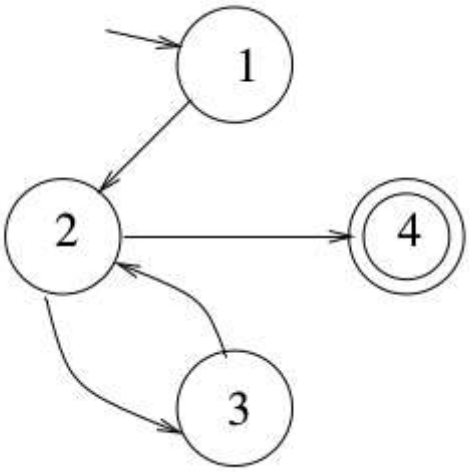
Yes, the answer is correct.
Score: 1
Accepted Answers:
It is defined on a graph model of the software artifact to be tested, purely in terms of vertices and edges.

5) How are test requirements defined and met in graphs-based structural coverage criteria? ***1 point***

- ( ) Test requirements are defined as properties of test paths and they are met by using the same test paths.
- (●) Test requirements are defined as properties of test paths and they are met by using test paths that satisfy each test requirement.

Yes, the answer is correct.
Score: 1
Accepted Answers:
Test requirements are defined as properties of test paths and they are met by using test paths that satisfy each test requirement.

For the next five questions, consider the given graph. The graph has four vertices, vertex 1 is the initial vertex (marked by an incoming arrow), vertex 4 is the final vertex (marked by two circles) and the edges are marked in the graph. The following questions are on structural coverage criteria on this graph.



6) There are test paths that achieve node coverage but not edge coverage. ***1 point***

- True
- False

Yes, the answer is correct.
Score: 1

Accepted Answers:
False

7) Which of the following test paths achieve edge coverage? ***1 point***

- Test path [1, 2, 3, 2, 4].
- Test paths [1, 2, 4] and [1, 2, 3, 2].

Yes, the answer is correct.
Score: 1

Accepted Answers:
Test path [1, 2, 3, 2, 4].

8) State yes or no: The edge pair [3, 2, 3] is toured by the test path [1, 2, 3, 2, 4]. ***1 point***

- Yes
- No

Yes, the answer is correct.
Score: 1

Accepted Answers:
No

9) The test paths {[1, 2, 4], [1, 2, 3, 2, 3, 2, 4]} achieves which of the following coverage criteria? ***1 point***

- Node coverage only.
- Node and edge coverage only.
- Edge pair coverage.
- Edge coverage only.

Yes, the answer is correct.
Score: 1

Accepted Answers:

Edge pair coverage.

10) State yes or no: The test path [1, 2, 3, 2, 4] achieves edge coverage. ***1 point***

- (•) Yes
- ( ) No

Yes, the answer is correct.
Score: 1

Accepted Answers:
Yes

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Week 3: Assignment 3

The due date for submitting this assignment has passed.

Due on 2021-08-25, 23:59 IST.

Assignment submitted on 2021-08-25, 16:21 IST

1) Consider a variable `num` of type `float`, i.e., it is a floating point number. Suppose a particular method has a statement `if(log(num)) >= 0.72`, will it be considered a definition of **num** or a use of `num`? ***1 point***

- The statement is a definition of **num** .
- The statement is a use of **num** .

Yes, the answer is correct.
Score: 1
Accepted Answers:
*The statement is a use of **num** .*

2) Consider a variable count of type `int`. Suppose there is a method that has a statement of the type `count++;`, which of the following statements are correct regarding the data flow definition of `count`? ***1 point***

- The statement is a definition of count.
- The statement is a use of count.
- The statement is both a definition and use of count.
- None of the above holds true.

Yes, the answer is correct.
Score: 1
Accepted Answers:
The statement is both a definition and use of count.

3) State true or false: For every variable in a particular program, every definition of a variable will always reach a use. ***1 point***

- True.
- False.

Yes, the answer is correct.
Score: 1
Accepted Answers:
False.

4) Which of the following best defines a du-path for a variable x? ***1 point***

- A du-path is a simple path from a definition of x to a use of x without any further definitions of x in-between.
- A du-path is a path from a definition of x to a use of x without any further definitions of x in-between.
- A du-path is a simple path from a definition of x to a use of x without any futher uses of x in-between.
- A du-path is a path from a definition of x to a use of x without any further uses of x in-between.

Yes, the answer is correct.
Score: 1
Accepted Answers:
A du-path is a simple path from a definition of x to a use of x without any further definitions of x in-between.

5) State yes or no: We group du-paths with respect to a variable by its uses. ***1 point***

- Yes.
- No.

Yes, the answer is correct.
Score: 1
Accepted Answers:
No.

6) Which of the following properties should a side-trip taken to cover a du- path satisfy? ***1 point***

- Side trips should be use clear.
- Side trips should be def clear.
- Side trips should be def and use clear.
- Side trips need not satisfy any condition.

Yes, the answer is correct.
Score: 1
Accepted Answers:
Side trips should be def clear.

7) Is it true that prime paths coverage (a structural coverage criterion that we saw earlier) subsumes all-du-paths-coverage? ***1 point***

- True.

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False.

Yes, the answer is correct.
Score: 1
Accepted Answers:
True.

8) Which of the following statements are true when it comes to comparing traditional source code coverage criteria with graph based coverage criteria? ***1 point***

- (•) Node and statement coverage are the same, edge and branch coverage are the same.
- ( ) Edge and decision coverage are the same.

Yes, the answer is correct.
Score: 1
Accepted Answers:
Node and statement coverage are the same, edge and branch coverage are the same.

9) Which of the following defines a linearly independent path of eecution in a control flow graph? ***1 point***

- ( ) A path in which there are no branches.
- (•) A path which does not contain other paths within it.
- ( ) A path that represents structural complexity of a program.
- ( ) A path within a connected component.

Yes, the answer is correct.
Score: 1
Accepted Answers:
A path which does not contain other paths within it.

10) State true or false: An algorithm for enumerating prime paths works by enumerating all simple paths in order of increasing length and stops when there are no more such paths. ***1 point***

- (•) True.
- ( ) False.

Yes, the answer is correct.
Score: 1
Accepted Answers:
True.

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Week 4: Assignment 4

The due date for submitting this assignment has passed.

Due on 2021-09-01, 23:59 IST.

Assignment submitted on 2021-09-01, 22:05 IST

1) Which of the following is a graph model used for design integration testing? ***1 point***

- Control flow graph.
- Data flow graph.
- Call graph
- Design graph.

Yes, the answer is correct.
Score: 1
Accepted Answers:
Call graph

2) In design integration, when a caller method m_1 calls a callee method m_2, the variables from m_1 that are used in the call are called as . . . . . ***1 point***

- Actual parameters.
- Formal parameters.

Yes, the answer is correct.
Score: 1
Accepted Answers:
Actual parameters.

3) In design integration, when two methods make queries and updates to an external database, which coupling definition does it represent? ***1 point***

- Message passing coupling.
- Shared data coupling.

Parameter coupling.
External device coupling.

Yes, the answer is correct.
Score: 1
Accepted Answers:
External device coupling.

4) A simple path from the last definition to the first use of a coupling variable is called as . . . . ***1 point***

A du-path.
A coupling du-path.

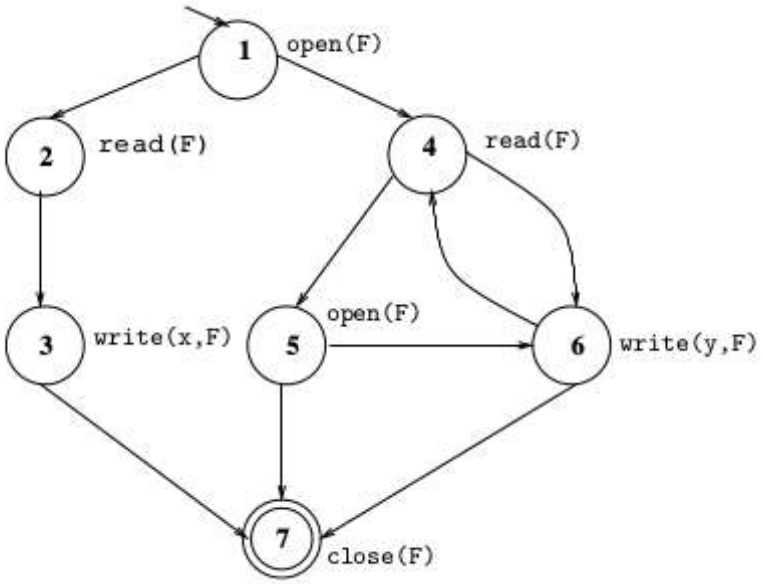
Yes, the answer is correct.
Score: 1
Accepted Answers:
A coupling du-path.

5) State true or false: Are control flow graphs representing code the same as finite state machines that represent the same code. ***1 point***

True.
False.

Yes, the answer is correct.
Score: 1
Accepted Answers:
False.

Consider the graph below that depicts the calls to file handler methods open(), close(), read() and write(). Any procedure/method that uses these methods has to satisfy the following sequencing constraints: (1) An open(f) must be executed before every write(t), (2) An open(f) must be executed before every close(), (3) A write(f) may not be executed after a close() unless there is an open(f) in between, (4) A write(t) should be executed before every close().



Answer the following questions with reference to the sequencing con- straints and the graph a

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method that uses these constraints.

6) Which of the following is true with reference to the graph satisfying the sequencing constraints? ***1 point***

- All the sequencing constraints are satisfied.
- Constraints (1) and (2) are satisfied but (3) and (4) are not.
- Constraints (1), (2) and (3) are satisfied but (4) is not.
- All constraints are violated.

Yes, the answer is correct.
Score: 1
Accepted Answers:
Constraints (1), (2) and (3) are satisfied but (4) is not.

7) State true or false: The path (1,4,5,7) satisfies constraint (4). ***1 point***

- True.
- False.

Yes, the answer is correct.
Score: 1
Accepted Answers:
False.

8) State true or false: The path (1,2,3,7) satisfies all the constraints. ***1 point***

- True.
- False.

Yes, the answer is correct.
Score: 1
Accepted Answers:
True.

9) State yes or no: Does the path (1,4,6,5,7) violate any of the constraints? ***0 points***

- Yes.
- No.

Yes, the answer is correct.
Score: 0
Accepted Answers:
No.

10) State true or false: The path (1,4,6,4,6,5,7) satisfies all the constraints. ***0 points***

- Yes.
- No.

Yes, the answer is correct.
Score: 0
Accepted Answers:
Yes.

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Week 5: Assignment 5

The due date for submitting this assignment has passed.

Due on 2021-09-01, 23:59 IST.

Assignment submitted on 2021-09-01, 22:03 IST

1) For a predicate with n clauses, how many test requirements suffice to achieve active clause coverage? ***1 point***

- n test requirements.
- n + 1 test requirements.
- n − 1 test requirements.
- $2n$ test requirements.

Yes, the answer is correct.
Score: 1
Accepted Answers:
n + 1 test requirements.

2) State true or false: Correlated ICC does not make sense as the major clause does not determine the predicate. ***1 point***

- True.
- False.

Yes, the answer is correct.
Score: 1
Accepted Answers:
True.

3) For a predicate p and a clause c in p, if p_c evaluates to false, then which of the following holds true? ***1 point***

- ACC criteria are infeasible for p with respect to c.
- ICC criteria are infeasible for p with respect to c.

Yes, the answer is correct.
Score: 1
Accepted Answers:
ACC criteria are infeasible for p with respect to c.

4) Which of the following represents a correct order of subsumption among logic coverage criteria? In the options below, read → as "subsumes'. ***1 point***

- Combinatorial coverage → GACC → Clause coverage.
- Combinatorial coverage → GACC → Predicate coverage.

Yes, the answer is correct.
Score: 1
Accepted Answers:
Combinatorial coverage → GACC → Clause coverage.

For the questions below, consider a predicate $p = (a \vee b) \wedge (c \vee d)$. Answer the following questions with reference to applying the various logic coverage criteria on this predicate.

5) How many clauses are there in the predicate p? ***1 point***

- One.
- Two.
- Three.
- Four.

Yes, the answer is correct.
Score: 1
Accepted Answers:
Four.

6) What is the value of p when $a = b = d = True$ and $c = False$? ***1 point***

- True.
- False.

Yes, the answer is correct.
Score: 1
Accepted Answers:
True.

7) For how many combinations of values of the various clauses, does the predicate p become false? ***1 point***

- Two.
- Four.
- Seven.
- Eight.

Yes, the answer is correct.
Score: 1

Accepted Answers:
Seven.

8) Which of the following is p_a , the predicate under which clause a determines p? ***1 point***

- $p_a = b \wedge (c \vee d)$.
- $p_a = \neg b \wedge (c \vee d)$.

Yes, the answer is correct.
Score: 1
Accepted Answers:
$p_a = \neg b \wedge (c \vee d)$.

9) Which of the following is p_c , the predicate under which clause c determines p? ***1 point***

- $p_c = \neg d \wedge (a \vee b)$.
- $p_c = \neg d \vee (a \vee b)$.

Yes, the answer is correct.
Score: 1
Accepted Answers:
$p_c = \neg d \wedge (a \vee b)$.

10) Which of the following sets represent the GACC pairs for clause a? ***1 point***

- The set {5, 6} × {13, 14}.
- The set {5, 6, 7} × {13, 14, 15}.

Yes, the answer is correct.
Score: 1
Accepted Answers:
The set {5, 6, 7} × {13, 14, 15}.

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Week 6: Assignment 6

The due date for submitting this assignment has passed.

Due on 2021-09-08, 23:59 IST.

Assignment submitted on 2021-09-08, 21:19 IST

1) Which of the following techniques are used to avoid using ACC criteria in logic based testing? ***1 point***

- (•) Predicate transformation to eliminate multiple clauses.
- ( ) Predicate transformation to ensure ACC criteria becomes easier.

Yes, the answer is correct.
Score: 1

Accepted Answers:
Predicate transformation to eliminate multiple clauses.

2) While generating logic-based test cases for guards in finite state machines, which of the following will an infeasible test requirement indicate? ***1 point***

- ( ) The predicates are incomplete.
- ( ) The predicates are inconsistent.
- (•) There is an error in the model that the predicate is a part of.
- ( ) There is an error in the connectives of the predicates.

Yes, the answer is correct.
Score: 1

Accepted Answers:
There is an error in the model that the predicate is a part of.

Answer the following questions for the method **`twoPred()`** below. The method is called with

two input parameters **x** and **y**. The variable **z** is internal to the method.

```
public String twoPred (int x, int y)
{
        boolean z;
        if (x < y)
          z = true;
        else
          z = false;
        if (z && x+y == 10)
          return "Yes";
        else
          return "No";
}
```

3) The variable z in the second predicate can be re-written in terms of x and y. Which of the following represents the re-written second predicate? ***0 points***

- ((x < y) && (x+y == 10).
- (x>=y) && (x+y == 10).

No, the answer is incorrect.
Score: 0
Accepted Answers:
(x>=y) && (x+y == 10).

4) State yes or no: Predicate coverage for the first predicate will also subsume predicate coverage for the second predicate. ***1 point***

- Yes.
- No.

Yes, the answer is correct.
Score: 1
Accepted Answers:
No.

5) How many test cases will be needed for clause coverage for the second predicate if we explicitly count the true and false values for each clause? ***1 point***

- Two test cases.
- Four test cases.

Yes, the answer is correct.
Score: 1
Accepted Answers:
Four test cases.

6) State true or false: The set of test case inputs {(x = 5, y = 3), (x = 4, y = 6), (x = 5, y = 6)} will satisfy clause coverage for the second predicate. ***1 point***

- True.
- False.

Yes, the answer is correct.
Score: 1
Accepted Answers:
True.

7) ***1 point***

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State yes or no: The set of test case inputs {(x = 5, y = 3), (x = 4, y = 6), (x = 5, y = 6)} will also satisfy predicate coverage for the first and second predicates.

- (•) Yes.
- ( ) No.

Yes, the answer is correct.
Score: 1
Accepted Answers:
Yes.

8) How many test cases are needed for satisfying RACC for all the clauses for the second predicate? ***1 point***

- ( ) Two test cases.
- (•) Three test cases.
- ( ) Four test cases.
- ( ) Six test cases.

Yes, the answer is correct.
Score: 1
Accepted Answers:
Three test cases.

9) State true or false: The set of test case inputs {(x = 4, y = 6), (x = 6, y = 4), (x = 4, y = 5)} satisfy RACC for the second predicate. ***1 point***

- (•) True.
- ( ) False.

Yes, the answer is correct.
Score: 1
Accepted Answers:
True.

10) State true or false: RICC has no feasible pairs of test cases for the second predicate to be true. ***1 point***

- (•) True.
- ( ) False.

Yes, the answer is correct.
Score: 1
Accepted Answers:
True.

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Week 7: Assignment 7

The due date for submitting this assignment has passed.

Due on 2021-09-15, 23:59 IST.

Assignment submitted on 2021-09-15, 23:36 IST

1) Test cases for black box testing are designed based on which of the follow- ing? ***1 point***

- Test cases are designed based on the code to be tested.
- Test cases are designed based on the design documentation.
- Test cases are taken directly from requirements.
- (selected) Test cases are designed based on inputs and outputs only.

Yes, the answer is correct.
Score: 1

Accepted Answers:
Test cases are designed based on inputs and outputs only.

2) State true or false: All inputs from one partition of inputs in equivalence class partitioning will result in the same output when the program is run on them. ***1 point***

- (selected) True.
- False.

Yes, the answer is correct.
Score: 1

Accepted Answers:
True.

3) Which of the following techniques handle multiple inputs by considering different combinations of equivalence classes? ***1 point***

- Boundary value analysis.

- Functional testing.
- Decision tables.
- Orthogonal arrays.

Yes, the answer is correct.
Score: 1
Accepted Answers:
Decision tables.

4) State true or false: In input space partitioning, both valid and invalid inputs need to be considered. ***1 point***

- True.
- False.

Yes, the answer is correct.
Score: 1
Accepted Answers:
True.

5) State yes or no: In input space partitioning, overlapping and missing partitions are allowed as long as they are values at the boundaries. ***1 point***

- Yes.
- No.

Yes, the answer is correct.
Score: 1
Accepted Answers:
No.

6) Why is Each Choice Coverage (ECC) considered to be a weak criterion? ***1 point***

- No combinations of values are considered.
- Only one choice is considered throughout.

Yes, the answer is correct.
Score: 1
Accepted Answers:
No combinations of values are considered.

7) Which of the following represents the total number of tests for all combinations coverage? In the options below, n is the number of partitions and B_i is the number of blocks in partition i. ***1 point***

- The total number of tests will be $\Pi_{i=1}^{n} B_i$
- The total number of tests will be $\Sigma_{i=1}^{n} B_i$

Yes, the answer is correct.
Score: 1
Accepted Answers:
The total number of tests will be $\Pi_{i=1}^{n} B_i$

8) State true or false: A test case for pair-wise coverage can cover more than one pair of values. ***1 point***

- True.
- False.

Yes, the answer is correct.
Score: 1

Accepted Answers:
True.

9) When does T -wise coverage criterion become the same as all combinations coverage criterion? ***1 point***

- When the value for T is the maximum value in a partition.
- When the value for T is equal to the number of partitions.

Yes, the answer is correct.
Score: 1

Accepted Answers:
When the value for T is equal to the number of partitions.

10) Which of the following represents a correct order of subsumption amongst coverage criteria for input space partitioning? ***1 point***
In the options below read the symbol → as “subsumes”.

- Multiple base choice coverage → Pair-wise coverage → Each choice coverage.
- T-wise coverage → Multiple base choice coverage → Pair-wise cover- age.
- Multiple base choice coverage → Base choice coverage → Each choice coverage.
- Pair-wise coverage → Base choice coverage → Each choice coverage.

Yes, the answer is correct.
Score: 1

Accepted Answers:
Multiple base choice coverage → Base choice coverage → Each choice coverage.

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Week 8: Assignment 8

The due date for submitting this assignment has passed.

Due on 2021-09-22, 23:59 IST.

Assignment submitted on 2021-09-15, 16:53 IST

1) Consider the regular expression $(a+b)^* \cdot c$. Does the word $abbabc$ belong to the language of this regular expression? ***1 point***

- (●) Yes
- ( ) No

Yes, the answer is correct.
Score: 1
Accepted Answers:
Yes

2) Consider the regular expression $(a+b)^* \cdot c$ once again. Which of the following describes the language corresponding to this regular expression? ***1 point***

- ( ) The language is the set of all words over a and b that have a's followed by b's and can optionally end with a c.
- ( ) The language is the set of all words over a and b that have a's and b's and can optionally end with a c.
- (●) The language is the set of all words over a and b ending with a c.
- ( ) The language is the set of all words over a and b that optionally end with a c.

Yes, the answer is correct.
Score: 1

Accepted Answers:
The language is the set of all words over a and b ending with a c.

3) In the syntax of a programming language, which of the following is used to define how tokens form phrases? ***1 point***

- Regular expressions.
- Context-free grammars.
- Context-sensitive grammars.
- Normal forms.

Yes, the answer is correct.
Score: 1
Accepted Answers:
Context-free grammars.

4) Which of the following best defines a mutant? ***1 point***

- A mutant is the result of one application of a mutation operator to a ground string.
- A mutant is the result of at least one application of a mutation op- erator to a ground string.

Yes, the answer is correct.
Score: 1
Accepted Answers:
A mutant is the result of one application of a mutation operator to a ground string.

5) State true or false: Are mutants test cases? ***1 point***

- True
- False

Yes, the answer is correct.
Score: 1
Accepted Answers:
False

6) Which of the following terms defines a mutant that can be killed by any test case? ***1 point***

- Stillborn mutant.
- Dead mutant.
- Equivalent mutant.
- Trivial mutant.

Yes, the answer is correct.
Score: 1
Accepted Answers:
Trivial mutant.

7) With reference to the notion of killing a mutant, which of the following terms do not need propagation of the error? ***1 point***

- Weakly killing a mutant.
- Strongly killing a mutant.

Yes, the answer is correct.
Score: 1
Accepted Answers:
Weakly killing a mutant.

8) When `bomb()` statement is used to replace a particular statement during mutation, ***1 point*** which of the following describes its use?

- (selected) Since it signals a failure as soon as it is executed, it can be used to test if the particular statement can be reached.
- Since it signals a potential failure, it can be used to check if the particular statement is erroneous.

Yes, the answer is correct.
Score: 1
Accepted Answers:
Since it signals a failure as soon as it is executed, it can be used to test if the particular statement can be reached.

9) What is the result of applying the mutation operator `failOnZero()`? ***1 point***

- (selected) The mutant with this operator is considerd to be killed if the value of the resulting expression is zero.
- The mutant with this operator forces the value of the resulting ex- pression to be zero.

Yes, the answer is correct.
Score: 1
Accepted Answers:
The mutant with this operator is considerd to be killed if the value of the resulting expression is zero.

10) Replacing a statement of the form `x := a+b`; with `x:=a`; is an example of which ***1 point*** kind of mutation operator?

- Relational operator replacement.
- Assignment operator replacement.
- (selected) Arithmetic operator replacement.
- None of the above.

Yes, the answer is correct.
Score: 1
Accepted Answers:
Arithmetic operator replacement.

X


(https://swayam.gov.in)


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Week 9: Assignment 9

The due date for submitting this assignment has passed.

Due on 2021-09-29, 23:59 IST.

Assignment submitted on 2021-09-29, 23:51 IST

1) Changing a method call `min(a,b)` to a call `min(b,a)` is an example of which kind of mutation operator for program integration testing? ***1 point***

- Integration Parameter Variable Replacement.
- Integration Parameter Exchange.

Yes, the answer is correct.
Score: 1
Accepted Answers:
Integration Parameter Exchange.

2) Which of the following mutation operators represent moving an overidden method call up or down by one or two statements? ***1 point***

- Overriding method modification.
- Overriding method renaming.
- Overriding method rewriting.
- Overriding method moving.

Yes, the answer is correct.
Score: 1
Accepted Answers:
Overriding method moving.

3) Which of the following integration mutation operator represents changing the order of arguments in method invocations to be the same as that of another overloading method, if one exists? ***1 point***

- Overloading method change.
- Argument number change.
- Argument order change.
- Reference type change.

Yes, the answer is correct.
Score: 1
Accepted Answers:
Argument order change.

4) State true or false: While applying mutation operators for integration testing, both the callee and the caller methods are considered. ***1 point***

- True
- False

Yes, the answer is correct.
Score: 1
Accepted Answers:
True

5) State yes or no: Is there a notion of killing of a mutant while applying mutation testing to inputs? ***1 point***

- Yes
- No

Yes, the answer is correct.
Score: 1
Accepted Answers:
No

6) Which of the access levels in Java allows access with the same class and within different class but same package? ***1 point***

- Public.
- Private
- Protected.
- Package.

Yes, the answer is correct.
Score: 1
Accepted Answers:
Package.

7) When the mutation operator of hiding variable deletion is applied, what does it cause in the ground string program? ***1 point***

- It removes references to the variable.
- It hides the variable.
- It causes references to the variable to access the variable defined in the parent or ancestor.
- It causes references to the variable to access the variable defined in the child class.

Yes, the answer is correct.
Score: 1
Accepted Answers:
It causes references to the variable to access the variable defined in the parent or ancestor.

8) Which options below have the two kinds of variables associated with a class? ***1 point***

- (●) Instance and class variables.
- ( ) Public and private variables.

Yes, the answer is correct.
Score: 1
Accepted Answers:
Instance and class variables.

9) State true or false: XML inputs to a program cannot be mutated as XML language is very complicated. ***1 point***

- ( ) True
- (●) False

Yes, the answer is correct.
Score: 1
Accepted Answers:
False

10) State true or false: Weak mutation testing subsumes node and edge cov- erage criteria in graphs based testing. ***1 point***

- (●) True
- ( ) False

Yes, the answer is correct.
Score: 1
Accepted Answers:
True

X

Week 10: Assignment 10

The due date for submitting this assignment has passed.

Due on 2021-10-06, 23:59 IST.

Assignment submitted on 2021-10-06, 23:40 IST

1) Which of the following best represents the checking of static websites? ***1 point***

- Testing involves checking if the underlying HTML files are correct.
- Testing involves checking for dead links and checking if all links are valid.
- Testing involves checking for the usability of the website.
- Testing involves checking if the content given in the website is correct.

Yes, the answer is correct.
Score: 1
Accepted Answers:
Testing involves checking for dead links and checking if all links are valid.

2) Which of the following is a typical example of a dynamic web page? ***1 point***

- The website of a university department giving details regarding the courses, faculty, facilities etc.
- The website of an application portal for filling application forms for degree programs.

Yes, the answer is correct.
Score: 1
Accepted Answers:
The website of an application portal for filling application forms for degree programs.

3) Which of the following best describes bypass testing? ***1 point***

- It is a client side testing technique where test cases are chosen to violate constraints on the inputs that are checked by a client application.

It is a server side testing technique where test cases are chosen to violate constraints on the inputs that can be ignored by the server.

Yes, the answer is correct.
Score: 1
Accepted Answers:
It is a client side testing technique where test cases are chosen to violate constraints on the inputs that are checked by a client application.

4) Which of the following lists constraints that cannot typically be checked by just using HTML? ***1 point***

Constraints involving POST/GET transfer modes and constraints on the length of input.
Constraints involving inter-dependent values and the format of input data.

Yes, the answer is correct.
Score: 1
Accepted Answers:
Constraints involving inter-dependent values and the format of input data.

5) State true or false: Client-side test cases are designed such that the server can ignore the wrong inputs generated by clients. ***1 point***

True
False

No, the answer is incorrect.
Score: 0
Accepted Answers:
False

6) Which of the following is a list of transitions between components in a component interaction model involved in server side testing? ***1 point***

Transitions that deal with invalid user inputs.
Transitions between atomic sections.
Transitions from one page to another by clicking of hyperlinks.
Simple link transition, form link transition, operational transition.

Yes, the answer is correct.
Score: 1
Accepted Answers:
Simple link transition, form link transition, operational transition.

7) Which of the following describes a fault in which an overriding method defines the same state variables that the overridden method
defines but the computations by the two methods are not the same. ***1 point***

State definition inconsistency anomaly.
State defined incorrectly fault.
Method defined incorrectly anomaly.
State visibility anomaly.

Yes, the answer is correct.
Score: 1
Accepted Answers:
State defined incorrectly fault.

8) Which of the following defines the nodes of a yo-yo graph? ***1 point***

Nodes of a yo-yo graph are the classes of the inheritance hierarchy.

Nodes of a yo-yo graph are the methods of different classes, one node for each of the new, inherited and overridden methods.

Yes, the answer is correct.
Score: 1

Accepted Answers:
Nodes of a yo-yo graph are the methods of different classes, one node for each of the new, inherited and overridden methods.

9) Which of the following best defines the edges of a yo-yo graph? ***1 point***

Edges of a yo-yo graph are the method calls among methods of different classes.

Edges of a yo-yo graph are among classes at different levels of inheritance.

Edges of a yo-yo graph are from a caller method to a callee method.

Edges of a yo-yo graph are of two kinds— the actual method calls and the calls that cannot be made due to overriding.

Yes, the answer is correct.
Score: 1

Accepted Answers:
Edges of a yo-yo graph are of two kinds— the actual method calls and the calls that cannot be made due to overriding.

X

Week 11: Assignment 11

The due date for submitting this assignment has passed.

Due on 2021-10-13, 23:59 IST.

Assignment submitted on 2021-10-13, 23:19 IST

1) Which of the following is true about concolic testing? ***1 point***

- Concolic testing is used instead of symbolic testing when the latter fails.
- Concolic testing keeps concrete state and symbolic state.

Yes, the answer is correct.
Score: 1
Accepted Answers:
Concolic testing keeps concrete state and symbolic state.

2) What is the use of a constraint solver in symbolic testing? ***1 point***

- Constraint solvers are used to collect path constraints in symbolic testing.
- Constraint solvers are used to solve path constraints in symbolic testing.
- Constraint solvers are not useful in symbolic testing as not all path constraints can be collected and solved.
- Constraint solvers always return true or false values dictating paths in symbolic testing.

Yes, the answer is correct.
Score: 1
Accepted Answers:
Constraint solvers are used to solve path constraints in symbolic testing.

3) State true or false: Symbolic execution involving loops will always detect non-terminating loops. ***1 point***

- True
- False

Yes, the answer is correct.
Score: 1
Accepted Answers:
False

4) State true or false: Symbolic execution can simultaneously take both the "true" and "false" execution paths for decision statements in a program. ***1 point***

- (•) True
- ( ) False

Yes, the answer is correct.
Score: 1
Accepted Answers:
True

5) What are the two techniques used in the algorithm deployed by DART? ***1 point***

- ( ) Ramdom testing and symbolic testing.
- ( ) Symbolic testing and automated testing.
- ( ) Directed search and random testing.
- (•) Concrete testing and symbolic testing.

No, the answer is incorrect.
Score: 0
Accepted Answers:
Directed search and random testing.

6) What is a stack used for in the DART algorithm? ***1 point***

- (•) It is used to remember details of the decision statements that are present during random testing.
- ( ) It is used to store the states of the program.

Yes, the answer is correct.
Score: 1
Accepted Answers:
It is used to remember details of the decision statements that are present during random testing.

Consider the code fragment given below. Answer the following questions related to symbolic execution of the given code fragment.

```
0: int x, y;
1: if (x > y) {
2: x = x + y;
3: y = x - y;
4: x = x - y;
5: if (x - y > 0)
6: assert(false);
}
```

7) How many decision points are there in the code fragment? ***1 point***

- (•) Two decision points.
- ( ) Three decision points.

Yes, the answer is correct.
Score: 1

Accepted Answers:
Two decision points.

8) What will be the path constraint at line 1 of the code fragment such that no further execution happens? ***1 point***

- `x > y.`
- `x <= y.`

Yes, the answer is correct.
Score: 1

Accepted Answers:
x <= y.

9) What will be the path constraint to reach statement 6? ***1 point***

- `x > y && y - x > 0.`
- `x > y && y - x <= 0.`

Yes, the answer is correct.
Score: 1

Accepted Answers:
x > y && y - x > 0.

10) State yes or no: Is statement 6 reachable in the program fragment? ***1 point***

- Yes.
- No.

Yes, the answer is correct.
Score: 1

Accepted Answers:
No.

X

Week 12: Assignment 12

The due date for submitting this assignment has passed.

Due on 2021-10-20, 23:59 IST.

As per our records you have not submitted this assignment.

1) State true or false: Non-functional testing is done at all phases of testing during software development. ***1 point***

- True
- False

No, the answer is incorrect.
Score: 0
Accepted Answers:
False

2) While sharing files over a common folder, suppose we provide access to read only or edit permissions to the users with which the files are shared, it represents testing for which feature? ***1 point***

- Reliability testing.
- Quality testing.
- Security testing.
- Compatibility testing.

No, the answer is incorrect.
Score: 0
Accepted Answers:
Security testing.

3) While launching a website, suppose we test for the website permitting simultaneous login of 1 to 5000 users, then which testing does it represent? ***1 point***

- Performance testing.
- Scalability testing.

Compatibility testing.
Stress testing.

No, the answer is incorrect.
Score: 0
Accepted Answers:
Scalability testing.

4) While testing a home assistant software, reading through the trouble shooting online help represents which kind of testing? ***1 point***

Compatibility testing.
Documentation testing.
Error testing.
Regression testing.

No, the answer is incorrect.
Score: 0
Accepted Answers:
Documentation testing.

5) State true or false: Load testing is done to find out and understand the upper limit capacity of the system under test and also to determine how the system performs if the current load goes well above the expected limit. ***1 point***

True
False

No, the answer is incorrect.
Score: 0
Accepted Answers:
False

6) Which of the following parameters are considered in performance testing? ***1 point***

Number of concurrent users, throughput, response time.
Maximum number of allowed users, response time.

No, the answer is incorrect.
Score: 0
Accepted Answers:
Number of concurrent users, throughput, response time.

7) When is a test case for regression testing considered obsolete? ***1 point***

A test case is considered obsolete if it is an invalid input to the modified program.
A test case is considered obsolete if the modified program produces the same output as the original program on the test case.

No, the answer is incorrect.
Score: 0
Accepted Answers:
A test case is considered obsolete if it is an invalid input to the modified program.

8) State true or false: Random testing and retest-all testing techniques are considered useful in regression testing. ***1 point***

True
False

No, the answer is incorrect.
Score: 0

Accepted Answers:
False

9) Which of the following object-oriented data flow criterion does not consider inheritance and polymorphism? ***1 point***

- All-poly-coupling-sequences.
- All-coupling-sequences.
- All-coupling-defs-and-uses.
- All-poly-classes.

No, the answer is incorrect.
Score: 0

Accepted Answers:
All-coupling-defs-and-uses.

10) In the testing of mobile applications, which of the following represents testing the application in different mobile phones, browsers and for different languages? ***1 point***

- Performance testing.
- Interrupt testing.
- Installation testing.
- Compatibility testing.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Compatibility testing.