

The due date for submitting this assignment has passed.

Due on 2023-06-18, 23:59 IST

You may submit any number of times before the due date. The final submission will be considered for grading.

You have last submitted on: 2023-06-17, 19:05 IST

1 point

- 1) Select the statements that are **true** with respect to software errors.

- If a software system that needs to be run continuously, encounters an error. There is no way to fix this error without shutting down the system.
- Poorly tested software systems will be more prone to errors.
- Software testing can be started only after the software development is completed.
- After completely testing software, there can still be errors in the software.

Yes, the answer is correct.

Score: 1

Accepted Answers:

Poorly tested software systems will be more prone to errors.

After completely testing software, there can still be errors in the software.

- 2) Choose the correct sequence of testing levels based on the SLDC phase they are applied to. First to last from left to right.

1 point

- (1) Beta Testing

- (2) Unit Testing

- (3) System Testing

- (4) Integration Testing

- (5) Acceptance Testing

- 4 -> 2 -> 3 -> 1 -> 5

- 2 -> 1 -> 4 -> 3 -> 5

- 5 -> 2 -> 3 -> 4 -> 1

- 2 -> 4 -> 3 -> 5 -> 1

Yes, the answer is correct.

Score: 1

Accepted Answers:

2->4 -> 3 -> 5 -> 1

- 3) Consider a software system containing several components of which two are named

1 point

1: C1

and

1: C2

:

1: C1  
contains two methods named  
1: createBlock  
and  
1: packBlock  
|  
1: createBlock  
calls  
1: packBlock  
. Other than that, these two method does not call any other user defined methods.

1: C2

contains a method named

1: updateBlock

; this method calls

1: packBlock

from

1: C1

:

We want to test the end to end functioning of methods |

1: updateBlock

and

1: createBlock

, the level of testing sufficient to test these are.

1: updateBlock

: Unit testing.

1: createBlock

: System testing

: Unit testing.

1: updateBlock

: Unit testing.

1: createBlock

: Integration testing

: System testing.

1: updateBlock

: Integration testing.

1: createBlock

: Unit testing

Yes, the answer is correct.

Score: 1

Accepted Answers:

Level 1

Level 2

Level 3

Yes, the answer is correct.

Score: 1

Accepted Answers:

Level 1

Level 2

Level 3

Yes, the answer is correct.

Score: 1

Accepted Answers:

1: a1+b1 < 5 && b1 < 9

- 4) There was an error detected in a software that is complete and deployed. This error was fixed by the software developer. After fixing the error the developer wants to test that the whole system is working correctly, this testing is typically referred as \_\_\_\_\_

1 point

- Functional testing

- Regression testing

- System testing

- Acceptance testing

Yes, the answer is correct.

Score: 1

Accepted Answers:

Integration testing

System testing

Acceptance testing

Yes, the answer is correct.

Score: 1

Accepted Answers:

1: LINE-1

such that the method would setup the fixture (initialize)

1: n1, n2

and

1: c

) for test cases.

public void setUp()

public void init()

public void run()

Yes, the answer is correct.

Score: 1

Accepted Answers:

public void setUp()

1: LINE-1

such that the method would setup the fixture (initialize)

1: n1, n2

and

1: c

) for test cases.

public void setUp()

public void init()

public void run()

Yes, the answer is correct.

Score: 1

Accepted Answers:

1: a1+b1 < 5 && b1 < 9

5) You want to develop an Android app that contains only one button. On pressing this button the whole screen turns white if its black, and turns black if its white. Initially when the app is started the screen is white. You job is to develop this app and test the correctness, and complete this process quickly.

1 point

Choose the minimum level of testing that should be sufficient while not compromising on the correctness.

Level 0

Level 1

Level 2

Level 3

Yes, the answer is correct.

Score: 1

Accepted Answers:

1: LINE-1

such that the output when executing

1: TestRun

class becomes

true

;

assertNull(e.getName())

assertNotEquals("Kumar", e.getName())

assertEquals("Kumar", e.getName())

No, the answer is incorrect.

Score: 0

Accepted Answers:

public void assertEquals()

1: LINE-1

such that the method would setup the fixture (initialize)

1: n1, n2

and

1: c

) for test cases.

public void assertEquals()

public void assertNull()

public void assertNotEquals()

public void assertEquals()

Yes, the answer is correct.

Score: 1

Accepted Answers:

1: a1+b1 < 5 && b1 < 9

6) Consider the code segment given below:

1 point

1: public void addNumbers(int a, int b) {

2: if(b < 5)

3: {

4:     a = a+1;

5:     b = b+10;

6:     return a;

7: }

If the values passed to the function

1: addNumbers

for variables

1: a

and

1: b

are

1: a1

and

1: b1

respectively. Then in which of the following condition the execution will reach the error statement in line |

1: 6

?

a1+b1 < 5

a1+b1 < 5 && b1 < 10

a1+b1 < 5 && b1 < 9

b1 < 9

Yes, the answer is correct.

Score: 1

Accepted Answers:

1: LINE-1

such that the method would setup the fixture (initialize)

1: n1, n2

and

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1 point

- 1) Which of the following are added to tours corresponding to test paths to make infeasible test requirements feasible?

- Prime paths.
- Initial and final nodes.
- Side trips and de-tours.
- Nothing.

Yes, the answer is correct.

Score: 1

Accepted Answers:

Side trips and de-tours.

- 2) Which of the following represents the running time of algorithms DFS and BFS run on a graph

1  $G = (V, E)$

?

Running time for both BFS and DFS is

- 1  $O(|V|)$
- 2  $O(|V| + |E|)$
- 3  $O(|V| \cdot |E|)$
- 4  $O(|V|^2)$

Running time for both BFS and DFS is

- 1  $O(|V| + |E|)$
- 2  $O(|V| \cdot |E|)$
- 3  $O(|V|^2)$
- 4  $O(|V|)$

Running time for BFS is

- 1  $O(|V| + |E|)$
- 2  $O(|V| \cdot |E|)$
- 3  $O(|V|^2)$
- 4  $O(|V|)$

and can be asymptotically more for DFS.

Running time for DFS is

- 1  $O(|V| + |E|)$
- 2  $O(|V| \cdot |E|)$
- 3  $O(|V|^2)$
- 4  $O(|V|)$

, and can be asymptotically more for BFS.

Yes, the answer is correct.

Score: 1

Accepted Answers:

Running time for both BFS and DFS is  $O(|V| + |E|)$ .

1 point

- 3) Strongly connected components in control flow graphs correspond to which of the following?

- Non-terminating loops.
- Loop executing more than once.
- All types of loops.
- Nested loops.

Yes, the answer is correct.

Score: 1

Accepted Answers:

All types of loops.

- 4) Which of the following coverage criteria(s) is/are always feasible for a directed cyclic graph.

1 point

- Node coverage.
- Edge-pair coverage.
- Each reachable path of length up to 3.
- Complete path coverage.

No, the answer is incorrect.

Score: 0

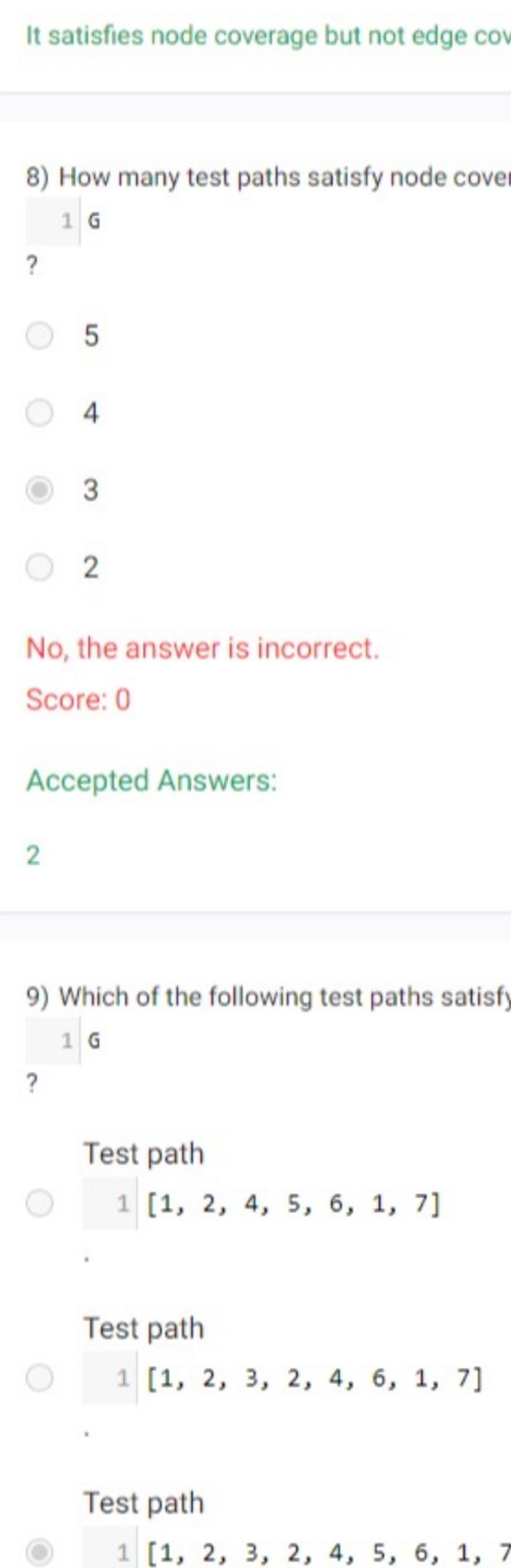
Accepted Answers:

Node coverage.

Edge-pair coverage.

Complete path coverage.

Common Data for the questions 5 to 12



Consider the above graph for the next set of questions, on structural graph coverage criteria. The set of nodes is given by

1  $N = \{1, 2, 3, 4, 5, 6, 7\}$

. Initial node is

1  $N_0 = \{1\}$

. final node is

1  $N_f = \{7\}$

and the set of edges are given by

1  $E = \{(1, 2), (1, 7), (2, 3), (2, 4), (3, 2), (4, 5), (4, 6), (5, 6), (6, 1)\}$

. Answer the following questions regarding structural coverage criteria over this graph.

- 5) How many test requirements are there for edge coverage?

1 point

- 5
- 7
- 9
- 12

Yes, the answer is correct.

Score: 1

Accepted Answers:

9

- 6) How many test requirements are there for edge pair coverage?

1 point

- 5
- 7
- 9
- 12

Yes, the answer is correct.

Score: 1

Accepted Answers:

12

- 7) Which of the following is true for the test paths

1  $[1, 2, 3, 2, 4, 5, 6, 1, 7]$

?

- It does not satisfy node coverage.
- It satisfies edge coverage.
- It satisfies node coverage but not edge coverage.
- It satisfies edge pair coverage.

No, the answer is incorrect.

Score: 0

Accepted Answers:

None of the above.

- 8) How many test paths satisfy node coverage on the graph

1  $G$

?

- 5
- 4
- 3
- 2

No, the answer is incorrect.

Score: 0

Accepted Answers:

2

- 9) Which of the following test paths satisfy edge coverage on the graph

1  $G$

?

Test path

1  $[1, 2, 4, 5, 6, 1, 7]$

?

Test path

1  $[1, 2, 3, 2, 4, 5, 6, 1, 7]$

?

- None of the above.

No, the answer is incorrect.

Score: 0

Accepted Answers:

It satisfies node coverage but not edge coverage.

1 point

- 10) Which of the following statement(s) is/are true for the test paths

1  $P = \{1, 2, 3, 2, 4, 6, 1, 2, 4, 5, 6, 1, 7\}$

and

1  $Q = \{1, 2, 4, 5, 6, 1, 7\}$

?

- It does not satisfy node coverage.
- It satisfies edge coverage.
- It satisfies node coverage but not edge coverage.
- It satisfies edge pair coverage.

No, the answer is incorrect.

Score: 0

Accepted Answers:

None of the above.

- 11) What is the length of longest prime path that can be found in the graph

1  $G$

?

- 5
- 6
- 7
- 8

No, the answer is incorrect.

Score: 0

Accepted Answers:

6

1 point

- 12) Which of the following test paths satisfy edge coverage?

1 point

1  $[1, 2, 3, 2, 4, 5, 6, 1, 7]$

?

1  $[1, 2, 4, 6, 1, 2, 3, 2, 4, 5, 6, 1, 7]$

?

1  $[1, 2, 3, 2, 4, 5, 6, 1, 2, 4, 6, 1, 7]$

?

1  $[1, 2, 4, 5, 6, 1, 2, 3, 2, 4, 5, 6, 1, 7]$

?

No, the answer is incorrect.

Score: 0

Accepted Answers:

[1, 2, 4, 6, 1, 2, 3, 2, 4, 5, 6, 1, 7]

[1, 2, 3, 2, 4, 5, 6, 1, 2, 4, 6, 1, 7]

?

No, the answer is incorrect.

Score: 0

Accepted Answers:

None of the above.

- 13) Which of the following test paths satisfy node coverage on the graph

1  $G$

?

- 5
- 4
- 3
- 2

No, the answer is incorrect.

Score: 0

Accepted Answers:

3

0 points

- 14) Which of the following test paths satisfy edge coverage on the graph

1  $G$

?

Test path

1  $[1, 2, 4, 5, 6, 1, 7]$

?

Test path

1  $[1, 2, 3, 2, 4, 5, 6, 1, 7]$

?

- None of the above.

No, the answer is incorrect.

Score: 0

1 point

The due date for submitting this assignment has passed.

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You may submit any number of times before the due date. The final submission will be considered for grading.

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1) All uses coverage subsumes edge coverage due to which of the following reason?

- Each use includes some edge.
- Each edge has at least one use.
- Each edge has at most one use.
- None of the above.

Yes, the answer is correct.

Score: 1

Accepted Answers:

Each edge has at least one use.

2) Which of the following statements are true?

- Side trips in data flow coverage criteria have to be def-clear.
- Side trips in data flow coverage criteria may or may not be def-clear.
- All-du-paths coverage subsumes prime path coverage.
- Prime path coverage subsumes all-du-paths coverage.

Yes, the answer is correct.

Score: 1

Accepted Answers:

Side trips in data flow coverage criteria have to be def-clear.

Prime path coverage subsumes all-du-paths coverage.

Common data for the next three questions.

Consider the following code segment:

```
x=0;
y=1;
while(x<y)
{
    y = x+y;
    x = x+1;
}
```

Answer the following questions with respect to the control flow graph of the above code segment.

3) How many total nodes will be in the CFG of the above code segment, and how many of them will be dummy nodes?

- Four nodes, no dummy node.
- Four nodes, one dummy node.
- Five nodes, no dummy node.
- Five nodes, one dummy node.

Yes, the answer is correct.

Score: 1

Accepted Answers:

Four nodes, one dummy node.

4) State true or false: There is only one node corresponding to the first two statements of the above code segment.

- True.
- False.

Yes, the answer is correct.

Score: 1

Accepted Answers:

True.

5) In the CFG of the above code, how many unique nodes will be there corresponding to the two statements within the body of the while loop?

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

Yes, the answer is correct.

Score: 1

Accepted Answers:

One.

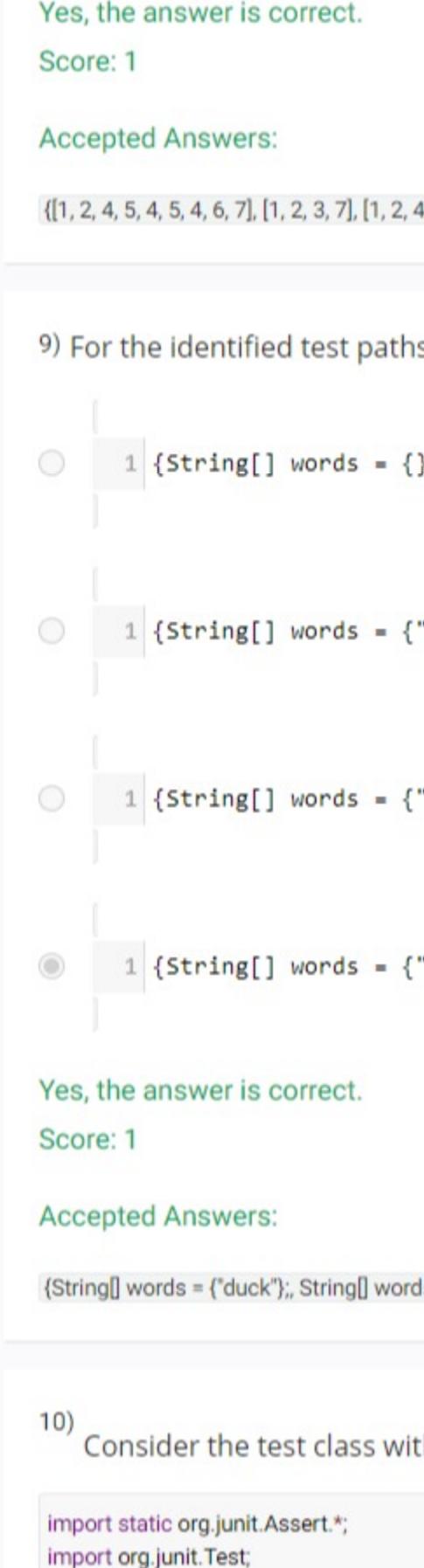
1 point

Common data for Next 5 questions

Consider the following code base. The method `getAvgWordLen()` needs to be tested.

```
//code base
public class StringStat {
    private String[] words;
    public StringStat(String[] words) {
        this.words = words;
    }
    public double getAvgWordLen() {
        double avg = 0.0;
        int totalLen = 0;
        int n = words.length;
        if(n == 1) {
            avg = words[0].length();
        } else {
            for(int i = 0; i < n; i++) {
                totalLen += words[i].length();
            }
        }
        avg = (double)totalLen / n;
    }
    return avg;
}
}
```

6) Select the correct CFG for the given function `getAvgWordLen()`.



Yes, the answer is correct.

Score: 1

Accepted Answers:

{[1, 2, 4, 6, 7], [1, 2, 4, 5], [1, 2, 3, 7], [5, 4, 6, 7], [5, 4, 5], [4, 5, 4]}

7) For the identified CFG in the previous question, identify option that provides all the prime paths.

- 1 {[1, 2, 4, 6, 7], [2, 4, 5, 6], [1, 2, 3, 7], [6, 5, 7], [5, 6, 5]}
- 2 {[1, 2, 4, 6, 7], [1, 2, 4, 5], [1, 2, 3, 7], [5, 4, 6, 7], [5, 4, 5], [4, 5, 4]}
- 3 {[1, 2, 4, 5, 7], [2, 4, 5, 6], [1, 2, 3, 7], [6, 5, 7], [1, 2, 4, 5], [5, 6, 5, 7]}

Yes, the answer is correct.

Score: 1

Accepted Answers:

{[1, 2, 4, 5, 4, 6, 7], [1, 2, 3, 7], [1, 2, 4, 6, 7]}

8) For the identified prime paths in the previous question, identify the option presenting all the test paths that provide prime path coverage.

- 1 {[1, 2, 4, 5, 7], [1, 2, 3, 7]}
- 2 {[1, 2, 4, 5, 4, 5, 6, 7], [1, 2, 3, 7], [1, 2, 4, 6, 7]}
- 3 {[1, 2, 4, 5, 7], [1, 2, 4, 5, 6, 5, 7]}

Yes, the answer is correct.

Score: 1

Accepted Answers:

{[1, 2, 4, 5, 4, 6, 7], [1, 2, 3, 7], [1, 2, 4, 6, 7]}

9) For the identified test paths in the previous question, identify the option presenting the test cases that test all the test paths in the code base.

- 1 {String[] words = {}}, String[] words = {"duck", "crow";}
- 2 {String[] words = {}}, String[] words = {"duck", "crow", "cow";}
- 3 {String[] words = {"duck"}}, String[] words = {"duck", "crow", "cow";}
- 4 {String[] words = {"duck"}}, String[] words = {}}, String[] words = {"duck", "crow";}

Yes, the answer is correct.

Score: 1

Accepted Answers:

{String[] words = {"duck"}, String[] words = {}}, String[] words = {"duck", "crow";}}

10) Consider the test class with the test methods (for the code base given) as follows:

```
import static org.junit.Assert.*;
import org.junit.Test;

public class TestStringStat {
    @Test
    public void testCase1() {
        String[] words = {"duck", "crow"};
        StringStat ss = new StringStat(words);
        assertEquals(ss.getAvgWordLen() == 4.0);
    }
    @Test
    public void testCase2() {
        String[] words = {"duck"};
        StringStat ss = new StringStat(words);
        assertEquals(ss.getAvgWordLen() == 4.0);
    }
    @Test
    public void testCase3() {
        String[] words = {};
        StringStat ss = new StringStat(words);
        assertEquals(ss.getAvgWordLen() == 0.0);
    }
    @Test
    public void testCase4() {
        String[] words = {"duck", "cow", "camel"};
        StringStat ss = new StringStat(words);
        assertEquals(ss.getAvgWordLen() == 4.0);
    }
}
```

Identify the test function that uncover the error in the given code base?

- testCase1()
- testCase2()
- testCase3()
- testCase4()

Yes, the answer is correct.

Score: 1

Accepted Answers:

testCase3()

1 point

The due date for submitting this assignment has passed.

Due on 2023-07-09, 23:59 IST.

You may submit any number of times before the due date. The final submission will be considered for grading.

You have last submitted on: 2023-07-09, 18:56 IST

1) Which of the following is a formula for the cyclomatic complexity of a code that does not have any procedure calls? In the options below, E is the number of edges in the CFG, N is the number of nodes in the CFG and P is the number of connected components in the CFG. 1 point

- Cyclomatic complexity is  $M = E - N + P$ .
- Cyclomatic complexity is  $M = E + N + 2$ .
- Cyclomatic complexity is  $M = N - E + 2P$ .
- Cyclomatic complexity is  $M = E - N + 2$ .

Yes, the answer is correct.

Score: 1

Accepted Answers:

Cyclomatic complexity is  $M = E - N + 2$ .

2) Which of the following statements are true. 1 point

- A test drivers is a special purpose skeletal implementation of a software module used in integration testing.
- A test stub is a special purpose skeletal implementation of a software module used in integration testing.
- Test drivers are used in bottom up integration testing.
- Test stubs are used in bottom up integration testing.

Yes, the answer is correct.

Score: 1

Accepted Answers:

A test stub is a special purpose skeletal implementation of a software module used in integration testing.

Test drivers are used in bottom up integration testing.

3) Single vertices of out-degree  $\geq$  1 point

x  
are DD-paths.  
In the above statement what will be the numerical value of

x  
?

0

1

2

3

Yes, the answer is correct.

Score: 1

Accepted Answers:

2

4) Which of the following is true about basis path testing? 1 point

- Basis path testing subsumes edge-pair coverage.
- Basis path testing is not related to any other graph coverage criteria.
- Basis path testing subsumes complete path coverage.
- Basis path testing subsumes branch coverage.

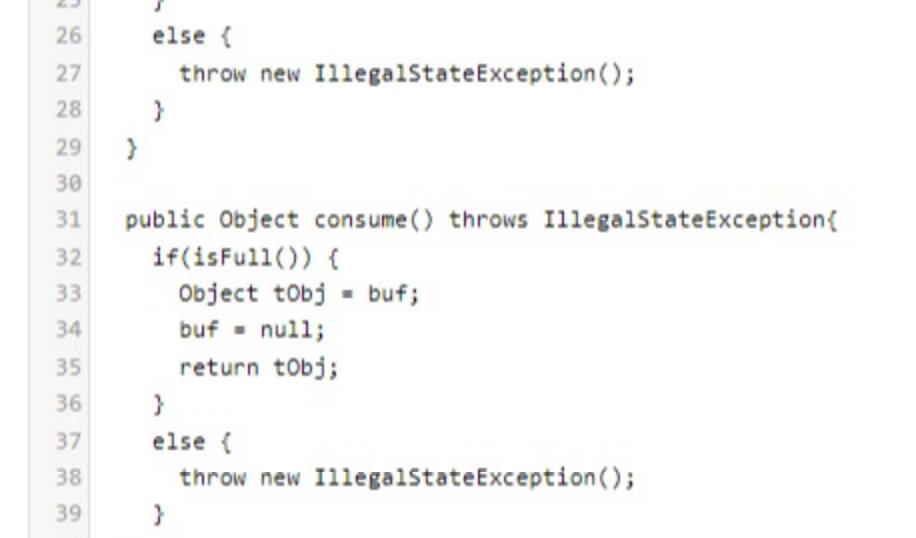
Yes, the answer is correct.

Score: 1

Accepted Answers:

Basis path testing subsumes branch coverage.

5) Consider the simple FSM that represents the activation of an electrical device. 1 point



pre: isPowerConnected = true

trigger: powerSwitch = On

Identify the statements which are correct about the given FSM.

- Activate and Deactivate are the two states, and Deactivate is the initial state.
- powerSwitch = On is the guard (needs to be set to true) for the transition from Deactivate to Activate.
- isPowerConnected = true is the action that triggers the transition from Deactivate to Activate.
- If isPowerConnected is set to true, then powerSwitch = On triggers the transition from Deactivate to Activate.

Yes, the answer is correct.

Score: 1

Accepted Answers:

1-B, 2-A, 3-D, 4-C

6) Match the following based on the way graph coverage criteria apply to the FSMs. 1 point

Coverage criteria	Applicable to
1. Node coverage	A. Execute a transition
2. Edge coverage	B. Execute every state
3. Edge-pair coverage	C. Typically model a subset of the variables
4. Data flow coverage	D. Execute every pair of transitions

1-B, 2-C, 3-D, 4-A

1-B, 2-A, 3-D, 4-C

1-C, 2-B, 3-D, 4-A

1-C, 2-D, 3-B, 4-D

Yes, the answer is correct.

Score: 1

Accepted Answers:

[null] and [obj] are states in the FSM.

The transition from [null] to [obj] is triggered by method produce, and the transition from [obj] to [null] is triggered by the method consume,

isEmpty is guard for the transition from [null] to [obj].

isEmpty is a guard for the transition from [obj] to [null].

Yes, the answer is correct.

Score: 1

Accepted Answers:

[null] and [obj] are states in the FSM.

The transition from [null] to [obj] is triggered by method produce, and the transition from [obj] to [null] is triggered by the method consume,

Common data for the next 4 questions

Consider the following program. The program computes  $\sqrt{p}$ ,  $0 \leq p \leq 1$ , to accuracy c,  $0 \leq c \leq 1$ .

```
1. start
2. read p,e
3. d := 1
4. x := 0
5. c := 2^p
6. if c >= 2 then goto 18
7. if d <= e then goto 16
8. d := d/2
9. t := c/(2^x+d)
10. if t < e then goto 14
11. x := x+d
12. c := c/(2^x+d)
13. goto 7
14. c := 2^c
15. goto 7
16. print t
17. stop
18. print "error"
19. stop
```

Answer the following questions related to data flow criteria in the above program. It will help if you can draw the CFG for the above program as per the following convention. Node 1 in the CFG is one node for the statements 2,3,4 and 5 above. Node 1 in the CFG is also the first decision in statement 6, node 2 in the CFG is the second decision in the statement 7, node 3 in the CFG is the node for statements 8, 9, and decision 10 in the above program, node 5 is for statements 11 and 12. Nodes 6, 7 and 4 in the CFG are the then branches of the decision statements in statements 6, 7 and 10 respectively.

8) Does the set of test paths  $\{[1, 6], [1, 2, 3, 4, 2, 3, 5, 2, 7]\}$  satisfy edge coverage? 1 point

Yes

No

Yes, the answer is correct.

Score: 1

Accepted Answers:

Yes

9) Which of the following criteria does the set of paths below satisfy? 1 point

[1, 6], [1, 2, 3, 5, 2, 3, 5, 2, 7], [1, 2, 7]

[1, 2, 3, 4, 2, 3, 5, 2, 7], [1, 2, 3, 4, 2, 7], [1, 2, 3, 5, 2, 3, 4, 2, 7]

All-defs coverage.

All-uses coverage.

All du-paths coverage.

None of the above.

Yes, the answer is correct.

Score: 1

Accepted Answers:

All-uses coverage.

10) There is a definition of c in node 5. This definition will be used if the path ..... is included. 1 point

[3, 5, 2]

[5, 2, 7]

[5, 2, 3]

[2, 3, 5]

Yes, the answer is correct.

Score: 1

Accepted Answers:

[5, 2, 3]

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1) Which of the following is the correct order of subsumption amongst logic coverage criteria? Read the notation → below as "subsumes".

- Predicate coverage → Clause coverage → Combinatorial coverage.
- Clause coverage → Predicate coverage → Combinatorial coverage.
- Combinatorial coverage → General active clause Coverage → Clause coverage.
- Combinatorial coverage → Restricted inactive clause coverage → Restricted Active clause coverage.

No, the answer is incorrect.

Score: 0

Accepted Answers:

Combinatorial coverage → General active clause Coverage → Clause coverage.

2) Consider the predicate  $p = a \wedge b$  with  $a$  as a major clause. For  $a$  to determine  $p$ , the only minor clause  $b$  should take which of the following values?

- True.
- False.

No, the answer is incorrect.

Score: 0

Accepted Answers:

True.

3) For a predicate  $p$  with  $k$  clauses, how many test requirements suffice to achieve active clause coverage?

- $k$
- $2k$
- $k + 1$
- None of the above.

No, the answer is incorrect.

Score: 0

Accepted Answers:

$k + 1$

Common data for the next three questions

For the next three questions, consider the predicate  $p = a \wedge (\neg b \vee c)$  and its truth table as given below, with row numbers for each row in the table. The truth table is incomplete in the sense that the true/false values for  $p$  are not given.

	a	b	c	p
1	T	T	T	
2	T	T	F	
3	T	F	T	
4	T	F	F	
5	F	T	T	
6	F	T	F	
7	F	F	T	
8	F	F	F	

4) Which rows in the above truth table will make the predicate  $p$  true?

- Rows 2, 3 and 4.
- Rows 3, 4 and 5.
- Rows 1, 3 and 4.
- Rows 1, 2 and 3.

No, the answer is incorrect.

Score: 0

Accepted Answers:

Rows 1, 3 and 4.

5) Which of the following represents  $p_a$ , the conditions under which clause  $a$  determines  $p$ ?

- $b \vee c$
- $\neg b \vee c$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$\neg b \vee c$

6) Which of the following represents  $p_b$ , the conditions under which clause  $b$  determines  $p$ ?

- $a \wedge \neg c$ .
- $a \vee c$ .

No, the answer is incorrect.

Score: 0

Accepted Answers:

$a \wedge \neg c$ .

Common data for the next 4 questions

Consider the predicate  $p = a \wedge b$ . Answer the following questions related to logic coverage criteria over

Truth table for  $p$ , with row numbers given below.

No.	a	b	p
1	T	T	T
2	T	F	F
3	F	T	F
4	F	F	F

7) With reference to the truth table row numbers above, GACC pair(s) for clause  $a$  is which of the following?

- Rows (1,3) and (1,4).
- Row (1,3) only.
- Rows (1,2) and (1,3).
- Row (1,2) only.

No, the answer is incorrect.

Score: 0

Accepted Answers:

Row (1,3) only.

8) With reference to the truth table row numbers above, GACC pair(s) for clause  $b$  is which of the following?

- Rows (1,3) and (1,4).
- Row (1,3) only.
- Rows (1,2) and (1,3).
- Row (1,2) only.

No, the answer is incorrect.

Score: 0

Accepted Answers:

Row (1,2) only.

9) State true or false: GACC pairs for clauses  $a$  and  $b$  are the same as CACC pairs.

- True.
- False.

No, the answer is incorrect.

Score: 0

Accepted Answers:

True.

10) State true or false: RACC pairs for clauses  $a$  and  $b$  are the same as CACC pairs.

- True.
- False.

No, the answer is incorrect.

Score: 0

Accepted Answers:

True.

The due date for submitting this assignment has passed.

Due on 2023-07-24, 23:59 IST.

You may submit any number of times before the due date. The final submission will be considered for grading.

Common data for the next 7 questions

Consider the method below:

```
public String twoPred(int x, int y)
{
    boolean z;

    if (x < y)
        z = true;
    else
        z = false;

    if (z && x+y == 10)
        return 'A';
    else
        return 'B';
}
```

Answer the following five questions related to coverage criteria over this method. Please note that the variable

```
1| z
```

needs to be re-written in terms of inputs in the second predicate to achieve various coverage criteria. We use the predicate

```
1| x<y
```

to represent

```
1| z
```

1) How many test inputs are needed to achieve Restricted Active Clause Coverage (RACC) for the method twoPred()?

1 point

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

No, the answer is incorrect.

Score: 0

Accepted Answers:

Three.

2) Which of the following lists test cases for RACC for the program fragment above?

1 point

- x = 4, y = 6
- x = 0, y = 10
- x = 4, y = 6, x = 6, y = 4, x = 6, y = 4
- x = 4, y = 6, x = 6, y = 4, x = 4, y = 5

No, the answer is incorrect.

Score: 0

Accepted Answers:

x = 4, y = 6, x = 6, y = 4, x = 4, y = 5

3) State True or False: Restricted Inactive Clause Coverage (RICC) has no feasible pairs for the predicate

1 point

```
1| p = (x < y) && (x + y == 10)
```

being true.

- True
- False

No, the answer is incorrect.

Score: 0

Accepted Answers:

True

4) Which of the following lists predicates that satisfy RICC for the method

1 point

```
1| twoPred()
?
```

- 1| x < y:true and x + y == 10:true

- 1| x < y:false and x + y == 10:false

- 1| x < y:true and x + y == 10:true, x < y:false and x + y == 10:true

- 1| x < y:false and x + y == 10:false, x < y:true and x + y == 10:false, x < y:false and x + y == 10:true

No, the answer is incorrect.

Score: 0

Accepted Answers:

twoPred(6,5), twoPred(4,5) and twoPred(6,4)

6)

If we re-write the second predicate (i.e., "z") in terms of the first predicate, (i.e., "x" and "y") such that it returns the value "A", which of the following will be the resulting predicate?

1 point

- 1| x < y && x + y == 10

- 1| x < y || x + y == 10

No, the answer is incorrect.

Score: 0

Accepted Answers:

x < y && x + y == 10

7) State true or false: Consider the tests

1 point

```
x < y : false; x + y == 10 : false. Example : twoPred(6, 5)
```

```
x < y : true; x + y == 10 : false. Example : twoPred(4, 5)
```

```
x < y : false; x + y == 10 : true. Example : twoPred(6, 6).
```

Does the above correspond to RICC test cases for the predicates in the above program fragment to be false?

- Yes.

- No.

No, the answer is incorrect.

Score: 0

Accepted Answers:

Yes.

8) In the set of test cases given in question above, is it correct that only two of them are necessary and why so?

1 point

Yes, because once

```
1| x < y
```

is false, it is not necessary to evaluate the second clause to make the predicate false.

No, because we need to evaluate all three clauses to get RICC criteria.

No, the answer is incorrect.

Score: 0

Accepted Answers:

Yes.

9) For the predicate,

1 point

```
1| P=(a v (b & c))& d
```

, what will be

```
1| P
```

c.

- 1| (~ a v ~ b) & d

- 1| ~ a & b & d

- 1| ~ a & ~ b & d

- 1| a v (b & d)

No, the answer is incorrect.

Score: 0

Accepted Answers:

\~a & b & d

10) While deriving TR for logic coverage criteria for a predicate in source code, which of the following needs to be done?

1 point

- Write TR purely in terms of inputs in the predicate.

- Write TR purely in terms of inputs and expected outputs in the predicate.

- Write TR in terms of inputs and internal variables that ensure that the predicate is reachable.

- Write TR in terms of inputs, internal variables and expected outputs that ensure that the predicate is reachable.

No, the answer is incorrect.

Score: 0

Accepted Answers:

Write TR in terms of inputs and internal variables that ensure that the predicate is reachable.

The due date for submitting this assignment has passed.

Due on 2023-07-30, 23:59 IST.

You may submit any number of times before the due date. The final submission will be considered for grading.

You have last submitted on: 2023-07-30, 23:16 IST

- 1) Consider the following code segment for symbolic testing.

1 point

```
//code base
int squarelt(int n) {
    return n * n;
}

int doublelt(int n) {
    return 2 * n;
}

int process(int x, int y) {
    if(x < y) {
        if(squarelt(x) < doublelt(y)) //LINE-1
            abort(x);
    }
    return x;
}
```

And let's consider that DART testing technique is applied.

Identify the path constraint that represents an equivalence class of input vectors containing all input values that leads to the error statement (i.e., abort call).

(x0 < y0; x0 \* x0 < 2 \* y0)

(x0 < y0; x0 \* x0 ≥ 2 \* y0)

(x0 > y0; x0 \* x0 < 2 \* y0)

(x0 > y0; x0 \* x0 ≥ 2 \* y0)

Yes, the answer is correct.

Score: 1

Accepted Answers:

(x0 < y0; x0 \* x0 < 2 \* y0)

Common data for the next 7 questions

Consider the following code segment as the code base for symbolic testing.

```
//code base
int squarelt(int n) {
    return n * n;
}

int doublelt(int n) {
    return 2 * n;
}

void compute(int x, int y, int z) {
    int t1 = doublelt(x);
    if(t1 == z) { //LINE-1
        int t2 = squarelt(y);
        if(t1 >= t2) { //LINE-2
            ERROR;
        }
    }
}
```

- 2) Considering the initial symbolic states as: x = x0; y = y0; Z = z0,

find out the predicate(s) for PC to be solved to get a solution that will reach the ERROR.

1 point

(2 \* x0 == z0) ∧ (2 \* x0 >= y0 + y0)

(2 \* x0 == z0) ∧ (2 \* x0 < y0 + y0)

(2 \* x0 == z0) ∧ (2 \* x0 >= y0 \* y0)

(x0 == z0) ∧ (x0 < y0)

Yes, the answer is correct.

Score: 1

Accepted Answers:

(2 \* x0 == z0) ∧ (2 \* x0 >= y0 + y0)

- 3) At LINE-7 two instances of symbolic execution are created. Identify the path constraints applicable to those.

1 point

(x0 = z0) and (x0 ≠ z0)

(2 \* x0 < z0) and (2 \* x0 >= z0)

(2 \* x0 = z0) and (2 \* x0 ≠ z0)

(2 \* x0 >= y0 \* y0) and (2 \* x0 < y0 \* y0)

Yes, the answer is correct.

Score: 1

Accepted Answers:

(x0 = z0), (x0 ≠ z0), (2 \* x0 < y0 \* y0)

- 4) At LINE-2 two instances of symbolic execution are created. Identify the path constraints applicable to those.

1 point

(2 \* x0 = z0) ∧ (2 \* x0 >= y0 \* y0) and (2 \* x0 = z0) ∧ (2 \* x0 < y0 \* y0)

(2 \* x0 = z0) ∧ (2 \* x0 >= y0 \* y0) and (2 \* x0 = z0) ∧ (2 \* x0 >= y0 \* y0)

(2 \* x0 = z0) ∧ (2 \* x0 < y0 \* y0) and (2 \* x0 = z0) ∧ (2 \* x0 >= y0 \* y0)

(2 \* x0 >= y0 \* y0) and (2 \* x0 < y0 \* y0)

Yes, the answer is correct.

Score: 1

Accepted Answers:

2 \* x0 ≠ z0

- 5) Consider that the execution generates a random input: {x = 10; y = 20; z = 30}.

1 point

What path condition (PC) symbolic execution generates at LINE-1?

x0 ≠ z0

2 \* x0 ≠ z0

2 \* x0 = z0

(2 \* x0 = z0) ∧ (2 \* x0 ≥ y0 \* y0)

Yes, the answer is correct.

Score: 1

Accepted Answers:

(2 \* x0 = z0) ∧ (2 \* x0 < y0 \* y0)

Common data for the next 2 questions

Consider the following code segment for symbolic testing.

```
//code base
int compute(int n, int m) {
    int sum = 0;
    for(int i = n; i <= m; i++) {
        r = sym_input();
        if(r % 5 != 0)
            sum += r;
        else
            break;
    }
    return sum;
}
```

- 6) Identify the appropriate program condition (PC) for the for loop with a sequence of  $n_1$  true-s followed by a false.

1 point

Consider each  $r_i$  is a fresh symbolic value.

$\bigwedge_{i \in [n, m]} (r_i \% 5 \neq 0) \wedge (r_{n+1} \% 5 = 0)$

$\bigwedge_{i \in [n, m]} (r_i \% 5 \neq 0) \wedge (r_{n+1} \% 5 = 0)$

$\bigwedge_{i \in [n, m]} (r_i \% 5 \neq 0) \wedge (r_{n+1} \% 5 = 0)$

Yes, the answer is correct.

Score: 1

Accepted Answers:

$\bigwedge_{i \in [n, m]} (r_i \% 5 \neq 0) \wedge (r_{n+1} \% 5 = 0)$

- 7) Consider that the execution generates a random input: {x = 10; y = 20; z = 30}.

1 point

What path condition (PC) symbolic execution generates at LINE-2?

x0 ≠ z0

2 \* x0 ≠ z0

2 \* x0 = z0

(2 \* x0 = z0) ∧ (2 \* x0 ≥ y0 \* y0)

Yes, the answer is correct.

Score: 1

Accepted Answers:

2 \* x0 ≠ z0

- 8) Consider that the execution generates a random input: {x = 10; y = 20; z = 20}.

1 point

What path condition (PC) symbolic execution generates at LINE-2?

(2 \* x0 ≠ z0) ∧ (2 \* x0 ≥ y0 \* y0)

(2 \* x0 ≠ z0) ∧ (2 \* x0 < y0 \* y0)

(2 \* x0 = z0) ∧ (2 \* x0 ≥ y0 \* y0)

Yes, the answer is correct.

Score: 1

Accepted Answers:

(2 \* x0 = z0) ∧ (2 \* x0 < y0 \* y0)

Common data for the next 2 questions

Consider the following code segment for symbolic testing.

```
//code base
int compute(int n, int m) {
    int sum = 0;
    for(int i = n; i <= m; i++) {
        r = sym_input();
        if(r % 5 != 0)
            sum += r;
        else
            break;
    }
    return sum;
}
```

- 9) Identify the appropriate program condition (PC) for the for loop with a sequence of  $n_1$  true-s followed by a false.

1 point

Consider each  $r_i$  is a fresh symbolic value.

$\bigwedge_{i \in [n, m]} (r_i \% 5 \neq 0) \wedge (r_{n+1} \% 5 = 0)$

$\bigwedge_{i \in [n, m]} (r_i \% 5 \neq 0) \wedge (r_{n+1} \% 5 = 0)$

$\bigwedge_{i \in [n, m]} (r_i \% 5 \neq 0) \wedge (r_{n+1} \% 5 = 0)$

Yes, the answer is correct.

Score: 1

Accepted Answers:

$\bigwedge_{i \in [n, m]} (r_i \% 5 \neq 0) \wedge (r_{n+1} \% 5 = 0)$

- 10) Identify the value of  $r$  at the end of the symbolic execution of the for loop with a sequence of  $n_1$  true-s followed by a false.

1 point

Score: 1

Accepted Answers:

$\{r \mapsto r_i, sum \mapsto \sum_{i \in [n, m]} r_i\}$

$\{r \mapsto r_i, sum \mapsto \sum_{i \in [n, m]} r_i\}$

$\{r \mapsto r_i, sum \mapsto \sum_{i \in [n, m]} r_i \wedge (r_i \% 5 \neq 0)\}$

$\{r \mapsto r_i, sum \mapsto \sum_{i \in [n, m]} r_i \wedge (r_i \% 5 \neq 0)\}$

Yes, the answer is correct.

Score: 1

Accepted Answers:

$\{r \mapsto r_i, sum \mapsto \sum_{i \in [n, m]} r_i\}$

The due date for submitting this assignment has passed.

Due on 2023-07-30, 23:59 IST.

You may submit any number of times before the due date. The final submission will be considered for grading.

You have last submitted on: 2023-07-30, 23:13 IST

1) In boundary value analysis, if the partition of inputs specifies an ordered set, which of the following best describes the guidelines to be used to choose the test case inputs? 1 point

- Construct test cases by any value from the partition and outside the partition.
- Construct test cases for the minimum and the maximum value of the number. In addition, select a value smaller than the minimum and a value larger than the maximum.
- Construct test cases by choosing minimum and maximum values.
- Construct test cases by choosing the first and the last elements of the set.

Yes, the answer is correct.

Score: 1

Accepted Answers:

Construct test cases by choosing the first and the last elements of the set.

2) Consider the method search() given below, 1 point

```
public static int search(List list, Object element)  
// Effects: if the list or the element is null throw NullPointerException  
// else if the element is in the list, return its index in the list.  
// else return -1  
  
// for example, search([3,3,1], 3) = either 0 or 1,  
// and search((1,7,5), 2) = -1
```

base your answer on the following characteristic partitioning:

Characteristic: Location of the element in the list  
Block 1: element is the first entry in the list.  
Block 2: element is the last entry in the list.  
Block 3: element is in some position other than first or last.

The Characteristic "Location of the element in list" fails which of the following property/properties?

- Disjointness.
- Completeness.
- Both disjointness and completeness.
- Neither disjointness nor completeness.

Yes, the answer is correct.

Score: 1

Accepted Answers:

Both disjointness and completeness.

## Common data for the next 5 questions

Answer the following questions based on the characteristics and blocks given in the table below.

Characteristic	Block 1	Block 2	Block 3	Block 4
Value 1	<0	0	>0	
Value 2	<0	0	>0	
Operation	+	-	x	÷

3) How many tests are needed to satisfy each choice criterion? 1 point

- 3
- 4
- 5
- 6

Yes, the answer is correct.

Score: 1

Accepted Answers:

4

4) How many total tests are required to satisfy the Base Choice criterion? Assume that the base choices are Value 1  $\geq 0$ , Value 2  $\geq 0$ , and Operation = +. 1 point

- 3
- 5
- 8
- 10

Yes, the answer is correct.

Score: 1

Accepted Answers:

8

## Common data for the next 3 questions

Consider a system that calculates the standard deduction that is applied towards calculating the income tax of a tax payee. Inputs to the system along with their values are:

- (1) Age, with values from 18 to 100,
- (2) Gender, with values being male or female,
- (3) Annual Income with values from 500,000 to 50,000,000.

Rules for computing standard deduction (the output) are as follows:

- (1) If the age is less than 60 and the gender is male, the standard deduction is 100,000.
- (2) If the age is less than 60 and the gender is female, the standard deduction is 120,000.
- (3) If the age is greater than 60 and the gender is male or female, the standard deduction is 150,000.
- (4) For income greater than 20,000,000, no standard deduction applies, irrespective of age and gender.

Answer the following questions based on the above scenario.

6) Which of the following is a valid test case input based on equivalence partitioning that considers the above rules? 0 points

- Annual income is 700,000, age is 67 and gender is male.
- Annual income is 20,000, age is 65 and gender is female.
- Annual income is 25,000,000, age is 55 and gender is male.
- Age is 45 and gender is female.

Partially Correct.

Score: 0

Accepted Answers:

Annual income is 700,000, age is 67 and gender is male.

Annual income is 25,000,000, age is 55 and gender is male.

7) Which of the following is a valid test case input for boundary value analysis of the above system? 1 point

- Annual income is 25,000,000, age is 55 and gender is male.
- Annual income is 20,000,001, age and gender are not applicable.

Yes, the answer is correct.

Score: 1

Accepted Answers:

Annual income is 20,000,001, age and gender are not applicable.

8) State true or false: A test case that gives age as 17, gender as male and annual income as 10,000,000 as input with the expected output being a standard deduction is 100,000 is a valid test case that uses equivalence partitioning for the above program. 1 point

- True.
- False.

Yes, the answer is correct.

Score: 1

Accepted Answers:

False.

The due date for submitting this assignment has passed.

Due on 2023-08-11, 23:59 IST.

You may submit any number of times before the due date. The final submission will be considered for grading.

You have last submitted on: 2023-08-11, 20:10 IST

1 point

1) Given a mutant **m** of a ground string **P** and a test case **t**, when is **t** said to kill **m**?

- Test case **t** is said to kill **m** if **m** cannot run on **t**.
- Test case **t** is said to kill **m** if the output produced by **P** and **m** are the same when **t** is run on them.
- Test case **t** is said to kill **m** if the output produced by **P** on **t** is different from the output produced by **m** on **t**.
- Test case **t** is said to kill **m** if the run of **P** on **t** is different from the run of **m** on **t**.

No, the answer is incorrect.

Score: 0

Accepted Answers:

Test case **t** is said to kill **m** if the output produced by **P** on **t** is different from the output produced by **m** on **t**.

2) Mutation of the statement **if(x < 3 && y >= 0)** to the statement **if(x <= 3 && y >= 0)** is an example of which kind of mutation operator?

1 point

- Relational operator replacement.
- Conditional operator replacement.
- Arithmetic operation replacement.
- Relational operator insertion.

No, the answer is incorrect.

Score: 0

Accepted Answers:

Relational operator replacement.

### Common data for the next 3 questions

Given a context free grammar over a finite alphabet  $\Sigma = \{a, b\}$ , with the production rules  $S \rightarrow aSb$  and  $S \rightarrow ab$ , answer the following questions regarding language of words derived from the grammar.

3) State yes or no:

1 point

"Can the string aab be generated by the grammar?"

- Yes.
- No.

No, the answer is incorrect.

Score: 0

Accepted Answers:

No.

4) Which of the following sets below correspond to the language generated by the given grammar?

1 point

- $\{ab\}$
- $\{a^n b^n \mid n \geq 0\}$
- $\{a^n b^n \mid n \geq 1\}$
- $\{(ab)^n \mid n \geq 1\}$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$\{a^n b^n \mid n \geq 1\}$

5) Consider a mutation of the production rule  $S \rightarrow ab$  to  $S \rightarrow a$ . The other rule is retained as it is. What will be the language generated by the mutated grammar?

1 point

- $\{a^2 b\}$
- $\{a^n b^n a \mid n \geq 1\}$
- $\{a^{n+1} b^n \mid n \geq 0\}$
- $\{a^{n+1} b^n \mid n \geq 1\}$

No, the answer is incorrect.

Score: 0

Accepted Answers:

No.

6) The mutant in line 4 is.

1 point

- Not reached, if the array is null.
- Always reached, only if the array is not null.
- Always reached, even if the array is null.
- Never reached.

Yes, the answer is correct.

Score: 1

Accepted Answers:

Always reached, even if the array is null.

7) State yes or no:

1 point

"Is it possible to find a test input that satisfies reachability but not infection for the mutant in line 4?"

- Yes.
- No.

No, the answer is incorrect.

Score: 0

Accepted Answers:

Yes.

8) Will the test input **(numbers, val) = ([1, 1], 1)** strongly kill the mutant in line 4?

1 point

- Yes.
- No.

No, the answer is incorrect.

Score: 0

Accepted Answers:

Strongly kill the mutant in line 4.

The due date for submitting this assignment has passed.

Due on 2023-08-16, 23:59 IST.

You may submit any number of times before the due date. The final submission will be considered for grading.

You have last submitted on: 2023-08-16, 21:02 IST

1 point

- 1) If a descendant class does not override any inherited method and there is no polymorphic behaviour, then which fault/anomaly does it represent?

- State definition anomaly.
- Polymorphic behaviour anomaly.
- Inconsistent type use fault.
- State visibility anomaly.

Yes, the answer is correct.

Score: 1

Accepted Answers:

Inconsistent type use fault.

- 2) While applying the mutation operator that deletes a method call, how is the value returned by the deleted method passed to the caller method?

1 point

- The method itself is deleted, so the call should also be deleted.
- The value returned by the deleted method is replaced with a suitable expression in the caller.
- The value returned by the deleted method is replaced with a fixed, constant value.
- A message is sent to the caller indicating that there is no value to be returned as the method is deleted.

Yes, the answer is correct.

Score: 1

Accepted Answers:

The value returned by the deleted method is replaced with a fixed, constant value.

- 3) 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 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.
- It hides the variable.

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.

- 4) Which of the following coverage criteria for object-oriented integration testing ensures that every last definition of a coupling variable reaches its first use but does not consider inheritance and polymorphism?

1 point

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

Yes, the answer is correct.

Score: 1

Accepted Answers:

All-coupling defs-uses.

- 5) Which of the following mutation operator represents moving an overridden method call to the first or last statement or up or down by one statement?

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.

- 6) 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 order change.
- Argument number change.
- Reference type change.

Yes, the answer is correct.

Score: 1

Accepted Answers:

Argument order change.

- 7) When state interactions of a descendant method are not consistent with those of its ancestor method, which of the following faults is said to occur?

1 point

- State definition inconsistency anomaly.
- State definition anomaly.
- State visibility anomaly.
- State defined incorrectly anomaly.

Yes, the answer is correct.

Score: 1

Accepted Answers:

State definition anomaly.

- 8) In a yo-yo graph used for testing object-oriented applications, what do nodes and edges represent?

1 point

- Nodes represent classes and edges represent class inheritance.
- Nodes represent classes and edges represent levels of classes.
- Nodes represent overridden methods and edges represent caller-callee relationships.
- Nodes represent methods and edges represent method calls.

Yes, the answer is correct.

Score: 1

Accepted Answers:

Nodes represent methods and edges represent method calls.

## Common data for the next 2 questions

Consider the below code to answer the following questions. The below code may have some faults/errors.

```
class Shapes {  
    private String owner="IITM"  
    public float area; // Variable representing area of the shape  
    public int side1;  
    public int side2;  
    public void setSide1(int s) {  
        side1 = s;  
    }  
    public void setSide2(int s) {  
        side2 = s;  
    }  
  
    public void setAreaGetFormula() {  
        System.out.println("The formula for area of ");  
    }  
    public void setNOS(int n) {  
        NOS=n;  
    }  
}  
class Circle extends Shapes {  
    public void setAreaGetFormula() {  
        super.setAreaGetFormula();  
        System.out.println("circle is pi*radius*radius ");  
        area = 3.14*side1*side1;  
    }  
}  
class Rectangle extends Shapes {  
    public void setAreaGetFormula() {  
        super.setAreaGetFormula();  
        System.out.println("rectangle is length*breadth ");  
        area=side1*side2;  
    }  
}  
class Main {  
    public static void main(String[] args) {  
        int numberOfSides, radius, length, breadth;  
        // Assume some code here that reads values into above variables  
        ...  
        ...  
        //  
        Shapes shape;  
  
        if (numberOfSides == 0) {  
            shape = new Circle();  
            // Circle  
            shape.setSide2(radius);  
            shape.setAreaGetFormula();  
        } else {  
            shape = new Rectangle();  
            shape.setSide1(length);  
            shape.setSide2(breadth);  
            shape.setAreaGetFormula();  
        }  
        shape.setAreaGetFormula();  
    }  
}
```

- 9) Which of the following methods will be run when the variable **shape** takes on **Circle** as the actual type?

1 point

- Circle**: setAreaGetFormula()
- Shapes**: setAreaGetFormula()
- Rectangle**: setLength()
- Circle**: setRadius()

Partially Correct.

Score: 0.5

Accepted Answers:

**Circle**: setAreaGetFormula()

**Shapes**: setAreaGetFormula()

- 10) Identify the fault in the program, and select the method version and variable that will result in missing definition use.

1 point

- Shape**: setAreaGetFormula() ; **Shape**: side1
- Rectangle**: setAreaGetFormula() ; **Shape**: side2
- Circle**: setAreaGetFormula() ; **Shape**: side1
- Circle**: setAreaGetFormula() ; **Shape**: side2

No, the answer is incorrect.

Score: 0

Accepted Answers:

**Circle**: setAreaGetFormula() ; **Shape**: side1

The due date for submitting this assignment has passed.

Due on 2023-08-31, 23:59 IST.

You may submit any number of times before the due date. The final submission will be considered for grading.

1 point

1) Which of the following layers of a 3-tier web application is responsible for in-memory data storage?

- Presentation layer
- Data content layer
- Data representation layer
- None of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

Data representation layer

2) Which of the following are true about a web service?

1 point

- It is a system of software that allows machines to interact with each other through a network.
- It is typically used to achieve the reusability of application components.
- It must have an HTML interface.
- It is usually a complete application that can directly interact with the end-users through a user interface.

No, the answer is incorrect.

Score: 0

Accepted Answers:

It is a system of software that allows machines to interact with each other through a network.

It is typically used to achieve the reusability of application components.

3) What exactly is a "dead link" in the context of static hypertext web site testing?

1 point

- Only the hyperlinks that are linked to valid URLs
- Only the hyperlinks that are not linked to any URL
- Only the hyperlinks that are linked to URLs that are no longer valid
- Only the hyperlinks that are never used by the users

No, the answer is incorrect.

Score: 0

Accepted Answers:

Only the hyperlinks that are linked to URLs that are no longer valid

4) Suppose for a particular web application, the server generates a error message |

1 point

| "Invalid input format"  
as response when a wrong text is entered as a HTML form input, what kind of server response will it be classified as?

- Invalid server response
- Valid server response
- Server crash
- Data corruption in server

No, the answer is incorrect.

Score: 0

Accepted Answers:

Valid server response

5) In a graph model of a static web site, what do nodes and edges represent?

1 point

- Nodes represent web pages, edges are HTML links
- Nodes represent tabs, edges are links between tabs
- Nodes represent static content, edges represent HTML links
- Nodes represent text and images, edges represent hyperlinks

No, the answer is incorrect.

Score: 0

Accepted Answers:

Nodes represent web pages, edges are HTML links

6) How is overloading different from overriding in object-oriented programming?

1 point

- Overloading occurs between two methods in the same class and overriding occurs between methods in a class and one of its descendants.
- Overloading occurs between a method in a class and one of its descendants and overriding occur between two methods in the same class.

No, the answer is incorrect.

Score: 0

Accepted Answers:

Overloading occurs between two methods in the same class and overriding occurs between methods in a class and one of its descendants.

7) Suppose a particular web application server is unable to recognise the invalid inputs, and as a result, abnormal software behaviour is exposed to the users.

1 point

Identify the type of response of the server on the test cases in the above scenario.

- Valid responses
- Faults and failures
- Exposure
- Server crash

No, the answer is incorrect.

Score: 0

Accepted Answers:

Exposure

Common data for the next 3 questions

Consider the code segment of a Java servlet along with the atomic sections given below.

```
HashMap<String, String> userdtl;  
response.setContentType("text/html");  
PrintWriter out=response.getWriter();
```

P1

```
out.println("<HTML><HEAD><TITLE>" + title + "</TITLE></HEAD><BODY>");  
HttpSession session=request.getSession(false);
```

```
if(session!=null){
```

P2

```
/*  
getProfile() take user id as input, runs a query  
in the database, and returns a Map object containing  
the user name, contact number etc.  
*/
```

```
userdtl = getProfile(UserId);  
String name = userdtl.get("name");  
out.println("Name : " + name + "</BR>");  
String contact = userdtl.get("Contact");
```

```
if(contact == null){
```

P3

```
out.println("Contact number : " + contact + "</BR>");  
}
```

```
else
```

P4

```
{
```

```
}
```

```
else{
```

P5

```
out.print("Please login first");  
request.getRequestDispatcher("login.html").include(request, response);  
}
```

P6

```
out.println("</BODY></HTML>");
```

```
out.close();
```

8) Identify the component expression corresponding to the given code.

1 point

- P1 . (P2 | P5) . (P3 | P4) . P6
- P1 . (P2 . (P3 | P4) | P5) . P6
- P1 . P2 . (P3 | P4) . P5 . P6
- P1 . (P2 | P3) . (P4 | P5) . P6

No, the answer is incorrect.

Score: 0

Accepted Answers:

P1 . (P2 . (P3 | P4) | P5) . P6

9) Identify the empty atomic section in the given code.

1 point

P1

P2

P4

P5

No, the answer is incorrect.

Score: 0

Accepted Answers:

P4

10) Identify the content variable in the given atomic section |

1 point

of code.

- out.println
- "Contact number : "
- contact
- </BR>

No, the answer is incorrect.

Score: 0

Accepted Answers:

contact

The due date for submitting this assignment has passed.

Due on 2023-08-31, 23:59 IST.

You may submit any number of times before the due date. The final submission will be considered for grading.

- 1) Consider the requirements for time (in a 24-hour format) validation as a sequence of user stories, as given below.

1 point

- A time can be taken as input and displayed.
- Invalid seconds must be recognized.
- Invalid minutes must be recognized.
- Invalid hours must be recognized.

Identify the appropriate test case methods in JUnit for user story 4, given that the code has to be written in a class |

ValidTime  
and the method that validates the hours is |  
 validRangeHours()  
(which is a static method in class |  
 ValidTime  
|).

public void testValidRangeHours (){  
assertEquals(false, ValidTime.validRangeHours(-1));  
assertEquals(false, ValidTime.validRangeHours(25));  
assertEquals(true, ValidTime.validRangeForDay(10));  
}

public void testValidRangeHours (){  
assertEquals(false, ValidTime.validRangeHours(-1));  
assertEquals(false, ValidTime.validRangeHours(24));  
assertEquals(true, ValidTime.validRangeForDay(10));  
}

public void testValidRangeHours (){  
assertEquals(true, ValidTime.validRangeHours(0));  
assertEquals(true, ValidTime.validRangeHours(24));  
assertEquals(false, ValidTime.validRangeForDay(28));  
}

No, the answer is incorrect.

Score: 0

Accepted Answers:

public void testValidRangeHours (){  
assertEquals(false, ValidTime.validRangeHours(-1));  
assertEquals(false, ValidTime.validRangeHours(25));  
assertEquals(true, ValidTime.validRangeForDay(10));  
}

public void testValidRangeHours1 (){  
assertFalse(ValidTime.validRangeHours(-1));  
assertFalse(ValidTime.validRangeHours(25));  
assertTrue(ValidTime.validRangeForDay(20));  
}

- 2) While re-using test cases for regression testing, which of the following is the best applicable method?

1 point

- Re-use all the test cases used for the original program.
- Identify and eliminate obsolete test cases that were used for the original program.
- Randomly select test cases for re-using.
- Identify test cases based on specified coverage criteria.

No, the answer is incorrect.

Score: 0

Accepted Answers:

Identify and eliminate obsolete test cases that were used for the original program.

- 3) Fill in the blank: Spike testing is a kind of \_\_\_\_ testing.

1 point

- security
- scalability
- performance
- regression

No, the answer is incorrect.

Score: 0

Accepted Answers:

performance

- 4) Testing for forward compatibility involves testing for which of the following features?

1 point

- Testing to accept inputs intended for modern versions of the operating system.
- Testing to accept inputs intended for a former version of the software.
- Testing to accept inputs for a later version of the software itself.
- Testing to accept inputs intended for a new version of third-party products the software interacts with.

No, the answer is incorrect.

Score: 0

Accepted Answers:

Testing to accept inputs for a later version of the software itself.

- 5) Testing done to ensure that the system under test performs under peak/stress conditions is called as

1 point

- Performance testing.
- Load testing.
- Reliability testing.
- Stress testing.

No, the answer is incorrect.

Score: 0

Accepted Answers:

Stress testing.

- 6) Which of the following is a list of black box testing techniques?

1 point

- Logic-based testing, performance testing, stress testing.
- Load testing, stress testing, and testing for covering loops.
- Testing based on partitioning inputs, load testing, and stress testing.
- Compatibility testing, functional testing, and data flow testing.

No, the answer is incorrect.

Score: 0

Accepted Answers:

Testing based on partitioning inputs, load testing, and stress testing.

- 7) In TDD, which of the following can be the result of the refactoring process?

1 point

- Results in increased size of code
- Remove the duplicate codes
- Re-arrange the code segments to make them logically consistent
- Results in re-writing all the test cases

No, the answer is incorrect.

Score: 0

Accepted Answers:

True

- 8) State true or false: Load and stress testing tests for scalability.

1 point

- True
- False

No, the answer is incorrect.

Score: 0

Accepted Answers:

True

- 9) Which of the following is **not** a software quality metric?

1 point

- Product quality metrics.
- Functional quality metrics.
- In-process quality metrics.
- Maintenance quality metrics.

No, the answer is incorrect.

Score: 0

Accepted Answers:

Functional quality metrics.

- 10) Fill in the blank: Defect density measures \_\_\_\_.

1 point

- Number of issues per unit of time (usually a month), as reported by customers.
- Number of defects relative to the size of software (KLOC/function points).
- Average time between software failures.
- None of the above.

No, the answer is incorrect.

Score: 0

Accepted Answers:

Number of defects relative to the size of software (KLOC/function points).