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



Course outline

About NPTEL ()

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NPTEL online
course work? ()

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● Week 6 - Assignment
Solving (unit?
unit=59&lesson=60)● Functional Testing
(unit?
unit=59&lesson=61)● Input Space
Partitioning (unit?
unit=59&lesson=62)● Input Space
Partitioning:
Coverage Criteria
(unit?
unit=59&lesson=63)● Input Space
Partitioning:
Coverage Criteria:
Example (unit?
unit=59&lesson=64)● Practice: Week 7:
Assignment 7 (Non

Week 7 : Assignment 7

The due date for submitting this assignment has passed.

Due on 2024-09-11, 23:59 IST.

Assignment submitted on 2024-09-11, 17:00 IST

1) Which of the following statements are true regarding input space partitioning applied to the inputs of a particular software? **1 point**

- ☐ Input space partitioning is a white-box testing technique that explores giving all possible inputs to the software for testing.
- ☐ Input space partitioning is a white-box testing technique that partitions the inputs according to the underlying code and passes inputs per partition for testing.
- ☐ Input space partitioning is a black-box testing technique that explores giving all possible inputs to the software for testing.
- ☒ Input space partitioning is a black-box testing technique that partitions the inputs according to the underlying requirements and passes inputs per partition for testing.

Yes, the answer is correct.

Score: 1

Accepted Answers:

*Input space partitioning is a black-box testing technique that partitions the inputs according to the underlying requirements and passes inputs per partition for testing.*2) If a particular partitioning of an input space does not meet the 'complete'ness criterion, what could go wrong in the test cases? Identify the most accurate answer option. **1 point**

- ☐ A partition that does not satisfy the completeness criterion is not well-defined and hence the test cases can be wrong.
- ☒ A partition that does not satisfy the completeness criterion might leave out certain kinds of inputs for testing, possibly resulting in missing some errors.
- ☐ A partition that does not satisfy the completeness criterion cannot be used for testing as it means that a tester does not know all the inputs.
- ☐ A partition that does not satisfy the completeness criterion ceases to be a partition and hence cannot give good test cases.

Yes, the answer is correct.

Score: 1

Accepted Answers:

*A partition that does not satisfy the completeness criterion might leave out certain kinds of inputs for testing, possibly resulting in missing some errors.*3) Which of the following is a list of functional testing techniques that work with inputs and requirements for defining test cases? **1 point**

- ☐ Decision tables, equivalence class partitioning, data flow testing.

graded)
(assessment?
name=206)

**Quiz: Week 7 :
Assignment 7
(assessment?
name=219)**

Week 7 Feedback
Form: Software
Testing (IIITB) (unit?
unit=59&lesson=171)

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- ☐ Equivalence class partitioning, data flow testing, boundary value analysis.
☒ Equivalence class partitioning, boundary value analysis, decision tables.
☐ Random testing, decision tables, input sets.

Yes, the answer is correct.

Score: 1

Accepted Answers:

Equivalence class partitioning, boundary value analysis, decision tables.

4) Which of the following gives the most expressive and the least expressive coverage criterion for input space partitioning? **1 point**

- ☒ All combinations coverage is the most expressive and base choice coverage is the least expressive criterion.
☐ All combinations coverage is the most expressive and each choice coverage is the least expressive criterion.
☐ T-wise coverage (for large T) is the most expressive and pair-wise coverage is the least expressive criterion.
☐ Multiple base choice coverage is the most expressive and base choice coverage is the least expressive criterion.

No, the answer is incorrect.

Score: 0

Accepted Answers:

All combinations coverage is the most expressive and each choice coverage is the least expressive criterion.

5) State true or false: Equivalence class partitioning is the same as input space partitioning, with pair-wise coverage. **1 point**

- ☐ True.
☒ False.

Yes, the answer is correct.

Score: 1

Accepted Answers:

False.

For the next five questions, consider the input space as given below and answer the following questions.

Characteristic	Block-1	Block-2	Block-3	Block-4
Annual-Income (in lakhs)	< 1.5	≥ 1.5 and < 3	≥ 3 and < 10	≥ 10
Age	< 18	≥ 18 and < 60	≥ 60	
Gender	Male	Female	Other	

6) How many input characteristics are there in the above table and how many blocks or partitions are there per input characteristic? **1 point**

- ☐ There are four input characteristics for the first input, three each for the second and the third inputs.
☐ There are three inputs and four blocks per input.
☒ There are three input characteristics and for the first input, there are four blocks, and three each for the second and third inputs.
☐ There are three input characteristics and totally four blocks per input.

Yes, the answer is correct.

Score: 1

Accepted Answers:

There are three input characteristics and for the first input, there are four blocks, and three each for the second and third inputs.

7) What is the minimum number of tests required to satisfy each choice coverage on the above table? **1 point**

- ☐ Three.
☒ Four.
☐ Nine.
☐ Thirty six.

Yes, the answer is correct.

Score: 1

Accepted Answers:

Four.

8) What is the minimum number of tests required (considering same test case to cover more than one unique pair of values) to satisfy each pairwise coverage (PWC) criterion? **0 points**

- ☐ Four.
- ☒ Eight.
- ☐ Fifteen.
- ☐ Thirty six.

No, the answer is incorrect.

Score: 0

Accepted Answers:

Fifteen.

9) Suppose the base choice test is (annualIncome = 2 lakhs, age = 20, gender = 'MALE'). What is the minimum number of tests required (including the base choice test case) to satisfy each base choice coverage (BCC) criterion? **1 point**

- ☒ Four.
- ☐ Eight.
- ☐ Fifteen.
- ☐ Thirty six.

No, the answer is incorrect.

Score: 0

Accepted Answers:

Eight.

10) State yes or no: Will the number of tests for all combinations coverage for this table be more than the number of tests for base choice coverage, as above? **1 point**

- ☒ Yes.
- ☐ No.

Yes, the answer is correct.

Score: 1

Accepted Answers:

Yes.

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● Syntax-Based Testing (unit? unit=66&lesson=67)

● Mutation Testing (unit? unit=66&lesson=68)

● Mutation Testing for Programs (unit? unit=66&lesson=69)

● Mutation Testing: Mutation Operators for Source Code (unit? unit=66&lesson=70)

● Mutation Testing Vs. Graphs and Logic Based Testing (unit? unit=66&lesson=71)

Week 8 : Assignment 8

The due date for submitting this assignment has passed.

Due on 2024-09-18, 23:59 IST.

Assignment submitted on 2024-09-18, 15:41 IST

1) Which of the following is a correct regular expression for the language of all binary words (over the alphabet $\{0, 1\}$) that begin with a 0 and end with a 1? **1 point**

☐ $0 + (0 + 1)^* + 1$

☐ $0 \cdot (0 \cdot 1)^* \cdot 1$

☒ $0 \cdot (0 + 1)^* \cdot 1$

☐ $(0 \cdot (0 + 1)^* \cdot 1)^*$

Yes, the answer is correct.

Score: 1

Accepted Answers:

 $0 \cdot (0 + 1)^* \cdot 1$

2) Suppose a programming language has identifier names from the lower case English alphabet that can be exactly of length three. Which of the following is a regular expression that corresponds to these identifier names? **1 point**

☒ $(a + b + c + \dots + z) \cdot (a + b + c + \dots + z) \cdot (a + b + c + \dots + z)$

☐ $(a \cdot b \cdot c \cdot \dots \cdot z) + (a \cdot b \cdot c \cdot \dots \cdot z) + (a \cdot b \cdot c \cdot \dots \cdot z)$

☐ $(a + b + c + \dots + z)^*$

☐ $(a + b + c + \dots + z) \cdot (a + b + c + \dots + z) \cdot (a + b + c + \dots + z)^*$

Yes, the answer is correct.

Score: 1

Accepted Answers:

 $(a + b + c + \dots + z) \cdot (a + b + c + \dots + z) \cdot (a + b + c + \dots + z)$

3) Which are the three levels in which the syntax of a programming language is typically given? **1 point**

☒ Characters, tokens, words and phrases.

☐ Words, phrases and context that specifies types, variable references etc.

☐ Regular expressions and context-free languages.

☐ Regular expressions and context-free grammars.

No, the answer is incorrect.

● Practice: Week 8 :
Assignment 8 (Non
Graded)
(assessment?
name=212)

● Week 8 Feedback
Form: Software
Testing (IIITB) (unit?
unit=66&lesson=170)

● Quiz: Week 8 :
Assignment 8
(assessment?
name=220)

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Score: 0

Accepted Answers:

Words, phrases and context that specifies types, variable references etc.

4) State true or false: If a mutant is strongly killed, it is also weakly killed. **1 point**

- ☒ True.
☐ False.

Yes, the answer is correct.

Score: 1

Accepted Answers:

True.

5) If an expression of the form if ($a \leq b$) is replaced with if (`true`), then it is an application of which of the mutation operators below? **1 point**

- ☒ Boolean constant replacement.
☐ Logical operator replacement.
☐ Relational operator replacement.
☐ True operator replacement.

No, the answer is incorrect.

Score: 0

Accepted Answers:

Relational operator replacement.

For the next five questions, consider the code snippet below and the mutation given in line 4. Answer the following with reference to mutation testing of the code snippet below.

```
1 public static int findVal(int array_num[], int Val)
2 {
3     int findVal = -1;
4     for (i=0; i < array_num.length; i++)
5         for (i=1; i < array_num.length; i++)
6             if (array_num[i] == Val)
7                 findVal = i;
8     return (findVal);
9 }
```

6) Identify the mutation operator that is applied at statement 4 in the above code snippet. **1 point**

- ☐ Arithmetic operator replacement.
☒ Loop initialization replacement.
☐ Scalar variable replacement.
☐ Constant value replacement.

No, the answer is incorrect.

Score: 0

Accepted Answers:

Scalar variable replacement.

7) Can the mutant be reached if the input array is empty? **1 point**

- ☐ Yes.
☒ No.

No, the answer is incorrect.

Score: 0

Accepted Answers:

Yes.

8) State Yes or No: Is it possible that infection of the mutation occurs when the input array is the empty array? **1 point**

- ☐ Yes.
☒ No.

Yes, the answer is correct.

Score: 1

Accepted Answers:

No.

9) Which of the following test cases ensures that the mutated statement is infected but propagation does not occur? **1 point**

- ☐ A test case with the value not in the array will ensure that infection occurs and propagation does not occur.
- ☐ A test case in which the last occurrence of the value is not in array num[0] will ensure infection and not propagation.
- ☐ A test case in which the element occurs exactly once in the array will ensure that infection occurs and propagation does not occur.
- ☒ A test case in which the last occurrence of the value is anywhere except in the first position will ensure that infection occurs and propagation does not occur.

No, the answer is incorrect.

Score: 0

Accepted Answers:

A test case in which the last occurrence of the value is not in array num[0] will ensure infection and not propagation.

10) Which of the following test cases will strongly kill the mutant? **1 point**

- ☐ A test case in which the value is not in the array will strongly kill the mutant.
- ☐ A test case in which the value occurs exactly once at any position in the array will strongly kill the mutant.
- ☒ A test case in which the value is in the first position of the array will strongly kill the mutant.
- ☐ A test case in which the value is not in the first position of the array will strongly kill the mutant.

Yes, the answer is correct.

Score: 1

Accepted Answers:

A test case in which the value is in the first position of the array will strongly kill the mutant.

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● Mutation testing
(unit?
unit=73&lesson=74)● Mutation Testing -
Mutation for
integration (unit?
unit=73&lesson=75)● Mutation testing :
Grammars and
inputs (unit?
unit=73&lesson=76)● Software Testing
Course: Summary
after Week 9 (unit?
unit=73&lesson=77)● Practice: Week 9:
Assignment 9 (Non

Week 9 : Assignment 9

The due date for submitting this assignment has passed.

Due on 2024-09-25, 23:59 IST.

Assignment submitted on 2024-09-25, 14:02 IST

1) Which of the following statements are true about mutation testing applied at the various stages of the software **1 point**
development life-cycle?

- ☐ Mutation can be applied to programs, input strings and to design artifacts. In all the cases, test cases are written to kill the mutants.
- ☐ Mutation can be only applied to programs and test cases can be written to kill the mutants.
- ☒ Mutation can be applied to programs, inputs and to design artifacts. Test cases can be written to kill the mutants for programs and design artifacts, not for input mutations.
- ☐ Mutation can be applied only to individual methods, not for inputs and design artifacts. Test cases can be written to kill the mutants.

Yes, the answer is correct.

Score: 1

Accepted Answers:

*Mutation can be applied to programs, inputs and to design artifacts. Test cases can be written to kill the mutants for programs and design artifacts, not for input mutations.*2) State yes or no: Are there mutation operators available for inputs that are XML files that are used in web applications? **1 point**

- ☒ Yes.
- ☐ No.

Yes, the answer is correct.

Score: 1

Accepted Answers:

Yes.

3) Consider a method A calling another method B, with the callee method B returning an integer back to method A. In a particular mutation, the method call for B is deleted and instead of the return statement, an integer constant is added in the same statement in method A. Which type of mutation will this be? **1 point**

- ☐ Integration method replacement.
- ☒ Integration method call deletion.
- ☐ Integration method return value change.
- ☐ Integration callee method change.

Yes, the answer is correct.

Score: 1

Accepted Answers:

Integration method call deletion.

graded)
(assessment?
name=207)

● Week 9 Feedback
Form: Software
Testing (IIITB) (unit?
unit=73&lesson=169)

● Quiz: Week 9 :
Assignment 9
(assessment?
name=221)

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4) Suppose the access level for a method M in a particular class C is changed and this change denies access to the method M for one of the child classes of C. Which mutation operator has been applied here and has the resulting mutant been successfully killed? **1 point**

- ☐ Overriding method change operator has been applied and the resulting mutant has been killed.
- ☐ Overriding method deletion operator has been applied and the resulting mutant has been killed.
- ☐ Method access has been changed and it need not mean that the resulting mutant has been successfully killed.
- ☒ Access modifier change mutation operator has been applied and the resulting mutant has been successfully killed.

Yes, the answer is correct.

Score: 1

Accepted Answers:

Access modifier change mutation operator has been applied and the resulting mutant has been successfully killed.

5) Is method overloading different from method overriding and if yes, what is the main difference? **1 point**

- ☐ Method overloading and method overriding are the same.
- ☒ Method overloading is different from method overriding. In the former case, the two methods are in the same class and in the latter case, the method is present in a class and one of its descendants.
- ☐ Method overloading is different from method overriding. In the former case, the method is present in a class and one of its descendants, and in the latter case, the two methods are in the same class.
- ☐ Method overloading and method overriding are nearly the same where two different pieces of code are given to the same method.

Yes, the answer is correct.

Score: 1

Accepted Answers:

Method overloading is different from method overriding. In the former case, the two methods are in the same class and in the latter case, the method is present in a class and one of its descendants.

6) When a particular variable belonging to a class is such that there is only one copy of the variable for the entire class, what is the associated declaration of the variable called? **1 point**

- ☒ Static.
- ☐ Private.
- ☐ Instance.
- ☐ Protected.

Yes, the answer is correct.

Score: 1

Accepted Answers:

Static.

7) How we say that mutation testing subsumes node and edge graph coverage criteria despite the fact that these are two different testing techniques? **1 point**

- ☐ Mutation testing does not subsume node and edge coverage criteria.
- ☐ Mutation testing is a weaker testing technique than node and edge coverage criteria.
- ☐ We consider weak mutation and specific mutation operators for the given subsumption.
- ☒ We consider strong mutation and specific mutation operators for the given subsumption.

No, the answer is incorrect.

Score: 0

Accepted Answers:

We consider weak mutation and specific mutation operators for the given subsumption.

Consider the code snippet below and answer the following two questions below.

```
public class Main {
    int x;

    // Constructor with a parameter
    public Main(int x) {
        this.x = x;
    }
}
```



```
// Call the constructor
public static void main(String[] args) {
    Main myObj = new Main(5);
    System.out.println("Value of x = " + myObj.x);
}
}
```

8) What is the use of the this keyword above?

1 point

- ☒ It refers to the current object in the constructor.
- ☐ It invokes the current class method.
- ☐ It is used to pass an argument whose value is not clear.
- ☐ It is a method parameter

Yes, the answer is correct.

Score: 1

Accepted Answers:

It refers to the current object in the constructor.

9) What will the output of the above code snippet be if the this keyword is omitted?

1 point

- ☐ Output will be unknown.
- ☒ Output will be 0.
- ☐ Output will be 5.
- ☐ There will be no output.

Yes, the answer is correct.

Score: 1

Accepted Answers:

Output will be 0.

10) Will the mutant that is created by a mutation that deletes the this keyword be killed by any test case? State yes or no.

1 point

- ☒ Yes.
- ☐ No.

Yes, the answer is correct.

Score: 1

Accepted Answers:

Yes.

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● Testing of web Applications and Web Services (unit? unit=79&lesson=80)

● Testing of web Applications and Web Services (unit? unit=79&lesson=81)

● Testing of web Applications and Web Services (unit? unit=79&lesson=82)

● Testing of Object-Oriented Applications

Week 10 : Assignment 10

The due date for submitting this assignment has passed.

Due on 2024-10-02, 23:59 IST.

Assignment submitted on 2024-10-02, 19:26 IST

1) As discussed in the videos, which are the major kinds of testing applicable to test the functionality of web applications? **1 point**

- ☒ Testing of web services, static and dynamic web applications.
- ☐ Testing of static and dynamic web sites.
- ☐ Client-side testing and server-side testing.
- ☐ Black-box testing and white-box testing.

No, the answer is incorrect.

Score: 0

Accepted Answers:

Client-side testing and server-side testing.

2) What is the main idea in bypass testing of web applications? **1 point**

- ☐ Bypass testing deletes all the client-side validation checks and saves the data to send to the server.
- ☒ Bypass testing technique removes some of the client-side validation checks and sends modified data to the server to check for server responses.
- ☐ Bypass testing sends data to another server by modifying the destination details.
- ☐ Bypass testing changes the HTML constraints of the data sent by the web client.

Yes, the answer is correct.

Score: 1

Accepted Answers:

Bypass testing technique removes some of the client-side validation checks and sends modified data to the server to check for server responses.

3) Which of the following is the main issue tested for in a static website? **1 point**

- ☐ Testing for non-functional properties.
- ☐ Checking if there is at least one HTML hyperlink.
- ☒ Testing for dead links.
- ☐ Testing using breadth first search.

Yes, the answer is correct.

Score: 1

Accepted Answers:

Testing for dead links.

4) If a web application contains a collection of web pages that are created based on the inputs given by a user or a client, which is the kind of underlying web application? **1 point**

(unit?
unit=79&lesson=83)

- Testing of Object-Oriented Applications (unit?
unit=79&lesson=84)

- Practice: Week 10: Assignment 10 (Non graded) (assessment?
name=208)

- Week 10 Feedback Form: Software Testing (IITB) (unit?
unit=79&lesson=168)

- Quiz: Week 10 : Assignment 10 (assessment?
name=222)**

Week 11 ()

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- ☐ Static website.
- ☒ Dynamic website.
- ☐ Web service.
- ☐ Client-varying website.

Yes, the answer is correct.
Score: 1

Accepted Answers:
Dynamic website.

5) Consider an Application Transition Graph (ATG), modeling a piece of some server code. A transition out of the **1 point** code's execution modeling the pressing of a back or a forward button is called by which term?

- ☐ Simple link transition.
- ☐ Form link transition.
- ☐ Operational transition.
- ☒ Redirect transition.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Operational transition.

6) What are the different data layers present in the architecture of a web application? **1 point**

- ☐ Data at the client-side and data at the server-side.
- ☒ Data content, data presentation and data storage layers.
- ☐ Data input and data output layers.
- ☐ Data at the unit level and integration level.

Yes, the answer is correct.
Score: 1

Accepted Answers:
Data content, data presentation and data storage layers.

Consider the Java Servlet code given in the image below. It is a simple code that takes as input, a student's roll number and after running a query, outputs the scores of the assignments. The atomic sections are marked in the code as P_i , for $1 \leq i \leq 7$. Answer the following questions with respect to testing of this server-side code.

	//asg_scores stores scores for all assignments ArrayList<Double> asg_scores = null; response.setContentType("text/html"); PrintWriter out=response.getWriter(); out.println("<HTML><HEAD><TITLE>Eligibility</TITLE></HEAD><BODY>"); String roll_no = request.getParameter("roll"); /* getScores() take roll number of a student as input, runs a query in the database, and returns a ArrayList object containing the scores for all the assignments. */ asg_scores = getScores(val); double total_score = 0.0; if(asg_scores != null){ for (Double val : asg_scores) { total_score += val; } avg_score = total_score / 10; if(perMark >= 50.0) out.println("Status : Eligible</BR>"); else out.println("Status : Not eligible</BR>"); } else{ out.println("Invalid roll number</BR>"); } out.println("</BODY></HTML>"); out.close();
P_1	/* getScores() take roll number of a student as input, runs a query in the database, and returns a ArrayList object containing the scores for all the assignments. */
P_2	for (Double val : asg_scores) { total_score += val; }
P_3	avg_score = total_score / 10; if(perMark >= 50.0)
P_4	out.println("Status : Eligible</BR>");
P_5	else out.println("Status : Not eligible</BR>");
P_6	else{ out.println("Invalid roll number</BR>"); }
P_7	out.println("</BODY></HTML>"); out.close();

7) State yes or no: Is there an empty atomic section in the given code? **1 point**

- ☒ Yes.
- ☐ No.

No, the answer is incorrect.

Score: 0

Accepted Answers:

No.

8) Identify the atomic sections that occur as choices in the sense that only one of them will be selected for generating the website.

1 point

- ☐ There are no atomic sections with choice in the given code.
- ☐ The atomic sections with choice are P_4 and P_5 .
- ☐ The atomic sections with choice are (1) P_4 and P_5 , and (2) P_3 and P_6 .
- ☒ The atomic sections with choice are (1) P_4 and P_5 , and (2) P_1 and P_6 .

No, the answer is incorrect.

Score: 0

Accepted Answers:

The atomic sections with choice are (1) P_4 and P_5 , and (2) P_3 and P_6 .

9) What do the atomic sections P_1 and P_7 take care of in the given code?

1 point

- ☐ These atomic sections take care of generating the header and body tags of the HTML file that will be sent to the client browser.
- ☒ These atomic sections ensure that correct data is sent to the server by the client.

No, the answer is incorrect.

Score: 0

Accepted Answers:

These atomic sections take care of generating the header and body tags of the HTML file that will be sent to the client browser.

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

1 point

- ☐ $P_1 \cdot ((P_2^* \cdot P_3 \cdot (P_4|P_5))|P_6) \cdot P_7$.
- ☐ $P_1 \cdot ((P_2|P_3) \cdot (P_4|P_5)|P_6) \cdot P_7$.
- ☐ $P_1 \cdot (P_2 \cdot P_3 \cdot (P_4|P_5)|P_6) \cdot P_7$.
- ☒ $P_1 \cdot (((P_2|P_3) \cdot (P_4|P_5))|P_6) \cdot P_7$.

No, the answer is incorrect.

Score: 0

Accepted Answers:

$P_1 \cdot ((P_2^* \cdot P_3 \cdot (P_4|P_5))|P_6) \cdot P_7$.

X

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

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● Symbolic Testing
(unit?
unit=86&lesson=87)● Symbolic Testing 2
(unit?
unit=86&lesson=88)● DART: Directed
Automated Random
Testing (unit?
unit=86&lesson=89)● DART: Directed
Automated Random

Week 11 : Assignment 11

The due date for submitting this assignment has passed.

Due on 2024-10-09, 23:59 IST.

Assignment submitted on 2024-10-02, 19:33 IST

1) Which of the following lists use(s) of symbolic execution in logic-based testing?

1 point

- ☐ Symbolic execution is used to generate the predicates for logic-based testing.
- ☐ Symbolic execution is used to reach the predicates for applying logicbased testing.
- ☐ Symbolic execution is used to solve the reachability and infection problems for logic-based testing.
- ☒ Symbolic execution is used to compute the predicates for logic-based testing

No, the answer is incorrect.

Score: 0

Accepted Answers:

Symbolic execution is used to solve the reachability and infection problems for logic-based testing.

2) When symbolic execution of a piece of code reaches a decision statement (like if), what kind of path constraints are generated?

1 point

- ☐ One path constraint, True is always generated.
- ☐ One path constraint containing the predicate of the decision statement is generated.
- ☐ Two path constraints are generated, one corresponding to the predicate with symbolic variables as it occurs in the decision statement and another corresponding to the negation of the same predicate with symbolic variables.
- ☒ Two path constraints are generated, corresponding to the predicate and negation of the predicate, as it occurs in the decision statement, with symbolic variables, and these are combined with a logical AND to the existing path constraint.

Yes, the answer is correct.

Score: 1

Accepted Answers:

Two path constraints are generated, corresponding to the predicate and negation of the predicate, as it occurs in the decision statement, with symbolic variables, and these are combined with a logical AND to the existing path constraint.

3) State yes or no: Can symbolic execution be used to detect the presence of non-terminating loops in a given code?

1 point

- ☒ Yes.
- ☐ No.

No, the answer is incorrect.

Score: 0

Accepted Answers:

No.

4) Which of the following is a list of all known disadvantages of symbolic execution?

1 point

- ☐ Symbolic execution is not an expressive testing technique for exploring all execution paths.

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unit=86&lesson=90)

● DART: Directed
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unit=86&lesson=91)

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name=223)

Week 12 ()

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- ☐ Symbolic execution will generate path constraints that are not solvable by known constraint solvers.
- ☐ Symbolic execution will not work for code bases that use API calls and hence not useful.
- ☒ Symbolic execution can generate path constraints that are not solvable by known constraint solvers, it will not work for code that contains functions whose source code is not available, and when there are many different program paths, the path constraints might get large, making it infeasible.

Yes, the answer is correct.

Score: 1

Accepted Answers:

Symbolic execution can generate path constraints that are not solvable by known constraint solvers, it will not work for code that contains functions whose source code is not available, and when there are many different program paths, the path constraints might get large, making it infeasible.

5) State true or false: DART algorithm, when run on a program, always terminates. **1 point**

- ☐ True.
- ☒ False.

Yes, the answer is correct.

Score: 1

Accepted Answers:

False.

Consider the code fragment below. It is written in a generic programming language, and doesn't represent a full executable piece of code. Answer the following questions related to the symbolic execution of the given code fragment.

```
1  int x, y;
2  if (x > y) {
3      x = x + y;
4      y = x - y;
5      x = x - y;
6      if (x - y > 0)
7          assert(false);
8  }
```

6) What does the code fragment do? **1 point**

- ☐ Tries to check if x is greater than y.
- ☐ Tries to check if y is greater than x.
- ☒ Swaps the values x and y.
- ☐ Swaps the values of x and x - y.

Yes, the answer is correct.

Score: 1

Accepted Answers:

Swaps the values x and y.

7) How many nodes will be there in the symbolic execution tree of this code fragment? **1 point**

- ☐ 3 nodes.
- ☒ 4 nodes.
- ☐ 7 nodes.
- ☐ 8 nodes.

No, the answer is incorrect.

Score: 0

Accepted Answers:

8 nodes.

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

- ☐ $x > y$.
- ☒ $x \leq y$.

Yes, the answer is correct.

Score: 1

Accepted Answers:

$x \leq y$.

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

1 point

- ☒ $x > y \ \&\& \ x - y > 0$.
- ☐ $x > y \ \&\& \ x - y \leq 0$.
- ☐ $x \leq y$.
- ☐ $x > y \ \&\& \ x - y \leq 0$.

Yes, the answer is correct.

Score: 1

Accepted Answers:

$x > y \ \&\& \ x - y > 0$.

10) Is statement 6 reachable in the given program fragment?

1 point

- ☐ Yes, it is reachable.
- ☒ No, it is not reachable.

Yes, the answer is correct.

Score: 1

Accepted Answers:

No, it is not reachable.

X

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Week 12 ()

● Testing of Object-Oriented Applications (unit? unit=93&lesson=94)

● Testing of Mobile Applications (unit? unit=93&lesson=95)

● Non-Functional System Testing (unit? unit=93&lesson=96)

Week 12 : Assignment 12

The due date for submitting this assignment has passed.

Due on 2024-10-16, 23:59 IST.

Assignment submitted on 2024-10-08, 12:21 IST

1) Which of the following is a list of quality attributes that are tested using techniques for non-functional testing? **1 point**

- ☐ Interoperability, functionality, security
- ☒ Security, performance, reliability
- ☐ Functionality, usability, scalability
- ☐ Testability, performance, controllability

Yes, the answer is correct.

Score: 1

Accepted Answers:

*Security, performance, reliability*2) State true or false: Security testing also involves testing for authorization and authentication policies that grant access permissions to users for files. **1 point**

- ☒ True
- ☐ False

Yes, the answer is correct.

Score: 1

Accepted Answers:

*True*3) Which of the following best defines regression testing? **1 point**

- ☐ Testing done on the entire software each time a part of it is modified
- ☒ Testing done with modified and other relevant parts of software, whenever modifications are done
- ☐ Testing done for the functionality of the entire software when it is modified
- ☐ Re-executing all the test cases and some new test cases on software each time it is modified

Yes, the answer is correct.

Score: 1

Accepted Answers:

*Testing done with modified and other relevant parts of software, whenever modifications are done*4) State true or false: Regression testing is a white-box testing technique. **1 point**

- ☐ True
- ☒ False

Yes, the answer is correct.

● Regression Testing
(unit?
unit=93&lesson=97)

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unit=93&lesson=98)

● Practice: Week 12:
Assignment 12 (Non
graded)
(assessment?
name=210)

● Week 12 Feedback
Form: Software
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unit=93&lesson=166)

● Quiz: Week 12 :
Assignment 12
(assessment?
name=224)

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Score: 1

Accepted Answers:

False

5) In regression testing, which of the following is done before test case selection? **1 point**

- ☒ Identifying coverage criteria
- ☐ Writing a new set of test cases for the modified program
- ☐ Identifying obsolete test cases that are invalid for the modified program
- ☐ Executing all the test cases for the original program again

No, the answer is incorrect.

Score: 0

Accepted Answers:

Identifying obsolete test cases that are invalid for the modified program

6) 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

7) State true or false: Documentation testing involves verifying the troubleshooting guide with actual errors. **1 point**

- ☒ True
- ☐ False

Yes, the answer is correct.

Score: 1

Accepted Answers:

True

8) While testing mobile applications, which of the following testing techniques addresses device fragmentation issues? **1 point**

- ☐ Functional testing
- ☒ System testing
- ☐ Usability testing
- ☐ Security testing

No, the answer is incorrect.

Score: 0

Accepted Answers:

Usability testing

9) Which of the following types of testing is performed to measure the ability of a system to keep operating over specified periods (typically several months or years) of time? **1 point**

- ☐ Compatibility testing
- ☐ Security testing
- ☒ Reliability testing
- ☐ Performance testing

Yes, the answer is correct.

Score: 1

Accepted Answers:

Reliability testing

10) State yes or no: In a piece of Java code over a class inheritance hierarchy that uses methods that are overridden, can all the method calls be determined statically? **1 point**

- ☐ Yes

☒ No

Yes, the answer is correct.

Score: 1

Accepted Answers:

No