

## SW Testing

<b>Section Id :</b>	64065349321
<b>Section Number :</b>	2
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	19
<b>Number of Questions to be attempted :</b>	19
<b>Section Marks :</b>	100
<b>Display Number Panel :</b>	Yes
<b>Section Negative Marks :</b>	0
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes

Maximum Instruction Time : 0  
Sub-Section Number : 1  
Sub-Section Id : 640653103729  
Question Shuffling Allowed : No  
Is Section Default? : null

Question Number : 34 Question Id : 640653699227 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0  
Correct Marks : 0

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "DEGREE LEVEL : SOFTWARE TESTING (COMPUTER BASED EXAM)"

ARE YOU SURE YOU HAVE TO WRITE EXAM FOR THIS SUBJECT?  
CROSS CHECK YOUR HALL TICKET TO CONFIRM THE SUBJECTS TO BE WRITTEN.

(IF IT IS NOT THE CORRECT SUBJECT, PLS CHECK THE SECTION AT THE TOP FOR THE SUBJECTS REGISTERED BY YOU)

Options :

6406532334957.  YES

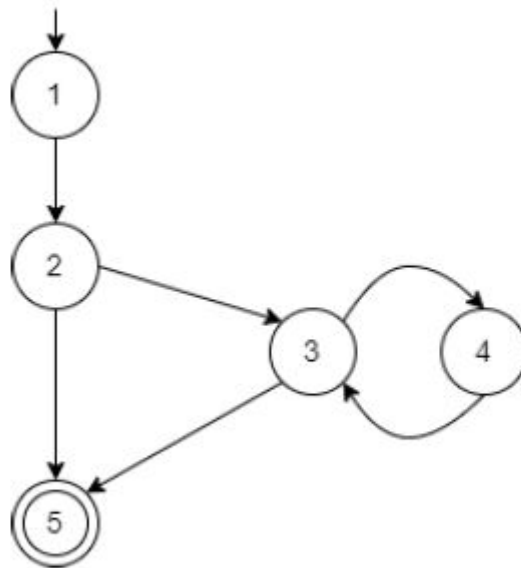
6406532334958.  NO

Sub-Section Number : 2  
Sub-Section Id : 640653103730  
Question Shuffling Allowed : Yes  
Is Section Default? : null

Question Number : 35 Question Id : 640653699228 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0  
Correct Marks : 5

Question Label : Multiple Choice Question

Consider the control flow graph (CFG) given below.



Identify the set of correct test paths that satisfies edge-pair coverage.

**Options :**

6406532334959. ✖ [1, 2, 3, 4, 3, 5]

6406532334960. ✖ [1, 2, 3, 4, 3, 5], [1, 2, 5]

6406532334961. ✔ [1, 2, 3, 4, 3, 4, 3, 5], [1, 2, 5], [1, 2, 3, 5]

6406532334962. ✖ [1, 2, 3, 4, 3, 4, 3, 5], [1, 2, 5]

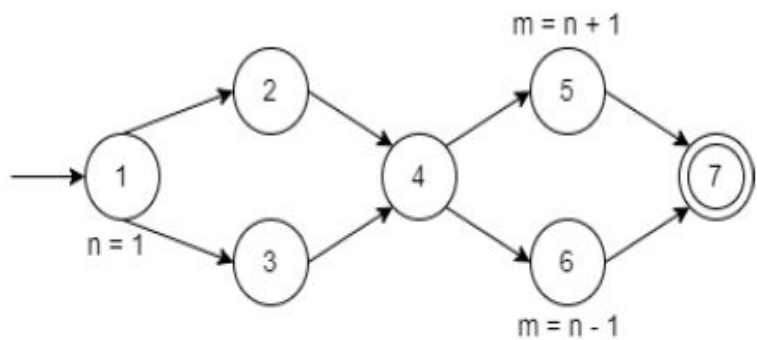
**Question Number : 36 Question Id : 640653699229 Question Type : MCQ Is Question**

**Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 5**

Question Label : Multiple Choice Question

Consider the control flow graph (CFG) given below.



Match the following from the dataflow coverage perspective:

Coverage type	Test paths
A. All defs for $n$	1. $[1, 2, 4, 5, 7]$ and $[1, 2, 4, 6, 7]$
B. All uses for $n$	2. $[1, 2, 4, 6, 7]$
C. All du-paths for $n$	3. $[1, 2, 4, 5, 7]$ , $[1, 3, 4, 5, 7]$ , $[1, 2, 4, 6, 7]$ and $[1, 3, 4, 6, 7]$

Options :

6406532334963. ✓ A-2, B-1, C-3

6406532334964. ✖ A-2, B-3, C-1

6406532334965. ✖ A-1, B-2, C-3

6406532334966. ✖ A-1, B-3, C-2

Question Number : 37 Question Id : 640653699231 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 5

Question Label : Multiple Choice Question

Consider the control flow graph (CFG),  $G = \{V, E\}$ , where

- Set of vertices  $V = \{1, 2, 3, 4, 5, 6, 7\}$ ,
- Set of edges  $E = \{(1, 2), (2, 3), (2, 6), (3, 4), (4, 5), (6, 7), (5, 7)\}$ ,
- Initial vertex  $V_0 = 1$ ,
- Final vertex  $V_f = 7$ .

Identify the max chain in the graph  $G$ .

Options :

6406532334971. ✖ [1, 2, 3, 4, 5, 7]

6406532334972. ✖ [2, 6, 7]

6406532334973. ✖ [3, 4, 5]

6406532334974. ✔ [2, 3, 4, 5, 7]

**Question Number : 38 Question Id : 640653699232 Question Type : MCQ Is Question**

**Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction**

**Time : 0**

**Correct Marks : 5**

Question Label : Multiple Choice Question

Consider the following code segment.

```
//code base
int squareIt(int n) {
    return n * n;
}
int doubleIt(int n) {
    return 2 * n;
}

int evaluate(int x, int y, int z) {
    int t1 = squareIt(x);
    int t2 = doubleIt(y);
    if(t1 > 0 && t2 > 0) {
        if(t1 * t2 > 10 * z) {    //LINE-1
            z = t1 * t2;
        }
    }
    return t2;
}
```

Consider that concolic testing has generated a random input:  $\{x = 1, y = 2, z = 3\}$ .  
What will be the path condition (PC) that symbolic execution at LINE-1 generates?

**Options :**

6406532334975. ✖  $(x_0 * x_0 \leq 0 \wedge 2 * y_0 \leq 0) \wedge ((x_0 * x_0) * (2 * y_0) < 10 * z_0)$

6406532334976. ✖  $(x_0 * x_0 < 0 \wedge 2 * y_0 < 0) \wedge ((x_0 * x_0) * (2 * y_0) > 10 * z_0)$

6406532334977. ✓  $(x_0 * x_0 > 0 \wedge 2 * y_0 > 0) \wedge ((x_0 * x_0) * (2 * y_0) < 10 * z_0)$

6406532334978. ✗  $(x_0 * x_0 > 0 \wedge 2 * y_0 > 0) \wedge ((x_0 * x_0) * (2 * y_0) > 10 * z_0)$

**Question Number : 39 Question Id : 640653699233 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 5**

Question Label : Multiple Choice Question

Consider the Java code segment given below.

```
long factorial(long n){
    if(n < 0)          //invalid input
        return -1;
    else if(n < 2)
        return 1;
    else{
        long f = 1;
        for(long i = 2; i <= n; ++i)
            f *= i;
        return f;
    }
}
```

What is the minimum number of test cases to be prepared for testing the application using the equivalence class partitioning technique?

**Options :**

6406532334979. ✗ 2

6406532334980. ✓ 3

6406532334981. ✗ 4

6406532334982. ✗ 5

**Question Number : 40 Question Id : 640653699234 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 5**

Question Label : Multiple Choice Question

Let the three partitions with blocks be  $[A, B, C, D]$ ,  $[1, 2, 3]$ , and  $[x, y]$ . What will be the minimum number of total tests that need to be prepared using the All Combinations Coverage (ACoC) criteria?

**Options :**

6406532334983. ✖ 4

6406532334984. ✖ 7

6406532334985. ✖ 15

6406532334986. ✔ 24

**Question Number : 41 Question Id : 640653699236 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 5**

Question Label : Multiple Choice Question

Mutations of the statement  $\text{if}(a == w * h)$  to the statements like  $\text{if}(a != w * h)$ ,  $\text{if}(a < w * h)$ ,  $\text{if}(a <= w * h)$ ,  $\text{if}(a > w * h)$  and  $\text{if}(a >= w * h)$  are examples of which kind of mutation operator?

**Options :**

6406532334991. ✖ Conditional operator replacement

6406532334992. ✖ Logical operator replacement

6406532334993. ✖ Scalar variable replacement

6406532334994. ✔ Relational Operator replacement

**Question Number : 42 Question Id : 640653699240 Question Type : MCQ Is Question**



**Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 5**

Question Label : Multiple Choice Question

Consider the following Java program.

```
class A{
    protected int x, y;
    public void set(int x, int y) {
        this.x = x;
        this.x = x;
    }
    public void print() {
        System.out.println(x + ", " + y);
    }
}
class B extends A{
    protected int n;
    public void setN(int n) {
        this.n = n;
    }
    public void print() {
        System.out.println(x + ", " + y + ", " + n);
    }
}
class C extends B{
    protected int m;
    public void set(int x, int y, int n, int m) {
        super.setN(n);
        this.m = m;
    }
}
public class Math {
    public static void main(String[] args) {
        C obj = new C();
        obj.set(10, 20, 30, 40);
        obj.print();
    }
}
```

The above program generates output as 0, 0, 30, instead 10, 20, 30, which is due to B::print() using x, y, which are not defined by C::set() and in data flow, print() is called after set() is called. Identify the type of anomaly/fault in the given scenario.

**Options :**

6406532335003. ✖ Inconsistent type use



6406532335004. ✓ State definition anomaly

6406532335005. ✖ State definition inconsistency anomaly

6406532335006. ✖ State visibility anomaly

**Question Number : 43 Question Id : 640653699241 Question Type : MCQ Is Question**

**Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 5**

Question Label : Multiple Choice Question

Consider the following Java program.

```
class X{
    public void f() { }
    public void g() { }
}
class Y extends X{
    public void f() { }
    public void g() { }
    public void h() { }
}
class Z extends Y{
    public void f() { }
    public void i() { }
}
public class Test {
    public static void main(String[] args) {
        Z obj = new Z();
        obj.f();
        obj.g();
        obj.h();
        obj.i();
    }
}
```

Which of the following sets of the methods will be invoked in the above program?

**Options :**

6406532335007. ✖ {X::f(), X::g(), Y::h(), Z::i()}

6406532335008.

✖ {X::f(), X::g(), Z::h(), Y::i()}

6406532335009. ✔ {Z::f(), Y::g(), Y::h(), Z::i()}

6406532335010. ✖ {Z::f(), Y::g(), Z::h(), Y::i()}

**Question Number : 44 Question Id : 640653699242 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 5**

Question Label : Multiple Choice Question

In the testing of static hypertext web sites, which of the following is considered a dead link?

**Options :**

6406532335011. ✖ A hyperlink that is linked to a valid URL

6406532335012. ✔ A hyperlink that is linked to a URL which is no longer valid

6406532335013. ✖ A hyperlink that is never used by users

6406532335014. ✖ A hyperlink that trigger a transition to the next page

**Question Number : 45 Question Id : 640653699246 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 5**

Question Label : Multiple Choice Question

Which client-side testing needs to be done to verify whether the web application evaluates the special inputs as invalid, which could corrupt data and cause a security vulnerability?

**Options :**

6406532335023. ✔ Value level bypass testing

6406532335024. ✖ Parameter level bypass testing

6406532335025. ✖ Control flow level bypass testing

6406532335026. ✖ User-session Data based Testing

**Question Number : 46 Question Id : 640653699248 Question Type : MCQ Is Question**

**Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 5**

Question Label : Multiple Choice Question

Which of the following software metrics use Defect Removal Effectiveness (DRE) for tracking the defects in each phase of software development?

**Options :**

6406532335031. ✖ Project metrics

6406532335032. ✖ Product quality Metrics

6406532335033. ✖ Maintenance quality metrics

6406532335034. ✔ In-process quality metrics

**Question Number : 47 Question Id : 640653699249 Question Type : MCQ Is Question**

**Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 5**

Question Label : Multiple Choice Question

Which of the following is the goal of *stress testing*?

**Options :**

6406532335035. ✖ To compare two systems to find which performs better.

6406532335036. ✔ To determine how the system performs if the current load goes well above the expected maximum.

6406532335037. ✖ To identify and measure which parts of the system or workload cause the system to perform badly.

6406532335038. ✖ To demonstrate that the system meets performance criteria.

Sub-Section Number : 3  
Sub-Section Id : 640653103731  
Question Shuffling Allowed : No  
Is Section Default? : null

Question Id : 640653699237 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0  
Question Numbers : (48 to 49)

Question Label : Comprehension  
Consider the truth table for predicate  $p = (a \vee b) \vee (a \wedge c)$  given below.

Row#	$a$	$b$	$c$	$p$	$p_a$	$p_b$	$p_c$
1	$T$	$T$	$T$	$T$			
2	$T$	$T$		$T$			
3	$T$		$T$	$T$	$T$		
4	$T$			$T$	$T$		
5		$T$	$T$	$T$		$T$	
6		$T$		$T$		$T$	
7			$T$		$T$	$T$	
8					$T$	$T$	

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 48 Question Id : 640653699238 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0  
Correct Marks : 5  
Question Label : Multiple Choice Question

With reference to the truth table row numbers (Row#) given, identify the *GICC* pairs for clause  $\alpha$  from the following options?

**Options :**

6406532334995. ✖  $\{1, 3, 5\} \times \{2, 4, 6\}$  for  $p = \text{true}$ ,  $(7, 8)$  for  $p = \text{false}$

6406532334996. ✖  $\{3, 4\} \times \{7, 8\}$  for  $p = \text{true}$ ,  $\{5, 6\} \times \{7, 8\}$  for  $p = \text{false}$

6406532334997. ✔  $\{1, 2\} \times \{5, 6\}$  for  $p = \text{true}$ , No feasible pair for  $p = \text{false}$

6406532334998. ✖  $(1, 5), (2, 6)$  for  $p = \text{true}$ , No feasible pair for  $p = \text{false}$

**Question Number : 49 Question Id : 640653699239 Question Type : MCQ Is Question**

**Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 5**

Question Label : Multiple Choice Question

With reference to the truth table row numbers (Row#) given, identify the *RICC* pairs for clause  $\alpha$  from the following options?

**Options :**

6406532334999. ✖  $\{1, 3, 5\} \times \{2, 4, 6\}$  for  $p = \text{true}$ ,  $(7, 8)$  for  $p = \text{false}$

6406532335000. ✖  $\{3, 4\} \times \{7, 8\}$  for  $p = \text{true}$ ,  $\{5, 6\} \times \{7, 8\}$  for  $p = \text{false}$

6406532335001. ✖  $\{1, 2\} \times \{5, 6\}$  for  $p = \text{true}$ , No feasible pair for  $p = \text{false}$

6406532335002. ✔  $(1, 5), (2, 6)$  for  $p = \text{true}$ , No feasible pair for  $p = \text{false}$

**Question Id : 640653699243 Question Type : COMPREHENSION Sub Question Shuffling**

**Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix**

**Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (50 to 51)**

Question Label : Comprehension

Consider the code segment of a Java servlet below. The atomic sections are marked as  $P_1, P_2, P_3, \dots$ .

	<pre> /* student_list, which is a collection of Student objects stores information of all the students applied for a course, student_roll and student_name store the roll number and name of students, and approval_status is true if the student is allowed for the course; otherwise, it is false that indicates the student is disallowd for the course */ ArrayList&lt;Student&gt; student_list = null; response.setContentType("text/html"); PrintWriter out = response.getWriter(); </pre>
$P_1$	<pre> out.print("&lt;HTML&gt;&lt;HEAD&gt;&lt;TITLE&gt;"); out.print("Eligible students"); out.println("&lt;/TITLE&gt;&lt;/HEAD&gt;&lt;BODY&gt;"); String cid = request.getParameter("CID"); /* getStudents() considers the course ID (cid) of a course, runs a query in the database, and returns an ArrayList object containing the information for the students applied for the course */ student_list = getStudents(cid); </pre>
	<pre> if(student_list == null){ </pre>
$P_2$	<pre>     out.println("Invalid course ID&lt;/BR&gt;"); </pre>
	<pre> } else {     for (Student s : student_list) {         if(approval_status == true){ </pre>
$P_3$	<pre>                 /* print the student's roll number and name                 if the student is allowed for given course                 */                 out.println(student_roll + " : " + student_name + "&lt;/BR&gt;"); </pre>
	<pre>         }     }     else </pre>
$P_4$	<pre>     {} </pre>
$P_5$	<pre> } out.println("&lt;/BODY&gt;&lt;/HTML&gt;"); out.close(); </pre>

Based on the above data, answer the given subquestions.

**Sub questions**

Time : 0

Correct Marks : 5

Question Label : Multiple Choice Question

Identify the component expression corresponding to the given code.

Options :

6406532335015. ✖  $P_1 \cdot (P_2 | (P_3^* | P_4)) \cdot P_5$

6406532335016. ✔  $P_1 \cdot (P_2 | (P_3 | P_4)^*) \cdot P_5$

6406532335017. ✖  $P_1 \cdot (P_2 | (P_3 | P_4))^* \cdot P_5$

6406532335018. ✖  $P_1 \cdot ((P_2 | P_3^*) | P_4) \cdot P_5$

Question Number : 51 Question Id : 640653699245 Question Type : MCQ Is Question

Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction

Time : 0

Correct Marks : 5

Question Label : Multiple Choice Question

Identify the empty atomic section in the given code.

Options :

6406532335019. ✖  $P_2$

6406532335020. ✖  $P_3$

6406532335021. ✔  $P_4$

6406532335022. ✖  $P_5$

Sub-Section Number :

4

Sub-Section Id :

640653103732

Question Shuffling Allowed :

Yes



**Is Section Default? :**

null

**Question Number : 52 Question Id : 640653699230 Question Type : MSQ Is Question**

**Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 5 Max. Selectable Options : 0**

Question Label : Multiple Select Question

Consider the following classes for the code base to be tested and the test class.

```
//code base
public class NumberStat {
    private int[] arr;
    public NumberStat(int[] a) {
        arr = a;
    }
    public int getEvenCount() {
        int c = 0;
        for(int i = 0; i < arr.length - 1; i++)
            if(arr[i] % 2 == 0)
                c++;
        return c;
    }
    public int getOddCount() {
        int c = 0;
        for(int i = 0; i < arr.length - 1; i++)
            if(arr[i] % 2 != 0)
                c++;
        return c;
    }
}

//test class
public class TestNumberStat {
    int[] a1 = {11, 25, 12, 13, 14};
    int[] a2 = {10, 25, 12, 13, 15};
    NumberStat ns;

    @Test
    public void testcase1() {
        ns = new NumberStat(a1);
        assertEquals(2, ns.getEvenCount());
    }
    @Test
    public void testcase2() {
        ns = new NumberStat(a1);
        assertEquals(3, ns.getOddCount());
    }
    @Test
    public void testcase3() {
        ns = new NumberStat(a2);
        assertEquals(2, ns.getEvenCount());
    }
    @Test
    public void testcase4() {
        ns = new NumberStat(a2);
        assertEquals(3, ns.getOddCount());
    }
}
```

Identify the test case method(s) that will fail for the given code base.

**Options :**

6406532334967. ✓ testcase1()

6406532334968. ✗ testcase2()

6406532334969. ✗ testcase3()

6406532334970. ✓ testcase4()

**Question Number : 53 Question Id : 640653699235 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 5 Max. Selectable Options : 0**

Question Label : Multiple Select Question

Which of the following predicate(s) is/are in Conjunctive Normal Form (CNF) ?

**Options :**

6406532334987. ✖  $a \vee b \vee c$

6406532334988. ✔  $(a \wedge b) \wedge c$

6406532334989. ✖  $(a \wedge b) \vee (c \wedge d) \vee e$

6406532334990. ✔  $(a \vee b) \wedge (c \vee d)$

**Question Number : 54 Question Id : 640653699247 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 5 Max. Selectable Options : 0**

Question Label : Multiple Select Question

Consider test-driven development (TDD) for a mobile app in which the user can register their electronics devices using the device code for availing services at a discounted price. One of the user story of the application is: "Device code validation: Invalid device codes can be recognized". The test cases for the user story "Device code validation" are provided below.

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

public class DeviceCodeValidationTest {
    DeviceCodeValidation obj;
    @Test
    public void test() {
        obj = new DeviceCodeValidation();
        assertEquals(false, obj.isValid("AXB11"));
        assertEquals(true, obj.isValid("PRN20871"));
        assertEquals(false, obj.isValid("KB2022MY121"));
    }
}
```

Which of the following are the appropriate implementations for the user story?

**Options :**

```
public class DeviceCodeValidation {
    public boolean isValid(String code) {
        if(code.length() < 5) {
            System.out.println("code size less than minimum size allowed");
            return false;
        }
        else if(code.length() > 11) {
            System.out.println("code size more than maximum size allowed");
            return false;
        }
        else
            return true;
    }
}
```

6406532335027. ✖ }

6406532335028. ✔

```

public class DeviceCodeValidation {
    public boolean isValid(String code) {
        if(code.length() < 6) {
            System.out.println("code size less than minimum size allowed");
            return false;
        }
        else if(code.length() > 10) {
            System.out.println("code size more than maximum size allowed");
            return false;
        }
        else
            return true;
    }
}

```

```

public class DeviceCodeValidation {
    public boolean isValid(String code) {
        if(code.length() <= 5) {
            System.out.println("code size less than minimum size allowed");
            return false;
        }
        else if(code.length() >= 11) {
            System.out.println("code size more than maximum size allowed");
            return false;
        }
        else
            return true;
    }
}

```

6406532335029. ✓ }

```

public class DeviceCodeValidation {
    public boolean isValid(String code) {
        if(code.length() >= 5) {
            System.out.println("code size less than minimum size allowed");
            return false;
        }
        else if(code.length() <= 11) {
            System.out.println("code size more than maximum size allowed");
            return false;
        }
        else
            return true;
    }
}

```

6406532335030. ✖ }