**Question1:**

1. **Syntax Errors:**
2. num = 45; [no data type defined]
3. int num = 45; [double declaration]

int num++

1. int = 22.56; [incompatible data type]
2. **Logical Errors:**
3. int sum = (2 + 4 )/ 3 \* 2;
4. int sum = 2 + 4 /( 3 \* 2);
5. int sum = (2 + 4 / 3) \* 2;

(Note: Basically all these statements are going to give different answers depending on different style of parathesis)

1. **Runtime Errors:**
2. int divide = 2 / 0; [Dividing by zero is impossible]

System.out.print(divide);

1. System.out.printf(“%.2f Hello World”); [Missing format specifier]
2. public static void Main(String[] args) {

}

1. **Finding Logical Errors:**

|  |  |  |
| --- | --- | --- |
| **Errored One** | **Type of Error** | **Fixed One** |
|  |  | final int PRIME = 0; [Defining Constant] |
|  |  | final int ONE = 1; [Defining Constant] |
| count = 1; | No data type | int count = 1; |
| sum = count + PRIME; | PRIME not defined |  |
| x := 25.67; | Illegal expression | double x = 25.67; |
| newNum = count \* ONE + 2; | No data type and ONE not defined | int newNum = count \* ONE + 2; |
| x = x + sum \* COUNT; | COUNT doesn’t exist | x = x + sum \* count; |
| sum + count = sum; | Unexpected type | sum = sum + count; |
| Prime | Prime not defined | PRIME |

**Fixed Code:**

public class Test{

public static void main(String[] args) {

final int PRIME = 0;

final int ONE = 1;

int count = 1;

int sum = count + PRIME;

double x = 25.67;

int newNum = count \* ONE + 2;

sum = sum + count;

x = x + sum \* count;

System.out.println(" count = " + count + ", sum = "

+ sum + ", PRIME = " + PRIME);

}

}

**Question2:**

1. **Finding Logical Errors:**

|  |  |
| --- | --- |
| **Sample** | **Identify** |
| comments (Single Line, Multiline), | /\*This program will calculate product of three numbers \*/ **[Multiline]**  // first number  // second number **[Single Line]**  // third number  //product of numbers |
| Special symbols (three) | // /\* + , |
| Reserve words (three) | Int, main, public, static |
| Identifier (predefined and defined by user) (three each) | [String[], main, args] [num1, num2, num3, result, Product] |
| Standard Input Stream Object | None |
| Standard Output Stream Object | System.out |

**Question3:**

1. **Declaring Java statements:**
2. int x, y;
3. x = 10;

char ch = "B";

1. x = x + 5;
2. double payRate = 12.50;
3. int x, y;
4. int firstNum = 0;

int tempNum = firstNum;

1. int x, y, z;

x = 10;

y = 20;

z = y;

y = x;

x = z;

1. double x, y;

x = 1;

y = 1;

double expression = x + 12 / y - 18;

System.out.print(expression);

1. char grade;

grade = "A";

1. int x, y, z, g;

x = 10;

y = 20;

z = 30;

g = 40;

1. double z = 10.28;

z = z + 0.5;

int x = (int)(z);

System.out.print(x);

1. **Table:**

*(Note: I used the same value calculated from the last one)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Statements** | **a** | **b** | **c** | **d** |
| a = (b++) + 3 \* ++d; | 15 | 7 | UND | 3 |
| c = 2 \* d + (++b) + a; | 15 | 8 | 29 | 3 |
| b = 2 \* (++c) - (a++); | 16 | 45 | 30 | 3 |
| d = d++ + d + b++ + b; | 16 | 46 | 30 | 98 |

1. **Table 2:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Statements** | **a** | **b** | **c** | **sum** |
| sum = a + b + (int) c | 3 | 5 | 14.1 | 22 |
| c /= a; | 3 | 5 | 4.7 | 22 |
| b += (int) c - a; | 3 | 6 | 4.7 | 22 |
| a \*= 2 \* b + (int) c; | 48 | 6 | 4.7 | 22 |

**Question 4:**

1. **Reason:**

The difference is of operators. One is OR logical operator while the other one is bit wise logical operator. “||” is used for short circuit analysis that means it won’t bother itself to solve for the both sides. It will just evaluate the first side and will give its result based on that. While the “|” doesn’t have the capability of doing short circuit analysis and that’s why we got different answers. 1 in case of bitwise and 0 in case of OR logical operator.

***// in here j++ will be executed!***

1. **True and False:**

|  |  |
| --- | --- |
| **Expression** | **Result** |
| !(x > 1 0) | True |
| x <= 5 || y < 15 | False |
| (x != 5 ) && (y != z) | True |
| x >= z || (x + y >= z) | True |
| (x <= y – 2) && (y >= z) || (z – 2 != 20) | True |

1. **Conditional Operator:**

|  |  |
| --- | --- |
| **Expresions** | **Conditional Operator** |
| if (x >= y)  z = x - y;  else  z = y - x; | z = (x >= y) ? x - y : y - x |
| if (hours >= 40.0)  wages = 40 \* 7.50 + 1.5  \* 7.5 \* (hours - 40);  else  wages = hours \* 7.50; | wages = (hours >= 40.0) ? 40 \* 7.50 + 1.5 \* 7.5 \* (hours - 40) : hours \* 7.50 |
| if (score >= 60)  str = "Pass";  else  str = "Fail"; | str = (score >= 60) ? "Pass" : "Fail" |

**Question 5:**

**Finding the roots of quadratic equation:**

**Code:**

import java.lang.Math;

import java.util.Scanner;

public class RootsCheck{

public static void main(String[] args) {

Scanner input = new Scanner(System.in);

System.out.println("Enter the value of a: ");

double a = input.nextDouble();

System.out.println("Enter the value of b: ");

double b = input.nextDouble();

System.out.println("Enter the value of c: ");

double c = input.nextDouble();

double discriminant = (b \* b - 4 \* a \* c);

if(discriminant > 0){

double root1 = (-b + Math.pow(discriminant, 0.5)) / (2.0 \* a);

double root2 = (-b - Math.pow(discriminant, 0.5)) / (2.0 \* a);

System.out.println("The equation has two roots: " + root1 + " and " + root2);

}

else if(discriminant == 0){

double root1 = (-b + Math.pow(discriminant, 0.5)) / (2.0 \* a);

System.out.println("The equation has one root: " + root1);

}

else{

System.out.println("The equation has no real roots");

}

}

}

**Question 6:**

**Generating random English months:**

**Code:**

import java.util.Random;

public class RandomNum{

public static void main(String[] args) {

Random random = new Random();

int rdmInt = random.nextInt(12) + 1;

if (rdmInt == 1){

System.out.println("The English month is: January");

}

else if(rdmInt == 2){

System.out.println("The English month is: February");

}

else if(rdmInt == 3){

System.out.println("The English month is: March");

}

else if(rdmInt == 4){

System.out.println("The English month is: April");

}

else if(rdmInt == 5){

System.out.println("The English month is: May");

}

else if(rdmInt == 6){

System.out.println("The English month is: June");

}

else if(rdmInt == 7){

System.out.println("The English month is: July");

}

else if(rdmInt == 8){

System.out.println("The English month is: August");

}

else if(rdmInt == 9){

System.out.println("The English month is: September");

}

else if(rdmInt == 10){

System.out.println("The English month is: October");

}

else if(rdmInt == 11){

System.out.println("The English month is: November");

}

else if(rdmInt == 12){

System.out.println("The English month is: December");

}

}

}

**Question 7:**

**Arranging in ascending order:**

**Code:**

import java.util.Scanner;

public class OrderArrange{

public static void main(String[] args) {

Scanner input = new Scanner(System.in);

System.out.print("Enter an integer x: ");

int x = input.nextInt();

System.out.print("Enter an integer y: ");

int y = input.nextInt();

System.out.print("Enter an integer z: ");

int z = input.nextInt();

if(x <= y && x <= z && y <= z){

System.out.print(x);

System.out.print(y);

System.out.print(z);

}

else if(x <= y && x <= z && z <= y){

System.out.print(x);

System.out.print(z);

System.out.print(y);

}

else if(y <= x && y <= z && x <= z){

System.out.print(y);

System.out.print(x);

System.out.print(z);

}

else if(y <= x && y <= z && z <= x){

System.out.print(y);

System.out.print(z);

System.out.print(x);

}

else if(z <= x && z <= y && x <= y){

System.out.print(z);

System.out.print(x);

System.out.print(y);

}

else if(z <= x && z <= y && y <= x){

System.out.print(z);

System.out.print(y);

System.out.print(x);

}

}

}

**Question 8:**

**Telling Future dates:**

**Code:**

import java.util.Scanner;

public class UpcomingDates{

public static void main(String[] args) {

Scanner input = new Scanner(System.in);

System.out.println("Sunday is 0, Monday is 1, Tuesday is 2, Wednesday is 3, Thursday is 4, Friday is 5 and Saturday is 6");

System.out.println("Enter day of the week (today)");

int day = input.nextInt();

System.out.print("Enter the number of days after today");

int dayAfter = input.nextInt();

int future = (day + dayAfter) % 7;

String today = "";

String futureDay = "";

if(day == 0){

today = "Sunday";

}

else if(day == 1){

today = "Monday";

}

else if(day == 2){

today = "Tuesday";

}

else if(day == 3){

today = "Wednesday";

}

else if(day == 4){

today = "Thursday";

}

else if(day == 5){

today = "Friday";

}

else if(day == 6){

today = "Saturday";

}

else{

System.out.print("Error! Again");

}

if(future == 0){

futureDay = "Sunday";

}

else if(future == 1){

futureDay = "Monday";

}

else if(future == 2){

futureDay = "Tuesday";

}

else if(future == 3){

futureDay = "Wednesday";

}

else if(future == 4){

futureDay = "Thursday";

}

else if(future == 5){

futureDay = "Friday";

}

else if(future == 6){

futureDay = "Saturday";

}

else{

System.out.print("Error! Again");

}

System.out.print("Today is " + today + " and the future day is " + futureDay);

}

}

**Question 9:**

**ISBN-10 Number:**

**Code:**

import java.lang.Math;

import java.util.Scanner;

public class IsbnCheck{

public static void main(String[] args) {

Scanner input = new Scanner(System.in);

System.out.println("Enter 9 digits of ISBN as integer and press Enter after every digit entered: ");

int isbnDigit1 = input.nextInt();

int isbnDigit2 = input.nextInt();

int isbnDigit3 = input.nextInt();

int isbnDigit4 = input.nextInt();

int isbnDigit5 = input.nextInt();

int isbnDigit6 = input.nextInt();

int isbnDigit7 = input.nextInt();

int isbnDigit8 = input.nextInt();

int isbnDigit9 = input.nextInt();

int checkSum = (isbnDigit1 \* 1 + isbnDigit2 \* 2 + isbnDigit3 \* 3 + isbnDigit4 \* 4 + isbnDigit5 \* 5 + isbnDigit6 \* 6 + isbnDigit7 \* 7 + isbnDigit8 \* 8 + isbnDigit9 \* 9) % 11;

if(checkSum == 10){

System.out.println("The ISBN-10 number is: " + isbnDigit1 + (isbnDigit2) + (isbnDigit3) + (isbnDigit4) + (isbnDigit5) + (isbnDigit6) + (isbnDigit7) + (isbnDigit8) + (isbnDigit9) + ("X"));

}

else

System.out.println("The ISBN-10 number is: " + isbnDigit1 + (isbnDigit2) + (isbnDigit3) + (isbnDigit4) + (isbnDigit5) + (isbnDigit6) + (isbnDigit7) + (isbnDigit8) + (isbnDigit9) + (checkSum));

}

}

**Question 10:**

**ISBN-10 Number:**

**Code:**

import java.util.Scanner;

public class LeapYear{

public static void main(String[] args) {

Scanner input = new Scanner(System.in);

System.out.println("Enter month 1-12: ");

int month = input.nextInt();

System.out.println("Enter any year: ");

int year = input.nextInt();

if (month == 1){

System.out.println("January" + year + "has 31 days");

}

else if (month == 2){

if((year % 4 == 0 && year % 100 != 0) || year % 400 == 0){

System.out.println("February " + year + " has 29 days");

}

else{

System.out.println("February " + year + " has 28 days");

}

}

else if(month == 3){

System.out.println("March " + year + " has 31 days");

}

else if(month == 4){

System.out.println("April " + year + " has 30 days");

}

else if(month == 5){

System.out.println("May " + year + " has 31 days");

}

else if(month == 6){

System.out.println("June " + year + " has 30 days");

}

else if(month == 7){

System.out.println("July " + year + " has 31 days");

}

else if(month == 8){

System.out.println("August " + year + " has 31 days");

}

else if(month == 8){

System.out.println("September " + year + " has 30 days");

}

else if(month == 9){

System.out.println("March " + year + " has 31 days");

}

else if(month == 10){

System.out.println("October " + year + " has 31 days");

}

else if(month == 12){

System.out.println("November " + year + " has 30 days");

}

else if(month == 12){

System.out.println("December " + year + " has 31 days");

}

}

}