JAVA CODING LEVEL 1

TEST 1 Operators and Variables

TEST 1 Learn Java: Operators and Variables

Q1

```
import java.util.*;
class TestClass
{
  public static void main(String args[])
  {
    Scanner sc = new Scanner(System.in);
    int a = sc.nextInt();
    int sum = 200 + 300;
    int divide = 250 / 50;
    int difference = 500 - 100;
    int product = a * 50;
    System.out.println(sum);
    System.out.println(divide);
    System.out.println(difference);
    System.out.println(product);
  }
}
```

Q2

```
import java.util.*;
class TestClass
{
  public static void main(String args[])
  {
    Scanner sc = new Scanner(System.in);
    int a = sc.nextInt();
    int value = (((a + 8) * 2) - 11) / 5;
    System.out.println(value);
  }
}
```

Q3

```
import java.util.*;
class TestClass
{
  public static void main(String args[])
  {
    Scanner sc = new Scanner(System.in);
    int a = sc.nextInt();
    int first = a;
    int second = first;
    System.out.println(second);
  }
}
```

Q4

```
import java.util.*;
class TestClass
{
```

```
  public static void main(String args[])
  {
    Scanner sc = new Scanner(System.in);
    int G = sc.nextInt();
    int M = 100;
    int MPG = M / G;
    System.out.println(MPG);
  }
}
```


TEST 2 Operators and Variables

Q1

```
import java.util.*;
class TestClass
{
  public static void main(String args[])
  {
    Scanner sc = new Scanner(System.in);
    int a = sc.nextInt();
    System.out.println(a+100);
  }
}
```

Q2

```
import java.util.*;
class TestClass
{
  public static void main(String args[])
  {
    Scanner sc = new Scanner(System.in);
    int num = sc.nextInt();
    System.out.println(num/5);
    System.out.println(num + 15);
    System.out.println(num * 4);
    System.out.println(num % 6);
    System.out.println(num * num * num);
  }
}
```

Q3

```
import java.util.*;
class TestClass
{
  public static void main(String args[])
  {
    Scanner sc = new Scanner(System.in);
    int a = sc.nextInt();
    System.out.println((a + 50) / 2);
  }
}
```

Q4

```
import java.util.*;
class TestClass
{
  public static void main(String args[])
  {
    Scanner sc = new Scanner(System.in);
    int num = sc.nextInt();
    System.out.println(((((num + 30) * 5) - 10) / 5));
    System.out.println((((num / 5) * 3) + 20));
    System.out.println(((num + 15) * 2) - 50);
  }
}
```

Q5

```
import java.util.*;
class TestClass
{
  public static void main(String args[])
  {
    Scanner sc = new Scanner(System.in);
    int side = sc.nextInt();
    int area = side * side;
    System.out.println(area);
  }
}
```

Q6

```
import java.util.*;
class TestClass
```

```
{
  public static void main(String args[])
  {
    Scanner sc = new Scanner(System.in);
    int length = sc.nextInt();
    int width = 5;
    int area = length * width;
    System.out.println(area);
  }
}
```

Q7

```
import java.util.*;
class TestClass
{
  public static void main(String args[])
  {
    Scanner sc = new Scanner(System.in);
    int x = 6;
    int y = sc.nextInt();
    System.out.println(x*x + y*y);
  }
}
```

Q8

```
import java.util.*;
class TestClass
{
  public static void main(String args[])
  {
```

```
    Scanner sc = new Scanner(System.in);
    int distance = 320;
    int time = sc.nextInt();
    int speed = distance / time;
    System.out.println(speed);
  }
}
```

Q9

```
import java.util.*;
class TestClass
{
  public static void main(String args[])
  {
    Scanner sc = new Scanner(System.in);
    int C = 50;
    int D = 30;
    int H = sc.nextInt();
    int Z = (2 * C * D) / H;
    int Q = Z * Z;

    System.out.println(Q);
  }
}
```

Q10

```
import java.util.*;
class TestClass
{
```

```
  public static void main(String args[])
  {
    int principal;
    int rate;
    int time;
    Scanner sc = new Scanner(System.in);
    principal=sc.nextInt();
    rate=sc.nextInt();
    time=sc.nextInt();

    int simple_interest = (principal * rate * time) / 100;
    System.out.println(simple_interest);
  }
}
```


TEST 3 Strings, List, Tuples and Maps

Q1

```
import java.util.*;
class TestClass
{
  public static void main(String args[])
  {
    Scanner sc = new Scanner(System.in);
```

```
   String greeting  = sc.nextLine();
   System.out.println(greeting);
  }
}
```

Q2

```
class TestClass
{
        public static void main(String args[])
   {
        String text  = "Salesman: Good evening, sir. How can I help you?\n" +
         "Customer: I have come to buy a pair of shoes.";
      System.out.println(text);
   }
}
```

Q3

```
class TestClass
{
        public static void main(String args[])
   {
        String text  = "He said: it\'s over, isn\'t it?";
      System.out.println(text);
   }
}
```

Q4

```
import java.util.*;
class TestClass
{
  public static void main(String args[])
  {
    Scanner sc = new Scanner(System.in);
    int score = sc.nextInt();
    String text = String.format("I scored %d points", score);
    System.out.println(text);
  }
}
```

Q5

```
import java.util.*;
class TestClass
{
  public static void main(String args[])
  {
    Scanner sc = new Scanner(System.in);
    String str1 = sc.nextLine();
    String str2 = sc.nextLine();
    System.out.println(str1 +" "+ str2);
  }
}
```

Q6

```
import java.util.*;

class TestClass
```

```
{
  public static void main(String args[])
  {
    String str = "*";
    Scanner sc = new Scanner(System.in);
    int num = sc.nextInt();

    String newstr = String.join("", Collections.nCopies(num, str));
    System.out.println(newstr);
  }
}
```

Q7

```
import java.util.*;
class TestClass
{
  public static void main(String args[])
  {
    Scanner sc = new Scanner(System.in);
    int a = sc.nextInt();

    //expression to add a and 5
    System.out.println("addition is "+(a+5));
  }
}
```

Q8

```
import java.util.*;
```

```
class TestClass
{
  public static void main(String args[])
  {
    Scanner scanner = new Scanner(System.in);
    String firstWord = scanner.nextLine();
    String secondWord = scanner.nextLine();
    System.out.println(firstWord + " " + secondWord);
  }
}
```

Q9

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
    Scanner in = new Scanner(System.in);
    String name1 = in.nextLine();
    String name2 = in.nextLine();
    int age1 = in.nextInt();
    int age2 = in.nextInt();
    float weight1 = in.nextFloat();
    float weight2 = in.nextFloat();
    float average_weight = (weight1 + weight2) / (float)2 ;
    System.out.println(name1 + " is " + (age1) + " years old");
    System.out.println(name2 + " is " + (age2) + " years old");
    System.out.println(String.format("Average weight is %.2f",(average_weight)));
  }
}
```

Q10

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
    List<String> l = new ArrayList<String>();
    Scanner sc = new Scanner(System.in);
    String a = sc.nextLine();
    l.add(a);
    a = sc.nextLine();
    l.add(a);
    a = sc.nextLine();
    l.add(a);
    System.out.println(l);
  }
}
```

Q11

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
    List<String> l = new ArrayList<String>();
    l.add("January");
    l.add("February");
```

```
    l.add("March");
    l.add("April");
    l.add("May");
    l.add("June");
    l.add("July");
    l.add("August");
    l.add("September");
    l.add("October");
    l.add("November");
    l.add("December");
    Scanner sc = new Scanner(System.in);
    int ind = sc.nextInt();
    System.out.println(l.get(ind-1));
  }
}
```

Q12

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
    List<Integer> l2 = new ArrayList<Integer>();
    for(int i=1;i<6;i++)
      l2.add(i);
    Scanner sc = new Scanner(System.in);
    int a = sc.nextInt();
    int b = sc.nextInt();
    l2.add(a);
```

```
    l2.add(b);
    System.out.println(l2);
  }
}
```

Q13

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
    List<Integer> l = new ArrayList<Integer>();
    for(int i=1;i<11;i++)
      l.add(i);
    Scanner sc = new Scanner(System.in);
    int a = sc.nextInt();
    l.remove(a-1);
    System.out.println(l);
  }
}
```

Q14

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
    List<String> l1 = new ArrayList<String>();
    List<String> l2 = new ArrayList<String>();
```

```
    l1.add("Grape");
    l1.add("Pineapple");
    l1.add("Apple");
    Scanner sc = new Scanner(System.in);
    String s1 = sc.nextLine();
    String s2 = sc.nextLine();
    l2.add(s1);
    l2.add(s2);
    l1.addAll(l2);
    System.out.println(l1);
  }
}
```

Q15

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
    int ar[] = new int[15];
    int in=0;
    for(int i=2;i<25;i+=2)
    {
      ar[in] = i;
      in++;
    }
    Scanner sc = new Scanner(System.in);
    int a = sc.nextInt();
    int b = sc.nextInt();
    System.out.println(ar[a] + ar[b]);
```

```
  }
}
```

Q16

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
    Map< String,Integer> hm =  new HashMap< String,Integer>();
    Scanner sc = new Scanner(System.in);
    int a = sc.nextInt();
    int b = sc.nextInt();
    int c = sc.nextInt();
    hm.put("Diana", a);
    hm.put("Antony", b);
    hm.put("Joe", c);
    System.out.println(hm);
  }
}
```

Q17

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
    Map< Integer,String> hm =  new HashMap< Integer,String>();
    hm.put(1,"January");
```

```
    hm.put(2,"February");
    hm.put(3,"March");
    hm.put(4,"April");
    hm.put(5,"May");
    hm.put(6,"June");
    hm.put(7,"July");
    hm.put(8,"August");
    hm.put(9,"September");
    hm.put(10,"October");
    hm.put(11,"November");
    hm.put(12,"December");
    Scanner sc = new Scanner(System.in);
    int a = sc.nextInt();
    int b = sc.nextInt();
    System.out.println(hm.get(a));
    System.out.println(hm.get(b));
  }
}
```

Q18

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
    Map< String,Integer> hm =  new HashMap< String,Integer>();
    hm.put("Mathematics",68);
    hm.put("Language",78);
    hm.put("Science",72);
    hm.put("Humanities",75);
```

```
   Scanner sc = new Scanner(System.in);
   String s = sc.nextLine();
   hm.remove(s);
   Set< Map.Entry< String,Integer> > st = hm.entrySet();

   for (Map.Entry< String,Integer> me:st)
   {
    System.out.print(me.getKey()+": ");
    System.out.println(me.getValue());
   }
  }
}
```


TEST 4 Strings, List, Tuples and Maps

Q1

```
import java.util.*;
class TestClass
{
  public static void main(String args[])
  {
   Scanner sc = new Scanner(System.in);
   String s = sc.nextLine();
   String t = sc.nextLine();
   s = s.concat(t);
```

```
    System.out.println(s);
  }
}
```

Q2

```
class TestClass
{
  public static void main(String args[])
  {
    System.out.println("Alice: Hurrah! Only ten days to the holidays.");
    System.out.println("Bob: I know. I've been counting the days.");
  }
}
```

Q3

```
import java.util.Scanner;
class TestClass
{
  public static void main(String args[])
  {
    Scanner in = new Scanner(System.in);
    String firstName = in.nextLine();
    String lastName = in.nextLine();
    String age = in.nextLine();
    System.out.println(firstName + " " + lastName + " is " + age + " years old");
  }
}
```

Q4

```
import java.util.*;
class TestClass
{
   public static void main(String args[])
   {
      Scanner in = new Scanner(System.in);
           int number1 = in.nextInt();
      int number2 = in.nextInt();
      int number3 = in.nextInt();
           double average = (double)(number1 + number2 + number3) / 3.0;
      System.out.println(String.format("Average is %.1f",average));




   }
}
```

Q5

```
import java.util.*;
class TestClass
{
  public static void main(String args[])
  {
    List<String> fruits_list = new ArrayList<>(Arrays.asList("Orange", "Apple", "Mango", "Pineapple",
"Strawberry", "Banana"));
    Scanner sc = new Scanner(System.in);
    int n = sc.nextInt();
    System.out.println(fruits_list.get(n-1));
    int x = sc.nextInt();
```

```
    fruits_list.remove(fruits_list.get(x-1));
    System.out.println(fruits_list);
  }
}
```

Q6

```
import java.util.*;
class TestClass
{
  public static void main(String args[])
  {
    ArrayList<String> colors = new ArrayList<>(Arrays.asList("Green", "Yellow", "Orange", "Red",
"Pink"));
    Scanner sc = new Scanner(System.in);
    String s = sc.nextLine();
    colors.add(s);
    int a = sc.nextInt();
    int b = sc.nextInt();
    int c = sc.nextInt();
    ArrayList<Integer> numbers = new ArrayList<>(Arrays.asList(a,b,c));
    List<String> newList = new ArrayList<String>(numbers.size());
    for (Integer myInt : numbers)
    {
      newList.add(String.valueOf(myInt));
    }
    colors.addAll(newList);
    System.out.println(colors);
  }
}
```

Q7

```
import java.util.*;
class TestClass
{
  public static void main(String args[])
  {
    ArrayList<Integer> num = new ArrayList<>(Arrays.asList(6, 7, 3, 8, 1, 5, 16, 13, 11, 19, 2, 4, 12, 9, 17, 10));
    Scanner sc = new Scanner(System.in);
    int a = sc.nextInt();
    int b = sc.nextInt();
    System.out.println(num.get(a-1));
    System.out.println(num.get(b-1));
    a = sc.nextInt();
    b = sc.nextInt();
    System.out.println(num.get(a-1) + num.get(b-1));
  }
}
```

Q8

```
import java.util.*;
import java.util.regex.Pattern;

class TestClass
{
  public static void main(String args[])
  {
    Scanner scanner = new Scanner(System.in);
```

```
    String values = scanner.nextLine();
    String[] strArray= values.split(Pattern.quote(","));
    List<String> value = new ArrayList<>(Arrays.asList(strArray));
    List<String> stringList = Collections.unmodifiableList(Arrays.asList(strArray));
    System.out.println(value);
    System.out.println(stringList);
  }
}
```

Q9

```
import java.util.*;
class TestClass
{
  public static void main(String args[])
  {
    ArrayList<Integer> num = new ArrayList<>(Arrays.asList(10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20));
            Scanner sc = new Scanner(System.in);
    int low = sc.nextInt();
    int high = sc.nextInt();
    ArrayList<Integer> otherList = new ArrayList<>(num.subList(low,high+1));
    System.out.println(otherList);
  }
}
```

Q10

```
import java.util.*;
class TestClass
```

```
{
  public static void main(String args[])
  {
    Map<String,Integer> shapes = new HashMap< String,Integer>();
    shapes.put("Square", 4);
    shapes.put("Triangle", 3);
    shapes.put("Rectangle", 4);
    shapes.put("Pentagon", 5);
    Scanner sc = new Scanner(System.in);
    String s = sc.nextLine();
    System.out.println(shapes.get(s));
    s = sc.nextLine();
    shapes.remove(s);
    System.out.println(shapes);
  }
}
```


TEST 5 Flow Control Statements

Q1

```
#include <stdio.h>
int main()
{
  int num;
  scanf("%d", &num);
  if(num < 0)
```

```
    printf("Invalid");
  if(num > 0)
    printf("Valid");
  return 0;
}
```

Q2

```
#include <stdio.h>
int main()
{
  int num;
  scanf("%d", &num);
  if(num==5)
  {
    printf("1\n");
    printf("2\n");
    printf("3\n");
    printf("4\n");
  }
  if(num==4)
  {
    printf("1\n");
    printf("2\n");
    printf("3\n");
  }
  return 0;
}
```

Q3

```
#include <stdio.h>
int main()
{
  int user_input;
  scanf("%d", &user_input);
  if(user_input > 0)
    printf("Positive");
  if(user_input < 0)
    printf("Negative");
  if(user_input == 0)
    printf("Zero");
  return 0;
}
```

Q4

```
#include <stdio.h>
int main()
{
  int marks;
  scanf("%d", &marks);
  if(marks > 120)
    printf("You are qualified");
  else
    printf("Not qualified");
  return 0;
}
```

Q5

```
#include <stdio.h>
```

```
#include <string.h>
int main()
{
  char day[100];
  scanf("%s", &day);
  if(strcmp(day,"Sunday") == 0 || strcmp(day,"Saturday") == 0)
    printf("It's a holiday");
  else
    printf("Not a holiday");
  return 0;
}
```

Q6

```
#include <stdio.h>
int main()
{
  int marks;
  scanf("%d", &marks);
  if(marks > 80)
    printf("Outstanding");
  else if(marks > 60)
    printf("Excellent");
  else if(marks > 40)
    printf("Good");
  else
    printf("Not qualified");
  return 0;
}
```

Q7

```
#include <iostream>
using namespace std;
int main()
{
  int op;
  int firstNumber, secondNumber;
  cin >> op;
  cin >> firstNumber >> secondNumber;
  switch(op)
  {
    case 1:
      cout << firstNumber+secondNumber;
      break;
    case 2:
      cout << firstNumber-secondNumber;
      break;
    default:
      cout <<"Error! operator is not correct";
  }
}
```

TEST 6 Flow Control Statements

Q1

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
```

```
    Scanner scanner = new Scanner(System.in);
    int user_input = scanner.nextInt();
    if(user_input > 60)
      System.out.println("You have reached the maximum limit");
    else
      System.out.println("You are within the limit");
  }
}
```

Q2

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
    Scanner scanner = new Scanner(System.in);
    int user_input = scanner.nextInt();
    if(user_input > 1000)
      System.out.println("You are rich");
    else
      System.out.println("You are not rich");
  }
}
```

Q3

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
```

```
 {
   Scanner scanner = new Scanner(System.in);
   int x = scanner.nextInt();
   int y = scanner.nextInt();
   System.out.println( x>y?x:y);
 }
}
```

Q4

```
import java.util.*;
class TestClass
{
 public static void main(String[] args)
 {
   Scanner scanner = new Scanner(System.in);
   int x = scanner.nextInt();
   int y = scanner.nextInt();
   if(x > y)
     System.out.println(x);
   else
     System.out.println(y);
 }
}
```

Q5

```
import java.util.*;
class TestClass
{
 public static void main(String[] args)
```

```
 {
   Scanner scanner = new Scanner(System.in);
   int user_input = scanner.nextInt();
   if(user_input > 70)
     System.out.println("Too many");
   else if(user_input < 10)
     System.out.println("Too few");
   else
     System.out.println("Good number");
 }
}
```

Q6

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
    Scanner scanner = new Scanner(System.in);
    int money = scanner.nextInt();
    if((money > 100 && money <= 500) || (money > 1000 && money <= 5000))
      System.out.println("Yes");
    else
      System.out.println("No");
  }
}
```

Q7

```
import java.util.*;
class TestClass
```

```
{
  public static void main(String[] args)
  {
    Scanner scanner = new Scanner(System.in);
    int marks = scanner.nextInt();
    if(marks > 50)
      System.out.println("Above average");
    else
      System.out.println("Below average");
  }
}
```

Q8

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
    Scanner scanner = new Scanner(System.in);
    int user_input = scanner.nextInt();
    if(user_input < 0 || user_input >100)
      System.out.println("Out of range");
    else
      System.out.println("Proceed");
  }
}
```

Q9

```
import java.util.*;
```

```
class TestClass
{
  public static void main(String[] args)
  {
    Scanner scanner = new Scanner(System.in);
    int maths = scanner.nextInt();
    int science = scanner.nextInt();
    int language = scanner.nextInt();
    if((maths >= 60 && science >= 50 && language >= 40) || (maths + science >= 150))
      System.out.println("Eligible");
    else
      System.out.println("Not Eligible");
  }
}
```

Q10

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
    Scanner scanner = new Scanner(System.in);
    char user_input = scanner.next().charAt(0);
    if(user_input=='a'||user_input=='e'||user_input=='i'||user_input=='o'||user_input=='u')
      System.out.println("Vowel");
    else
      System.out.println("Consonant");
  }
```

```
}
```

Q11

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
    Scanner scanner = new Scanner(System.in);
    String month = scanner.next();
    if(month.equals("January") || month.equals("March") || month.equals("May") ||
month.equals("July") || month.equals("August") || month.equals("October") ||
month.equals("December"))
      System.out.println("31 Days");
    else if(month.equals("April") || month.equals("June") || month.equals("September") ||
month.equals("November"))
      System.out.println("30 Days");
    else
      System.out.println("28 or 29 Days");
  }
}
```

Q12

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
    Scanner scanner = new Scanner(System.in);
```

```
    int denom = scanner.nextInt();
    if(denom == 1)
      System.out.println("George Washington");
    else if(denom == 2)
      System.out.println("Thomas Jefferson");
    else if(denom == 5)
      System.out.println("Abraham Lincoln");
    else if(denom == 10)
      System.out.println("Alexander Hamilton");
    else if(denom == 20)
      System.out.println("Andrew Jackson");
    else if(denom == 50)
      System.out.println("Ulysses S. Grant");
    else if(denom == 100)
      System.out.println("Benjamin Franklin");
    else
      System.out.println("Invalid Entry");
  }
}
```

Q13

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
    Scanner scanner = new Scanner(System.in);
    String month = scanner.nextLine();
```

```
   int date = scanner.nextInt();
   if (((month.equals("April") || month.equals("May")) || (month.equals("March") && (date >= 20 && date <= 31))) || ((month.equals("June")) && (date >= 1 && date <= 20)))
     System.out.println("Spring Season");
   else if(((month.equals("July") || month.equals("August")) || (month.equals("June") && (date >= 21 && date <= 30))) || ((month.equals("September")) && (date >= 1 && date <= 21)))
     System.out.println("Summer Season");
   else if(((month.equals("October") || month.equals("November")) || (month.equals("September") && (date >= 22 && date <= 30))) || ((month.equals("December")) && (date >= 1 && date <= 20)))
     System.out.println("Fall Season");
   else
     System.out.println("Winter Season");
  }
}
```

Q14

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
    Scanner scanner = new Scanner(System.in);
    int num = scanner.nextInt();
    if(num == 1)
      System.out.println("Sunday");
    else if(num == 2)
      System.out.println("Monday");
    else if(num == 3)
      System.out.println("Tuesday");
    else if(num == 4)
      System.out.println("Wednesday");
```

```
    else if(num == 5)
      System.out.println("Thursday");
    else if(num == 6)
      System.out.println("Friday");
    else if(num == 7)
      System.out.println("Saturday");
    else
      System.out.println("Invalid");
  }
}
```

Q15

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
    Scanner scanner = new Scanner(System.in);
    int length = scanner.nextInt();
    int breadth = scanner.nextInt();
    if(length == breadth)
      System.out.println("Yes, it is a square");
    else
      System.out.println("No, it is a rectangle");
  }
}
```

Q16

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
    Scanner scanner = new Scanner(System.in);
    int first = scanner.nextInt();
    int second = scanner.nextInt();
    int third = scanner.nextInt();
    if(first < second && first < third)
      System.out.println(first);
    else if(second <first && second < third)
      System.out.println(second);
    else
      System.out.println(third);
  }
}
```


Learn Java: Control Loops

Q1

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
```

```
    for(int i = 20; i <= 30; i++)
      System.out.println(i);
  }
}
```

Q2

```
class TestClass
{
  public static void main(String[] args)
  {
    String colors[] = {"Red", "Green", "Blue", "Black", "Yellow"};
    for(int i = 0; i < 5; i++)
      System.out.println(colors[i]);
  }
}
```

Q3

```
class TestClass
{
  public static void main(String[] args)
  {
    int num[] = {25, 33, 42, 28, 53, 66, 75, 36, 80, 40};
    int sum=0;
    for(int i = 0; i < 10; i++)
    {
      if(i == 5)break;
      sum += num[i];
    }
```

```
    System.out.println(sum);
  }
}
```

Q4

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
    Scanner scanner = new Scanner(System.in);
    int num[] = {16, 8, 12, 5, 7, 10, 11, 9, 13, 15};
    boolean isPresent = false;
    int user_input=scanner.nextInt();
    for(int i = 0; i < 10; i++)
    {
      if(num[i] == user_input)
      {
        isPresent = true;
        for(int j=1; j <= user_input; j++)
          System.out.println(j);
      }
    }
    if(isPresent == false)
      System.out.println("Not found");
  }
}
```

Q5

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
    Scanner scanner = new Scanner(System.in);
    int x=scanner.nextInt();
    int y=scanner.nextInt();
    int num=0;
    while(num <= y)
    {
      if(num >= x && num<=y)
        System.out.println(num);
      num++;
    }
  }
}
```

Practice Java: Control Loops

Q1

```
class TestClass
{
  public static void main(String[] args)
  {
    int num[]={5, 6, 2, 1, 4, 3};
    System.out.print("[");
```

```
    for(int i=0;i<6;i++){
      if(i!=5)System.out.print(num[i]*num[i]+", ");
      else System.out.print(num[i]*num[i]);
    }
    System.out.println("]");
  }
}
```

Q2

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
    Scanner scanner=new Scanner(System.in);
    int num=scanner.nextInt();
    for(int i=1;i<11;i++)
    {
      System.out.println(i + " x " + num + " = " + num*i);
    }
  }
}
```

Q3

```
class TestClass
{
  public static void main(String[] args)
  {
    for(int i=10;i<101;)
    {
```

```
      System.out.println(i);
      i = i + 10;
    }
  }
}
```

Q4

```
class TestClass
{
  public static void main(String[] args)
  {
    int num=1;
    System.out.print("[");
    for(int i=0;i<10;i++)
    {
      if(i!=9)System.out.print(num*2+", ");
      else System.out.print(num*2);
      num = num * 2;
    }
    System.out.println("]");
  }
}
```

Q5

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
```

```
   int num=0;
   System.out.print("[");
   while(num<=630)
   {
     System.out.print(num+", ");
     num = num + 5;
     if(num!=635)System.out.print(num+", ");
     else System.out.print(num);
     num = num * 2;
   }
   System.out.println("]");
  }
}
```

Q6

```
class TestClass
{
  public static void main(String[] args)
  {
    String months[] = {"January", "February", "March", "April", "May", "June", "July", "August",
"September", "October", "November", "December"};
    for(int i=0; i<12; i++)
      System.out.println(i+1 + " " + months[i]);
  }
}
```

Q7

```
import java.util.*;
class TestClass
```

```
{
  public static void main(String[] args)
  {
    Scanner scanner = new Scanner(System.in);
    float sum=0;
    for(int i=0;i<10;i++)
    {
      float x = scanner.nextFloat();
      sum = sum + x;
    }
    System.out.println(String.format("%.1f",sum/10));
  }
}
```

Q8

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
    Scanner scanner = new Scanner(System.in);
    float sum = 0;
    int pro = 1, num = 0;
    while(true)
    {
      String x = scanner.nextLine();
      if(x.equals("q"))break;
      sum = sum + (float)Integer.parseInt(x);
      pro = pro * Integer.parseInt(x);
      num++;
```

```
    }
    System.out.println(String.format("%.1f",sum/num));
    System.out.println(pro);
  }
}
```

Q9

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
    Scanner scanner = new Scanner(System.in);
    float sum = 0;
    int[] num = new int[5];
    for(int i=0;i<5;i++)
      num[i]=scanner.nextInt();

    int search=scanner.nextInt();
    int index = -1;
    for(int i=0;i<5;i++)
    {
      if(search == num[i])
      {
        index = i;
      }
    }
    System.out.print("[");
    for(int i=0;i<5;i++)
    {
      if(i != index)
```

```
      System.out.print(num[i]);
     if((i == index) || (i == 4) || (i == 3 && index == 4))
      System.out.print("");
     else
      System.out.print(", ");
   }
   System.out.println("]");
  }
}
```

Q10

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
    for(int i=2;i<101;i+=2)
    {
     System.out.print(i+" ");
    }
    System.out.println();
    for(int i=1;i<101;i+=2)
    {
     System.out.print(i+" ");
    }
  }
}
```

Q11

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
    Scanner scanner = new Scanner(System.in);
    int start = scanner.nextInt();
    int limit = scanner.nextInt();
    while(start<=limit)
    {
      System.out.println(start);
      start = start +2;
    }
  }
}
```


Learn Java: Functions and Modules

Q1

```
class TestClass
{
  public static void print()
  {
    System.out.println("Whose woods these are I think I know.\n" +
                       "His house is in the village though;\n" +
```

```
                "He will not see me stopping here\n" +
                "To watch his woods fill up with snow.");
  }
  public static void main(String[] args)
  {
    print();
  }
}
```

Q2

```
import java.util.*;
class TestClass
{
  public static void print(int x, int y)
  {
    System.out.println(x + y);
  }
  public static void main(String[] args)
  {
    Scanner scanner = new Scanner(System.in);
    int x=scanner.nextInt();
    int y=scanner.nextInt();
    print(x, y);
  }
}
```

Q3

```
import java.util.*;
```

```
class TestClass
{
  public static int find_min(int x, int y)
  {
    return Math.min(x, y);
  }
  public static void main(String[] args)
  {
    Scanner scanner = new Scanner(System.in);
    int x=scanner.nextInt();
    int y=scanner.nextInt();
    int num=find_min(x, y);
    System.out.println(num);
  }
}
```

Q4

```
class TestClass
{
  static String message="This variable is in global scope";
  public static void print()
  {
    String message="This variable is in local scope";
    System.out.println(message);
  }
  public static void main(String[] args)
  {
    System.out.println(message);
    print();
  }
```

```
}
```

Practice Java: Functions and Modules

Q1

```
import java.util.*;
class TestClass
{
  public static void square(int x)
  {
    System.out.println(x*x);
  }
  public static void main(String[] args)
  {
    Scanner scanner=new Scanner(System.in);
    int x=scanner.nextInt();
    square(x);
  }
}
```

Q2

```
import java.util.*;
class TestClass
{
  public static int max(int x, int y)
  {
    return Math.max(x, y);
  }
```

```
  public static void main(String[] args)
  {
    Scanner scanner=new Scanner(System.in);
    int x=scanner.nextInt();
    int y=scanner.nextInt();
    int ans = max(x, y);
    System.out.println(ans);
  }
}
```

Q3

```
import java.util.*;
class TestClass
{
  public static int sum(int x, int y)
  {
    return x + y;
  }
  public static int square(int x)
  {
    return x * x;
  }
  public static void main(String[] args)
  {
    Scanner scanner=new Scanner(System.in);
    int x=scanner.nextInt();
    int y=scanner.nextInt();
    System.out.println(sum(square(x),square(y)));
  }
}
```

Q4

```
import java.util.*;
class TestClass
{
  public static void interchange(int x, int y)
  {
    System.out.println("["+ y + ", " + x + "]");
  }
  public static void main(String[] args)
  {
    Scanner scanner=new Scanner(System.in);
    int x=scanner.nextInt();
    int y=scanner.nextInt();
    interchange(x,y);
  }
}
```

Q5

```
import java.util.*;
class TestClass
{
  public static void cal(int x)
  {
    System.out.println(x*x);
    System.out.println(4*x);
  }
  public static void main(String[] args)
  {
```

```
    Scanner scanner=new Scanner(System.in);
    int x=scanner.nextInt();
    cal(x);
  }
}
```

Q6

```
import java.util.*;
class TestClass
{
  public static void cal(int x)
  {
    if(x%2 == 0)
      System.out.println("Even");
    else
      System.out.println("Odd");
  }
  public static void main(String[] args)
  {
    Scanner scanner=new Scanner(System.in);
    int x=scanner.nextInt();
    cal(x);
  }
}
```

Q7

```
import java.util.*;
class TestClass
```

```
{
  public static void fac(int x)
  {
    int ans = 1;
    for(int i = x; i > 0; i--)
    {
      ans = ans * i;
    }
    System.out.println(ans);
  }
  public static void main(String[] args)
  {
    Scanner scanner=new Scanner(System.in);
    int x=scanner.nextInt();
    fac(x);
  }
}
```

Q8

```
import java.util.*;
class TestClass
{
  public static void max(int x, int y, int z)
  {
    int ans = Math.max(x, Math.max(y,z));
    System.out.println(ans);
  }
  public static void main(String[] args)
  {
```

```
    Scanner scanner=new Scanner(System.in);
    int x=scanner.nextInt();
    int y=scanner.nextInt();
    int z=scanner.nextInt();
    max(x, y, z);
  }
}
```

Q9

```
import java.util.*;
class TestClass
{
  static int ar[] = {4, 5, 6, 3, 7, 9};
  public static void cal()
  {
    int ans = 0;
    for(int i=0; i<6; i++)
      ans = ans + ar[i];
    System.out.println(ans);
  }
  public static void main(String[] args)
  {
    cal();
  }
}
```

Q10

```
import java.util.*;
```

```
class TestClass
{
  public static void check(int low, int upp, int num)
  {
    if(num >= low && num <= upp)
      System.out.println("Yes");
    else
      System.out.println("No");
  }
  public static void main(String[] args)
  {
    Scanner scanner=new Scanner(System.in);
    int num=scanner.nextInt();
    int low=scanner.nextInt();
    int upp=scanner.nextInt();
    check(low, upp, num);
  }
}
```

Q11

```
class TestClass
{
  public static void print()
  {
    System.out.print("{");
    for(int i=1;i<11;i++)
    {
      System.out.print(i+": "+i*i);
      if(i != 10)
        System.out.print(", ");
    }
```

```
    System.out.print("}");
  }
  public static void main(String[] args)
  {
    print();
  }
}
```

Q12

```
class TestClass
{
  public static int fac(int x)
  {
    int ans = 1;
    for(int i=x;i>0;i--)
      ans = ans * i;
    return ans;
  }
  public static void print()
  {
    System.out.print("{");
    for(int i=1;i<6;i++){
      System.out.print(i+": "+fac(i));
      if(i != 5)
        System.out.print(", ");
    }
    System.out.print("}");
  }
  public static void main(String[] args)
  {
```

```
    print();
  }
}
```

Q13

```
import java.util.*;
class TestClass
{
  public static int cal(int x)
  {
    if(x == 0)
      return 1;
    return cal(x-1) + 100;
  }
  public static void main(String[] args)
  {
    Scanner in = new Scanner(System.in);
    int num = in.nextInt();
    System.out.println(cal(num));
  }
}
```

Q14

```
import java.util.*;
class TestClass
{
  static int ar[] = {3, 4, 6, 7, 8, 9, 11, 15, 18};
  public static int bin_search(int x)
  {
```

```
  int l=0,r=8;
  while(l<=r)
  {
    int mid = (l+r)/2;
    if(ar[mid] == x)
      return mid;
    else if(ar[mid] > x)
      r = mid - 1;
    else
      l = mid + 1;
  }
  return -1;
 }
 public static void main(String[] args)
 {
  Scanner in = new Scanner(System.in);
  int num = in.nextInt();
  int ans = bin_search(num);
  if(ans == -1)
    System.out.println("Not found");
  else
    System.out.println(ans);
 }
}
```

Q1

```
class Bird
{
  public static void main(String[] args)
  {
    Bird obj = new Bird();
    fly();
  }
  static void fly()
  {
    System.out.println("The bird is flying");
  }
}
```

Q2

```
import java.util.*;
class computer
{
  String input;
  public void system_in()
  {
    Scanner in = new Scanner(System.in);
    input = in.nextLine();
  }
  public void system_out()
  {
    System.out.println("Thank you " + input);
  }
```

```
}
class TestClass
{
  public static void main(String[] args)
  {
    computer obj = new computer();
    obj.system_in();
    obj.system_out();
  }
}
```

Q3

```
class circle
{
  double radius;
  circle(double r)
  {
    this.radius = r;
  }
  public void circumference()
  {
    double peri = 2.0 * 3.14 * radius;
    System.out.println(String.format("%.1f",peri));
  }
  public void area()
  {
    double area = 3.14 * radius * radius;
    System.out.println(String.format("%.1f",area));
  }
}
```

```
class TestClass
{
  public static void main(String[] args)
  {
    circle obj = new circle(10);
    obj.area();
    obj.circumference();
  }
}
```

Q4

```
class Person
{
  String name;
  public Person(String s)
  {
    this.name = s;
  }
}
class Student extends Person
{
  int roll_no;
    String gender;
    public Student(String s, int roll, String g)
    {
        super(s);
        this.roll_no = roll;
        this.gender = g;
    }
    void display()
```

```
    {
        System.out.println(super.name);
        System.out.println(this.roll_no);
        System.out.println(this.gender);
    }
}
class TestClass
{
  public static void main(String[] args)
  {
    Student obj = new Student("Sam", 15, "Male");
    obj.display();
  }
}
```

Practice Java: Classes and Objects

Q1

```
import java.util.Scanner;
class Temperature
{
  void celsiusToFahren(double celsius)
  {
    double fahren = (celsius *  9.0 / 5.0 ) + 32 ;
    System.out.println(String.format("%.1f",fahren));
  }
}
class TestClass
{
  public static void main(String[] args)
```

```
 {
  Scanner scan = new Scanner( System.in);
  Temperature obj = new Temperature();
  double d = scan.nextDouble();
  obj.celsiusToFahren(d);
 }
}
```

Q2

```
class Student
{
 int age, marks;
 String name;
 public Student(String s)
 {
  this.name = s;
 }
 void setage(int a)
 {
  this.age = a;
 }
 void setmarks(int m)
 {
  this.marks = m;
 }
 void display()
 {
  System.out.println("Name: " + this.name);
  System.out.println("Age: " + this.age);
```

```
    System.out.println("Marks: " + this.marks);
  }
}
class TestClass
{
  public static void main(String[] args)
  {
    Student obj = new Student("Emma");
    obj.setage(18);
    obj.setmarks(68);
    obj.display();
  }
}
```

Q3

```
class Date
{
  String day, month, year;
  public Date(String d, String m, String y)
  {
    day = d;
    month = m;
    year = y;
  }
  void display()
  {
    System.out.println(day + " " + month + " " + year);
  }
}
```

```
class TestClass
{
  public static void main(String[] args)
  {
    Date obj = new Date("08","April","2000");
    obj.display();
  }
}
```

Q4

```
import java.util.*;
class Fruits
{
  String name;
  int price;
  int quantity;
  public Fruits(String s, int p)
  {
    name = s;
    price = p;
  }
  void setQuan( int quan)
  {
    quantity = quan;
  }
  void total()
  {
    System.out.println(quantity * price);
  }
}
```

```
class TestClass
{
  public static void main(String[] args)
  {
    Scanner it = new Scanner( System.in);
    String str = it.nextLine();
    Fruits obj = new Fruits(str, it.nextInt());
    obj.setQuan(it.nextInt());
    obj.total();
  }
}
```

Q5

```
class Animals
{
  void eating()
  {
    System.out.println("Eating....");
  }
  void walking()
  {
    System.out.println("Walking.....");
  }
}
class Herbivores extends Animals
{
  void herb_eat()
  {
    eating();
    System.out.println("Grass");
```

```
  }
}
class Carnivores extends Animals
{
  void carn_eat()
  {
    eating();
    System.out.println("Meat");
  }
}
class TestClass
{
  public static void main(String[] args)
  {
    Herbivores cow = new Herbivores();
    cow.herb_eat();
    Carnivores lion = new Carnivores();
    lion.carn_eat();
  }
}
```

Q6

```
import java.util.*;
class Rectangle
{
  int length, width;
  public Rectangle(int l, int w)
  {
    length = l;
    width = w;
```

```
  }
  void area()
  {
    System.out.println(length * width);
  }
}
class TestClass
{
  public static void main(String[] args)
  {
    Scanner it = new Scanner( System.in);
    Rectangle obj = new Rectangle(it.nextInt(), it.nextInt());
    obj.area();
  }
}
```

Q7

```
import java.util.*;
class Shape
{
  void area()
  {
    System.out.println(0);
  }
}
class Square extends Shape
{
    int length;
    public Square(int l)
    {
```

```
        length = l;
    }
    void area()
    {
        System.out.println(length * length);
    }
}
class TestClass
{
  public static void main(String[] args)
  {
    Scanner it = new Scanner(System.in);
    Square obj = new Square(it.nextInt());
    obj.area();
  }
}
```

Q8

```
class Person
{
  void gender()
  {
    System.out.println("Unknown");
  }
}
class Male extends Person
{
```

```
    void gender()
    {
        System.out.println("Male");
    }
}
class Female extends Person
{
    void gender()
    {
        System.out.println("Female");
    }
}
class TestClass
{
  public static void main(String[] args)
  {
    Male obj1 = new Male();
    Female obj2 = new Female();
    obj1.gender();
    obj2.gender();
  }
}
```

Q9

```
class poem
{
  String Poem[] = new String[4];
  public poem()
  {
```

```
    Poem[0] = "When I behold a forest spread";
    Poem[1] = "With silken trees upon thy head;";
    Poem[2] = "And when I see that other dress";
    Poem[3] = "Of flowers set in comeliness;";
  }
  void getpoem()
  {
    for(int i=0;i<4;i++)
      System.out.println(Poem[i]);
  }
}
class TestClass
{
  public static void main(String[] args)
  {
    poem obj = new poem();
    obj.getpoem();
  }
}
```

Learn Java: Built in Functions

Q1

```
import java.util.*;
```

```
class TestClass
{
  public static void main(String[] args)
  {
    Scanner in = new Scanner(System.in);
    int x = in.nextInt();
    int y = in.nextInt();
    int z = in.nextInt();
    System.out.println(Math.abs(x)+Math.abs(y)+Math.abs(z));
  }
}
```

Q2

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
    System.out.println(Math.round(2.5));
    System.out.println(Math.round(-2.5));
    System.out.println(Math.round(-2.52));
  }
}
```

Q3

```
import java.util.*;
class TestClass
{
```

```
  public static void main(String[] args)
  {
    Scanner in = new Scanner(System.in);
    Integer a = in.nextInt();
    Integer b = in.nextInt();
    System.out.println(a.equals(b));
  }
}
```

Q4

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
    List<Integer> l1 = new ArrayList<Integer>();
    for(int i=25;i<64;i++)
      l1.add(i);

    System.out.println(l1.size());
  }
}
```

Q5

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
```

```
    Scanner in = new Scanner(System.in);
    String s1 = in.nextLine();
    String x = in.nextLine();
    System.out.println(s1.contains(x));
  }
}
```

Q6

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
    int ar[] = {12, 78, 5, 46, 32, 52, 61, 43};
    int ma=ar[0],mi=ar[0];
    for(int i=1;i<8;i++)
    {
      mi = Math.min(mi, ar[i]);
      ma = Math.max(ma, ar[i]);
    }
    System.out.println(mi + "\n" + ma);
  }
}
```

Q7

```
class TestClass
{
  public static void main(String[] args)
  {
```

```
    for(int i=500;i<551;i+=5)
    {
      System.out.print(i + " ");
    }
  }
}
```

Q8

```
class TestClass
{
  public static void main(String[] args)
  {
    int s = Integer.sum(44, 45);
    for(int i=46;i<67;i++)
    {
      s = Integer.sum(i, s);
    }
    System.out.println(s);
  }
}
```


Practice Java: Built in Functions

Q1

```
import java.util.*;
class TestClass
{
   public static void main(String[] args)
   {
      int ar[] = {2, 56, 7, -6, 99, -76, -33, 69, 3, -56, 4, 56, 34, -9, 10, -20, 38, 55};

      for(int i=0;i<18;i++)
         System.out.print(Math.abs(ar[i])+" ");
   }
}
```

Q2

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
    int a =  Math.min(Integer.sum(11,22), Math.max(Math.abs(-30),20));
    System.out.println(a);
  }
}
```

Q3

```
import java.util.*;
class TestClass
```

```
{
  public static void main(String[] args)
  {
    int ar[] = {-1, 2, -3, 4, 5};
    for(int i=0;i<5;i++)
    {
      if(Math.abs(ar[i]) < 3)
        System.out.println(ar[i]);
    }
  }
}
```

Q4

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
    int ar[] = {53, 5, 36, 65, 78, 10};
    int a =Math.max(Math.min(Math.abs(-63),63),ar[3]);
    System.out.println(a);
  }
}
```

Q5

```
class TestClass
{
  public static void main(String[] args)
  {
```

```
    int a = 0;
    for(int i=60;i>=-10;i-=2)
    {
      a = a + i;
    }
    System.out.println(a);
  }
}
```

Q6

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
    List<Integer> l1 = new ArrayList<Integer>();
    for(int i=25;i<76;i+=2)
    {
      l1.add(i);
    }
    System.out.println(l1);
  }
}
```

Q7

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
```

```
 {
   List<Integer> l1 = new ArrayList<Integer>();
   for(int i=125;i>=65;i-=5)
   {
    l1.add(i);
   }
   System.out.println(l1);
 }
}
```

Q8

```
import java.util.*;
class TestClass
{
  public static void main(String[] args)
  {
    List<Integer> l1 = new ArrayList<Integer>();
    int a = 0;
    for(int i=32;i<89;i+=3)
    {
     l1.add(i);
     a = a + i;
    }
    System.out.println(l1);
    System.out.println(l1.size());
    System.out.println(Collections.max(l1));
    System.out.println(a);
  }
}
```

Practice Java: Some useful Modules/Packages

Q1

```
import java.util.*;
class shape
{
  int sides;
  String colour;
  shape(int s, String c)
  {
    sides = s;
    colour = c;
  }
}
class TestClass
{
  public static void main(String[] args)
  {
    Scanner in = new Scanner(System.in);
    shape rectangle = new shape(4,"yellow");
    shape square = rectangle;
    System.out.println(square.sides);
  }
}
```

Q2

```
import java.util.*;
class TestClass
```

```
{
  public static void main(String[] args)
  {
    Scanner in = new Scanner(System.in);
    String s=in.nextLine();
    System.out.println(s);
  }
}
```

Practice: Data Structure (Easy)

Q1

```
import java.util.*;
class Main
{
  public static void main(String args[])
  {
    int n,m,i,j;
    int value;
    Scanner sc = new Scanner(System.in);
    n = sc.nextInt();
    int arr[][] = new int[n][10];

    for(i=0;i<n;i++)
    {
      m = sc.nextInt();
      arr[i][0] = m;
      for(j=0;j<m;j++)
      {
        arr[i][j+1] = sc.nextInt();
```

```
    }
   }
   int q = sc.nextInt();
   int x,y;
   for(i=0;i<q;i++)
   {
    x = sc.nextInt();
    y = sc.nextInt();
    if(x<=n)
    {
     if(y<=arr[x-1][0])
      System.out.println(arr[x-1][y]);
     else
      System.out.println("ERROR!");
    }
    else
     System.out.println("ERROR!");
   }
  }
}
```

Q2

```
import java.util.*;
class Perfectice
{
  public static void main(String[] args)
  {
    Scanner in = new Scanner(System.in);
    int arr[][] = new int[6][6];
    for(int arr_i=0; arr_i < 6; arr_i++)
```

```
  {
    for(int arr_j=0; arr_j < 6; arr_j++)
    {
      arr[arr_i][arr_j] = in.nextInt();
    }
  }
  Sum(arr);
 }
 private  static void Sum(int arr[][])
 {
  int sum=-1000;
  for(int i =0 ; i<4;i++)
  {
    for(int x =0 ; x<4; x++)
    {
      int top = arr[i][x]+arr[i][x+1]+arr[i][x+2];
      int middle = arr[i+1][x+1];
      int bottom = arr[i+2][x]+arr[i+2][x+1]+arr[i+2][x+2];
      if(top+middle+bottom>sum)
      {
        sum=top+middle+bottom;
      }
    }
  }
  System.out.println(sum);
 }
}
```

Q3

```
import java.util.*;
```

```
class Perfectice
{
  public static void main(String[] args)
  {
    Scanner sc = new Scanner(System.in);
    int bitSetSize = sc.nextInt();
    int numOperations = sc.nextInt();
    BitSet[] bitSetArray = new BitSet[2];
    bitSetArray[0] = new BitSet(bitSetSize);
    bitSetArray[1] = new BitSet(bitSetSize);
    sc.nextLine();
    for(int i = 0;i < numOperations; i++)
    {
      String[] opArray = sc.nextLine().split(" ");
      switch(opArray[0]){
        case "AND": bitSetArray[Integer.parseInt(opArray[1])-
1].and(bitSetArray[Integer.parseInt(opArray[2])-1]);
          break;
        case "OR": bitSetArray[Integer.parseInt(opArray[1])-
1].or(bitSetArray[Integer.parseInt(opArray[2])-1]);
          break;
        case "XOR": bitSetArray[Integer.parseInt(opArray[1])-
1].xor(bitSetArray[Integer.parseInt(opArray[2])-1]);
          break;
        case "FLIP": bitSetArray[Integer.parseInt(opArray[1])-1].flip(Integer.parseInt(opArray[2]));
          break;
        case "SET": bitSetArray[Integer.parseInt(opArray[1])-1].set(Integer.parseInt(opArray[2]));
          break;
      }
      System.out.println(bitSetArray[0].cardinality() + " " + bitSetArray[1].cardinality());

    }
```

```
  }
}
```


Practice: Data Structure (Medium)

Q1

```
import java.util.*;
class Solution
{
  public static void main(String []argh)
  {
    Scanner sc = new Scanner(System.in);
    while (sc.hasNext())
    {
      String input=sc.next();
      while(input.length() != (input = input.replaceAll("\\(\\)|\\[\\]|\\{\\}", "")).length());
      System.out.println(input.isEmpty());
    }
  }
}
```

Q2

```
import java.util.*;
class Checker implements Comparator<Player>
{
    public int compare(Player a, Player b)
    {
```

```
        if (a.score == b.score)
        {
            return a.name.compareTo(b.name);
        }
        else
        {
            return b.score - a.score;
        }
    }
}
class Player
{
  String name;
  int score;
  Player(String name, int score)
  {
    this.name = name;
    this.score = score;
  }
}

class Solution
{
  public static void main(String[] args)
  {
    Scanner scan = new Scanner(System.in);
    int n = scan.nextInt();
    Player[] player = new Player[n];
    Checker checker = new Checker();
    for(int i = 0; i < n; i++)
    {
```

```
      player[i] = new Player(scan.next(), scan.nextInt());
    }
    scan.close();

    Arrays.sort(player, checker);
    for(int i = 0; i < player.length; i++)
    {
      System.out.printf("%s %s\n", player[i].name, player[i].score);
    }
  }
}
```

Q3

```
import java.util.*;
class test
{
  public static void main(String[] args)
  {
    Scanner in = new Scanner(System.in);
    Deque<Integer> deque = new ArrayDeque<>();
    HashSet<Integer> set = new HashSet<>();
    int n = in.nextInt();
    int m = in.nextInt();
    int max = Integer.MIN_VALUE;
    for (int i = 0; i < n; i++)
    {
      int input = in.nextInt();
      deque.add(input);
      set.add(input);
      if (deque.size() == m)
```

```
    {
      if (set.size() > max) max = set.size();
      int first = deque.remove();
      if (!deque.contains(first)) set.remove(first);
    }
  }
  System.out.println(max);
 }
}
```

Practice: Searching (Easy)

Q1

```
import java.util.Scanner;
class LinearSearch {
        static int search(int arr[], int n, int search)
        {
                for (int i = 0; i < n; i++) {
                        if (arr[i] == search)
                                return i;
                }
                return -1;
        }
        public static void main(String args[])
  {
     int i, n, search, arr[];
     Scanner in = new Scanner(System.in);
     n = in.nextInt();
     arr = new int[n];
     for (i = 0; i < n; i++)
```

```
        arr[i] = in.nextInt();
      search = in.nextInt();
      if(search(arr, n, search) >= 0)
         System.out.println("Element is present at index " + search(arr, n, search));
      else
                              System.out.println("Element is not present in array");
   }
}
```

Q2

```
import java.util.Scanner;
class BinarySearchAlgo {
        int binarySearch(int arr[], int l, int r, int search)
        {
                if (r >= l) {
                        int mid = l + (r - l) / 2;
                        if (arr[mid] == search)
                                return mid;
                        if (arr[mid] > search)
                                return binarySearch(arr, l, mid - 1, search);
                        return binarySearch(arr, mid + 1, r, search);
                }
                return -1;
        }
        public static void main(String args[])
        {
                BinarySearchAlgo ob = new BinarySearchAlgo();
                int i, n, search, array[];
```

```
        Scanner in = new Scanner(System.in);
        n = in.nextInt();
        array = new int[n];
        for (i = 0; i < n; i++)
          array[i] = in.nextInt();
        search = in.nextInt();
        int result = ob.binarySearch(array, 0, n - 1, search);
        if (result == -1)
           System.out.println("Element is not present in array");
        else
           System.out.println("Element is present at index " + result);
             }
}
```

Q3

```
import java.util.*;
class MissingNoinArray
{
            static int findMissingNo (int arr[], int n)
            {
                        int i, total;
                        total = (n+1)*(n+2)/2;
                        for ( i = 0; i< n; i++)
                        total -= arr[i];
                        return total;
            }
            public static void main(String args[])
            {
      Scanner sc = new Scanner(System.in);
```

```
                int arr[]=new int[20];
        int n = sc.nextInt();
            for(int i=0;i<n;i++)
        {
        arr[i] = sc.nextInt();
        }
                int missno = findMissingNo(arr,n);
                System.out.println(missno);
            }
}
```

Q4

```
import java.util.*;
class SearchKey
{
        static int search(int arr[], int l, int h, int key)
        {
                if (l > h)
                        return -1;
                int mid = (l+h)/2;
                if (arr[mid] == key)
                        return mid;

                if (arr[l] <= arr[mid])
                {
                        if (key >= arr[l] && key <= arr[mid])
                        return search(arr, l, mid-1, key);

                        return search(arr, mid+1, h, key);
```

```
                }


                if (key >= arr[mid] && key <= arr[h])
                        return search(arr, mid+1, h, key);
                return search(arr, l, mid-1, key);
        }


        public static void main(String args[])
        {
                Scanner s=new Scanner(System.in);
    int n = s.nextInt();
    int arr[]=new int[n];
    for(int i=0;i<n;i++){
       arr[i]=s.nextInt();
    }
                int key = s.nextInt();
                int index = search(arr, 0, n-1, key);
                if (index != -1)
                        System.out.println("Index: " + index);
                else
                        System.out.println("Key not found");
        }
}
```

Practice: Backtracking (Medium)

Q1

```
import java.util.*;
class TestClass
```

```
{
  static boolean checkPalindrome(String str)
  {
    int len = str.length();
    len--;
    for (int i=0; i<len; i++)
    {
      if (str.charAt(i) != str.charAt(len))
        return false;
      len--;
    }
    return true;
  }

  static void printSolution(ArrayList<ArrayList<String>>partitions)
  {
    for(ArrayList<String> i: partitions)
    {
      for(String j: i)
      {
        System.out.print(j+" ");
      }
      System.out.println();
    }
  }
  static ArrayList<ArrayList<String>> addStrings(ArrayList<ArrayList<String>> v, String s,
ArrayList<String> temp,int index)
  {
    int len = s.length();
    String str = "";
    ArrayList<String> current = new ArrayList<>(temp);
```

```
 if (index == 0)
  temp.clear();

 for (int i = index; i < len; ++i)
 {
  str = str + s.charAt(i);
  if (checkPalindrome(str))
  {
   temp.add(str);

   if (i + 1 < len)
   {
    v = addStrings(v,s,temp,i+1);
   }
   else
   {
    v.add(temp);
   }
   temp = new ArrayList<>(current);
  }
 }
 return v;
}
static void partition(String s, ArrayList<ArrayList<String>> v)
{
 ArrayList<String> temp = new ArrayList<>();
 v = addStrings(v, s, temp, 0);
 printSolution(v);
}
public static void main(String[] args)
{
```

```
    TestClass obj = new TestClass();
    Scanner in = new Scanner(System.in);
    ArrayList<ArrayList<String>> partitions = new ArrayList<>();
    String n=in.next();
    obj.partition(n, partitions);
  }
}
```

Q2

```
import java.util.*;
class Edge
{
  int source, dest;
  public Edge(int source, int dest)
  {
    this.source = source;
    this.dest = dest;
  }
};
class Main
{
  List<List<Integer>> adjList = null;

  Main(List<Edge> edges, int N)
  {
    adjList = new ArrayList<>(N);
    for (int i = 0; i < N; i++)
    {
      adjList.add(i, new ArrayList<>());
```

```
    }
    for (int i = 0; i < edges.size(); i++)
    {
      int src = edges.get(i).source;
      int dest = edges.get(i).dest;

      adjList.get(src).add(dest);
      adjList.get(dest).add(src);
    }
  }
}
class TestClass
{
  static boolean flag=false;
  public static void printAllHamiltonianPaths(Main g, int v, boolean[] visited, List<Integer> path, int N)
  {
    if (path.size() == N)
    {
      flag=true;
      return;
    }
    for (int w : g.adjList.get(v))
    {
      if (!visited[w])
      {
        visited[w] = true;
        path.add(w);
        printAllHamiltonianPaths(g, w, visited, path, N);

        visited[w] = false;
        path.remove(path.size()-1);
```

```
    }
  }
}
public static void main(String[] args)
{
  TestClass obj = new TestClass();
  Scanner in = new Scanner(System.in);
  List<Edge> edges = new ArrayList<Edge>();
  int n=in.nextInt();
  int m=in.nextInt();
  int graph[][] = new int[n][n];
  for(int i=0;i<n;i++)
    for(int j=0;j<n;j++)
      graph[i][j]=0;

  for(int i=0;i<m;i++)
  {
    int a=in.nextInt();
    int b=in.nextInt();
    a--;
    b--;
    edges.add(new Edge(a,b));
  }
  Main g = new Main(edges, n);
  int start = 0;
  List<Integer> path = new ArrayList<>();
  path.add(start);
  boolean[] visited = new boolean[n];
  visited[start] = true;
  obj.printAllHamiltonianPaths(g, start, visited, path, n);
  if(flag)
```

```
      System.out.println(1);
    else
      System.out.println(0);
  }
}
```