

### Practice Quiz (CSW 2)

What is the time complexity of a program that takes two arrays  $\text{Arr1}[n]$  and  $\text{Arr2}[m]$  representing integers, and returns an integer representing their product?

- A.  $O(1)$
- B.  $O(n)$
- C.  $O(m)$
- D.  $O(n*m)$

What is the space complexity of a program that takes two arrays  $\text{Arr1}[n]$  and  $\text{Arr2}[m]$  representing integers, and returns an integer representing their product?

- A.  $O(n)$
- B.  $O(m)$
- C.  $O(n+m)$
- D.  $O(n*m)$

What is the output of a program which takes an array of  $n$  integers, where  $A[i]$  denotes the maximum you can advance from index  $i$ , and returns whether it is possible to advance to the last index starting from the beginning of the array? Let  $A = \{3, 3, 1, 0, 2, 0, 1\}$

- A. It is not possible to reach the last index.
- B. It is possible to reach the last index.

What is the time complexity of the Dutch National Flag algorithm, where we make a single pass and move all the elements less than the pivot to the beginning and in the second pass we move the larger elements to the end.

- A.  $O(1)$
- B.  $O(N)$
- C.  $O(N+N)$
- D.  $O(N*M)$

What is the output of a program which takes an array of  $n$  integers, where  $A[i]$  denotes the maximum you can advance from index  $i$ , and returns whether it is possible to advance to the last index starting from the beginning of the array? Let  $A = \{3, 2, 0, 0, 2, 0, 1\}$

- A. It is not possible to reach the last index.
- B. It is possible to reach the last index.

What is the output of a program which takes an array of  $n$  integers, where  $A[i]$  denotes the maximum you can advance from index  $i$ , and returns whether it is possible to advance to the last index starting from the beginning of the array? Let  $A = \{2, 4, 1, 1, 0, 2, 3\}$

- A. It is not possible to reach the last index.
- B. It is possible to reach the last index.

What is the minimum number of jumps required to reach the end of an Array= $\{2, 1, 3, 2, 3, 4, 5, 1, 2, 8\}$ , where  $A[i]$  denotes the maximum move you can advance from index  $i$ .

- A. 2
- B. 3
- C. 4
- D. 5

An array  $Price[] = \{310, 315, 275, 295, 260, 270, 290, 230, 255, 250\}$  denoting the daily stock price. What is the corresponding to buying and selling one share of that stock once so that maximum profit is earned?

- A. Buy at price = 315 & Sell at price = 230
- B. Buy at price = 275 & Sell at price = 290
- C. Buy at price = 260 & Sell at price = 290
- D. Buy at price = 230 & Sell at price = 255

An array  $Price[] = \{10, 22, 5, 75, 65, 80\}$  denoting the daily stock price. What is the maximum profit by buying and selling a share of that stock at most twice?

- A. Max profit=75
- B. Max profit=80
- C. Max profit=87
- D. Not possible to earn

An array  $Price[] = \{2, 30, 15, 10, 8, 25, 80\}$  denoting the daily stock price. What is the maximum profit by buying and selling a share of that stock at most twice?

- A. Max profit=80
- B. Max profit=100
- C. Max profit=106
- D. Not possible to earn

An array  $\text{Price}[] = \{100, 30, 15, 10, 8, 25, 80\}$  denoting the daily stock price. What is the maximum profit by buying and selling a share of that stock at most twice?

- A. Max profit=72
- B. Max profit=92
- C. Max profit=70
- D. Not possible to earn

An array  $\text{Price}[] = \{90, 80, 70, 60, 50\}$  denoting the daily stock price. What is the maximum profit by buying and selling a share of that stock at most twice?

- A. Max profit=40
- B. Max profit=30
- C. Max profit=10
- D. Not possible to earn

An array  $\text{Price}[] = \{12, 11, 13, 9, 12, 8, 14, 13, 15\}$  denoting the daily stock price. What is the maximum profit by buying and selling a share of that stock at most twice?

- A. Max profit=7
- B. Max profit=12
- C. Max profit=10
- D. Max profit=3

What is the time complexity of a program that takes an integer argument and returns all the primes between 1 and that integer using trial-division method.

- A.  $O(n * n)$
- B.  $O(n^{(1/2)})$
- C.  $O(n^{(3/2)})$
- D.  $O(n \log n)$

What is the time complexity of a program that takes an integer argument and returns all the primes between 1 and that integer using the sieve method.

- A.  $O(n^{(3/2)})$
- B.  $O(n \log n)$
- C.  $O(\log n)$
- D.  $O(n \log \log n)$

What is the space complexity of a program that takes an integer argument and returns all the primes between 1 and that integer using the sieve method.

- A.  $O(n)$
- B.  $O(n^{1/2})$
- C.  $O(n \log n)$
- D.  $O(n \log \log n)$

A program that takes an integer argument and returns all the primes between 1 and that integer using the improve sieve method. What is the size of a boolean array to encode the candidates, i.e., if the  $i$ th entry in the array is true, then  $i$  is potentially a prime?

- A.  $\text{size} = n$
- B.  $\text{size} = n+1$
- C.  $\text{size} = \text{Math.floor}(0.5 * (n - 3)) + 1$
- D.  $\text{size} = \text{Math.floor}(0.5 * n) + 1$

Suppose  $A[] = \langle 0, 1, 2, 0, 2, 1, 1 \rangle$  and the pivot index is 1, then apply the Dutch National Flag algorithm to reorder the array. What is the final output after applying the algorithm?

- A.  $[0, 1, 2, 0, 2, 1, 1]$
- B.  $[0, 0, 1, 1, 1, 2, 2]$
- C.  $[0, 0, 1, 1, 2, 2, 1]$
- D.  $[1, 0, 0, 1, 1, 2, 2]$

Suppose  $\text{ArrayList} = [\text{WHITE}, \text{BLUE}, \text{WHITE}, \text{BLUE}, \text{RED}, \text{RED}]$  and the pivot index is 1, then apply the Dutch National Flag algorithm to reorder the ArrayList. What is the final output after applying the algorithm?

- A.  $[\text{WHITE}, \text{BLUE}, \text{WHITE}, \text{BLUE}, \text{RED}, \text{RED}]$
- B.  $[\text{RED}, \text{RED}, \text{BLUE}, \text{WHITE}, \text{BLUE}, \text{WHITE}]$
- C.  $[\text{WHITE}, \text{WHITE}, \text{RED}, \text{RED}, \text{BLUE}, \text{BLUE}]$
- D.  $[\text{RED}, \text{RED}, \text{WHITE}, \text{WHITE}, \text{BLUE}, \text{BLUE}]$

What is the time complexity of accessing an element in ArrayList?

- A.  $O(n)$
- B.  $O(1)$
- C.  $O(n \log n)$
- D.  $O(2)$

What is the time complexity of the Dutch National Flag algorithm, where we make a single pass and move all the elements less than the pivot to the beginning and in the second pass we move the larger elements to the end.

- A.  $O(1)$
- B.  $O(N)$
- C.  $O(N*N)$
- D.  $O(N*M)$

Apply Quick sort ascending order on a given sequence 5, 3, 6, 7, 9, 2, 8, 4. What is the sequence after the first phase, if pivot is the last element?

- A. 5, 3, 6, 7, 9, 2, 8, 4
- B. 2, 3, 4, 5, 6, 7, 8, 9
- C. 7, 9, 5, 8, 6, 4, 2, 3
- D. 3, 2, 4, 7, 9, 5, 8, 6

What is the order of variables in Enum?

- A. Ascending order
- B. Descending order
- C. Random order
- D. Depends on the order() method

What will be the output of the following Java code?

```
enum Season  
{  
    WINTER, SPRING, SUMMER, FALL  
};  
  
System.out.println(Season.WINTER.ordinal());
```

- A. 0
- B. 1
- C. 2
- D. 3

What will be the output of the following code?

```
public class test {
    public static void dutchFlagPartition(int PivotIndex,
    List<Integer> A) {
        int pivot=A.get(PivotIndex);
        for(int i=0; i<A.size(); ++i) {
            for(int j=i+1; j<A.size(); ++j) {
                if(A.get(j) < pivot) {
                    Collections.swap(A, i, j);
                    break;
                }
            }
        }
        for(int i=A.size()-1; i>0 && A.get(i) >= pivot; --i) {
            for(int j=i-1; j>=0 && A.get(j) >= pivot; --j) {
                if(A.get(j) >= pivot) {
                    Collections.swap(A, i, j);
                    break;
                }
            }
        }
    }
    public static void main(String[] args) {
        ArrayList<Integer> al=new ArrayList<>();
        al.add(0);
        al.add(1);
        al.add(2);
        al.add(0);
        al.add(2);
        al.add(1);
        al.add(1);
        System.out.println(al);
        int pivotindex = al.indexOf(1);
        dutchFlagPartition(pivotindex, al);
        System.out.println(al);
    }
}
```

- A. [0, 1, 2, 0, 2, 1, 1]
- B. [0, 0, 1, 1, 1, 2, 2]
- C. [0, 0, 1, 2, 1, 2, 1]
- D. [1, 0, 0, 1, 1, 2, 2]

What is the space complexity of the Dutch National Flag algorithm, where we make a single pass and move all the elements less than the pivot to the beginning and in the second pass we move the larger elements to the end.

- A.  $O(1)$
- B.  $O(N)$
- C.  $O(N*N)$
- D.  $O(N*M)$

What will be the output of the following code? \*

```
public class test {
    public static enum Color {WHITE, RED, BLUE; }
    public static void dutchFlagPartition(int PivotIndex, List<Color> A) {
        Color pivot=A.get(PivotIndex);
        int smaller=0, equal=0, larger=A.size();
        while (equal < larger) {
            if (A.get(equal).ordinal() < pivot.ordinal()) {
                Collections.swap(A, smaller++, equal++);
            }
            else if (A.get(equal).ordinal() == pivot.ordinal()) {
                ++equal ;
            }
            else { // A . get (equal) > pivot.
                Collections.swap(A, equal, --larger);
            }
        }
    }
    public static void main(String[] args) {
        ArrayList<Color> al=new ArrayList<>();
        al.add(Color.RED);
        al.add(Color.RED);
        al.add(Color.WHITE);
        al.add(Color.BLUE);
        al.add(Color.WHITE);
        al.add(Color.BLUE);
        al.add(Color.RED);
        al.add(Color.RED);
        System.out.println(al);
        int pivotindex=al.indexOf(Color.RED);
        dutchFlagPartition(pivotindex, al );
        System.out.println(al);
    }
}
```

- A. [RED, RED, WHITE, BLUE, WHITE, BLUE, RED, RED]
- B. [WHITE, WHITE, BLUE, RED, BLUE, RED, RED, RED]
- C. [WHITE, WHITE, RED, RED, RED, RED, BLUE, BLUE]
- D. [RED, RED, RED, RED, WHITE, WHITE, BLUE, BLUE]

Given the array[] = {1,2,3,4} and a permutation array p[] = {3,2,1,0}. What is the output after permuting the given array[] based on the permutation p[]?

- A. {4, 3, 2, 1}
- B. {4, 3, 1, 2}
- C. {1, 2, 3, 4}
- D. {1, 2, 4, 3}

Given the array  $[ ] = \{11, 32, 3, 42\}$  and a permutation array  $p[ ] = \{2, 3, 0, 1\}$ . What is the output after permuting the given array  $[ ]$  based on the permutation  $p[ ]$ ?

- A.  $\{11, 32, 3, 42\}$
- B.  $\{3, 42, 11, 32\}$
- C.  $\{3, 11, 32, 42\}$
- D.  $\{3, 11, 42, 32\}$

Given the array  $[ ] = \{a, b, c, d\}$  and a permutation array  $p[ ] = \{2, 0, 1, 3\}$ . What is the output after permuting the given array  $[ ]$  based on the permutation  $p[ ]$ ?

- A.  $\{a, b, c, d\}$
- B.  $\{b, c, d, a\}$
- C.  $\{b, c, a, d\}$
- D.  $\{b, d, c, a\}$

Given the array  $[ ] = \{a, b, c, d\}$  and a permutation array  $p[ ] = \{3, 1, 2, 0\}$ . What is the output after permuting the given array  $[ ]$  based on the permutation  $p[ ]$ ?

- A.  $\{a, b, c, d\}$
- B.  $\{b, c, a, d\}$
- C.  $\{b, c, d, a\}$
- D.  $\{d, b, c, a\}$

Compute the next permutation of an input  $\{6, 2, 1, 5, 4, 3, 0\}$  under dictionary ordering.

- A.  $\{6, 2, 3, 0, 1, 4, 5\}$
- B.  $\{6, 2, 1, 0, 3, 4, 5\}$
- C.  $\{6, 2, 1, 5, 4, 3, 0\}$
- D.  $\{6, 2, 3, 5, 4, 1, 0\}$

Compute the next permutation of an input  $\{0, 1, 2, 5, 3, 3, 0\}$  under dictionary ordering.

- A.  $\{ \text{Empty} \}$
- B.  $\{0, 1, 2, 5, 3, 3, 0\}$
- C.  $\{0, 1, 3, 5, 3, 2, 0\}$
- D.  $\{0, 1, 3, 0, 2, 3, 5\}$



Compute the next permutation of an input {6, 5, 4, 3, 2, 3, 2, 1, 0} under dictionary ordering.

- A. { Empty }
- B. {6, 5, 4, 3, 3, 0, 1, 2, 2}
- C. {6, 5, 4, 3, 3, 2, 2, 1, 0}
- D. {6, 5, 4, 3, 3, 2, 2, 0, 1}

Compute the next permutation of an input {9, 5, 4, 3, 1} under dictionary ordering.

- A. { Empty }
- B. {9, 5, 4, 3, 1}
- C. {9, 5, 4, 1, 3}
- D. {9, 5, 3, 4, 1}
- E. {9, 5, 3, 1, 4}

A program that takes an integer argument and returns all the primes between 1 and that integer using the general sieve method. What is the size of a boolean array to encode the candidates, i.e., if the  $i$ th entry in the array is true, then  $i$  is potentially a prime?

- A. size =  $n$
- B. size =  $n+1$
- C. size =  $\text{Math.floor}(0.5 * (n - 3)) + 1$
- D. size =  $\text{Math.floor}(0.5 * n) + 1$

A program that takes an integer argument and returns all the primes between 1 and that integer using the improve sieve method. What is the size of a boolean array to encode the candidates, i.e., if the  $i$ th entry in the array is true, then  $i$  is potentially a prime?

- A. size =  $n$
- B. size =  $n+1$
- C. size =  $\text{Math.floor}(0.5 * (n - 3)) + 1$
- D. size =  $\text{Math.floor}(0.5 * n) + 1$

What is the time complexity to delete an element at index  $i$  from an ArrayList?

- A.  $O(n-i)$
- B.  $O(1)$
- C.  $O(n \log n)$
- D.  $O(2)$

Given an array of non-negative integers A, you are initially positioned at the array's first index. Each element in the array represents your maximum advance length at that position. Determine if you can reach the last index. Determine the output for the Input: A= [2, 3, 1, 1, 4].

- A. True
- B. False

Given an array of non-negative integers A, you are initially positioned at the array's first index. Each element in the array represents your maximum advance length at that position. Determine if you can reach the last index. Determine the output for the Input: A= [3, 2, 1, 0, 4].

- A. True
- B. False

You are given an array of prices where prices[i] is the price of a given stock on the ith day. Find the maximum profit you can achieve by buying and selling a stock once and twice, respectively. If you cannot achieve any profit, return 0. Input : prices = [12, 11, 13, 9, 12, 8, 14, 13, 15]

- A. 6, 9
- B. 7, 10
- C. 8, 9
- D. 8, 10

Compute the next permutation of an input {0, 1, 2, 5, 3, 3, 0} under dictionary ordering.

- A. {0, 1, 2, 0, 3, 3, 5}
- B. {0, 1, 2, 5, 3, 3, 0}
- C. {0, 1, 3, 5, 3, 2, 0}
- D. {0, 1, 3, 0, 2, 3, 5}

Given an array A[]={3, 7, 5, 11, 13}. How many equally likely subsets of size 3 are obtained from the array A[]?

- A. 5
- B. 6
- C. 10
- D. 120

Compute the next permutation of an input {8, 6, 5, 2, 0} under dictionary ordering.

- A. { Empty }
- B. {8, 6, 5, 2, 0}
- C. {8, 5, 6, 0, 2}
- D. {8, 6, 2, 5, 0}
- E. {8, 6, 2, 0, 5}

What is the time complexity in offline random sampling of the input array with size "n" and returns a subset of size "k" of the array elements?

- A.  $O(n)$
- B.  $O(n+k)$
- C.  $O(n*k)$
- D.  $O(k)$

Compute random permutations of  $A[] = \{0, 1, \dots, n-1\}$  with equal probability, where  $n=3$ . Random number generator returns integers 1, 2, 3, and 3 respectively.

- A. {1, 0, 2, 3}
- B. {1, 2, 0, 3}
- C. {1, 2, 3, 0}
- D. {0, 1, 2, 3}

What is the output of the following code?

```
import java.util.*;
public class Output {

    public static void main(String[] args) {
        HashMap<Integer, Integer> map=new HashMap<>();
        map.put(10, 1);
        map.put(20, 2);
        map.put(20, 2);
        map.put(40, 4);
        map.put(20, 6);
        map.put(50, 5);
        System.out.println(map);
    }
}
```

- A. {50=5, 20=6, 40=4, 10=1}
- B. {50=5, 20=2, 40=4, 10=1}
- C. {50=5, 20=2, 20=6, 40=4, 10=1}
- D. {50=5, 20=2, 20=6, 40=4, 20=2, 10=1}

Compute:  $20 \& (20 - 1)$  \*

- A. 15
- B. 16
- C. 17
- D. 18

Compute:  $20 \& \sim(20 - 1)$  \*

- A. 4
- B. 5
- C. 6
- D. 7

Compute:  $11 \& (11 - 1)$  \*

- A. 8
- B. 9
- C. 10
- D. 11

Compute:  $11 \& \sim(11 - 1)$  \*

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

Compute:  $16 \& (16 - 1)$  \*

- A. 10
- B. 1
- C. 16
- D. 0

Compute:  $16 \& \sim(16 - 1)$  \*

- A. 15
- B. 16
- C. 10
- D. 0

Compute:  $0010 \ll 2$  \*

- A. 1000
- B. 0100
- C. 0010
- D. 0000

Compute:  $1011 \ggg 3$  \*

- A. 0101
- B. 0001
- C. 1011
- D. 1111

Compute:  $1011 \gg 1$  \*

- A. 1111
- B. 0000
- C. 1101
- D. 0101

Compute:  $0011 \gg 2$  \*

- A. 0000
- B. 0001
- C. 1001
- D. 0011

Compute the parity of 10001000:

- A. 0
- B. 1
- C. 2
- D. 3

What is the time complexity to computing the parity using a lookup table?

- A.  $O(n)$
- B.  $O(k)$
- C.  $O(\log n)$
- D.  $O(n/L)$

For the parity computation, if  $n=16$  (word size),  $L=4$  (sub word size), then preferable BitMask=\_\_\_\_\_.

- A. 00000000 00000001
- B. 00000000 00000011
- C. 00000000 00001111
- D. 00000000 11111111

Which operation replaces the lowest bit that is "1" with "0" ?

- A.  $X = (X \& 1)$
- B.  $X = (X \wedge 1)$
- C.  $X = X \& \sim(X-1)$
- D.  $X = X \& (X-1)$

Which bitwise operator is used for flipping bits?

- A. Bitwise OR (|)
- B. Bitwise AND (&)
- C. Bitwise XOR (^)
- D. All of the above

What is the output of the following code?

```
package mypackage;
public class test {
    static int CountBit(long n) {
        int count=0;
        while(n>0) {
            n &=(n-1);
            count++;
        }
        return count;
    }
    public static void main(String[] args) {
        long i=45;
        System.out.println(CountBit(i));
    }
}
```

- A. 5
- B. 4
- C. 3
- D. 0

What is the output of the following code?

```
package mypackage;
public class test {

    public static void main(String[] args) {
        int a=5;
        int b=7;
        System.out.println("a^b = " + (a ^ b));
    }
}
```

- A. a^b = 2
- B. a^b = 5
- C. a^b = 7
- D. a^b = 0

Compute: -10 >> 2

- A. -3
- B. -2
- C. -5
- D. 5

Compute:  $5 \ll 2$

- A. 11
- B. 10
- C. 20
- D. 30

What is the output of the following code?

```
package mypackage;
public class test {

    public static void main(String[] args) {
        int x=0b11010111;
        x = x ^ (x >>> 4);
        System.out.println("x=" + Integer.toBinaryString(x));
    }
}
```

- A. x=00001010
- B. x=11111010
- C. x=10101010
- D. x=11011010

Which among the following is not a primitive data type in Java?

- A. char
- B. String
- C. byte
- D. short

What is the default boolean literal assigned to a boolean variable in Java?

- A. true
- B. false
- C. undefined
- D. None of the above



What will be the output of the following code? (Input to the array represents the integer 123.)

```
class Solution {
public int[] do(int[] digits) {

    int[] tempArray = null;
    if(digits[digits.length-1] == 9) {
        int positions = 1;
        for(int i = digits.length-1; i >=0; i--) {
            if(digits[i] == 9) {
                digits[i] = 0;
                positions++;
            } else {
                digits[i] +=1;
                break;
            }
        }
        if(positions > digits.length) {
            tempArray = new int[digits.length+1];
            tempArray[0] = 1;
            for(int i = 0; i < digits.length; i++) {
                tempArray[i+1] = digits[i];
            }
        }
    } else {
        digits[digits.length-1] +=1;
    }
    return (tempArray == null ? digits : tempArray);
}
}
```

- A. [1,2,2]
- B. [1,2,3]
- C. [1,2,4]
- D. [1,1,1]

What is the time complexity of the Dutch National Flag algorithm, where we make a single pass and move all the elements less than the pivot to the beginning and in the second pass we move the larger elements to the end.

- A.  $O(1)$
- B.  $O(N)$
- C.  $O(N*N)$
- D.  $O(N*M)$

What will be the output of the following code? (Input to the array represents the integer 999.)

```
public static List<Integer> Do (List<Integer> A) {  
    int n = A.size() - 1;  
    A.set(n, A.get(n) + 1);  
    for(int i = n; i > 0 && A.get(i) == 10; --i) {  
        A.set (i, 0) ;  
        A.set(i - 1, A.get(i - 1) + 1);  
    }  
    if (A .get (0) == 10) {  
        A.set(0, 0) ;  
        A.add(0, 1);  
    }  
    return A ;  
}
```

- A. [9, 9, 0]
- B. [9, 9, 9]
- C. [0, 0, 0]
- D. [1, 0, 0, 0]

Modify the above runtime in such a way that the number of invocations or (multiplication) will be less than 36 for evaluation of  $\text{pow}(2, 37)$ . How many invocations is required to compute the  $\text{pow}(2, 37)$ ?

- A. 10
- B. 11
- C. 6
- D. 7

Modify the above runtime in such a way that the number of invocations or (multiplication) will be less than 29 for evaluation of  $\text{pow}(2, 30)$ . How many invocations is required to compute the  $\text{pow}(2, 30)$ ?

- A. 6
- B. 7
- C. 10
- D. 11

What is the output of the following code?

```
public class test {
    public static long Do (long x, long y) {
        long c;
        while(y != 0) {
            c = x & y;
            x = x ^ y;
            y = c << 1;
        }
        return x;
    }
    public static void main(String[] args) {
        long x=0b1101, y=0b1001;
        long result= Do(x,y);
        System.out.println(result);
    }
}
```

- A. 9
- B. 13
- C. 22
- D. 25

What is the output of the following code?

```
public class test {
    public static long Do (long x, long y) {
        while (y != 0)
        {
            long b = (~x) & y;
            x = x ^ y;
            y = b << 1;
        }
        return x;
    }
    public static void main(String[] args) {
        long x=0b1101, y=0b1001;
        long result= Do(x,y);
        System.out.println(result);
    }
}
```

- A. 22
- B. 20
- C. 9
- D. 4

What is the output of the following code?

```
public class test {  
    public static long Do (long x, long y) {  
        if (y == 0)  
            return 1;  
        else if (y % 2 == 0)  
            return Do(x, y / 2) * Do(x, y / 2);  
        else  
            return x * Do(x, y / 2) * Do(x, y / 2);  
    }  
    public static void main(String[] args) {  
        int x = 2;  
        int y = 3;  
        System.out.printf("%d", Do(x, y));  
    }  
}
```

- A. 1
- B. 5
- C. 8
- D. 0

Which of these methods of the ArrayList class is used to obtain the present size of an object?

- A. size()
- B. length()
- C. index()
- D. capacity()

How to sort elements of ArrayList?

- A. Collection.sort(listObj);
- B. Collections.sort(listObj);
- C. listObj.sort(listObj);
- D. Arrays.sort(listObj);

What is the computational complexity of inserting an element in the middle of an array ? (where N is the number of elements in the array)

- A.  $O(1)$
- B.  $O(N*N)$
- C.  $O(N)$
- D.  $O(C)$

What will be the output of the following Java program?

```
import java.util.*;
class ArrayList
{
    public static void main(String args[])
    {
        ArrayList obj = new ArrayList();
        obj.add("A");
        obj.add("B");
        obj.add("C");
        obj.add(1, "D");
        System.out.println(obj);
    }
}
```

- A. [A, B, C, D]
- B. [A, D, B, C]
- C. [A, D, C]
- D. [A, B, C]

What will be the output of the following Java program?

```
import java.util.*;
class Output
{
    public static void main(String args[])
    {
        ArrayList obj = new ArrayList();
        obj.add("A");
        obj.add(0, "B");
        System.out.println(obj.size());
    }
}
```

- A. 0
- B. 1
- C. 2
- D. Any Garbage Value

A pivot element to partition unsorted list is used in:

- A - Merge Sort
- B - Quick Sort
- C - Insertion Sort
- D - Selection Sort

- A. A
- B. B
- C. A & B
- D. B & C

Apply Quick sort on a given sequence 7 11 14 6 9 4 3 12. What is the sequence after the first phase, pivot is the first element?

- A. 6 4 3 7 11 9 14 12
- B. 6 3 4 7 9 14 11 12
- C. 7 6 14 11 9 4 3 12
- D. 7 6 4 3 9 14 11 12

What is the co-ordinate(x,y), width, and height of the intersect rectangle?

Apply the RectangleIntersect algorithm:

R1: (1,2), width=3, height=4

R2: (4,3), width=2, height=4

- A. R3: (x,y)=(0,0), width=-1, height=-1
- B. R3: (x,y)=(4,3), width=0, height=3
- C. R3: (x,y)=(2,3), width=2, height=3
- D. R3: (x,y)=(5,3), width=0, height=3

Time complexity of binary search having n elements:

- A.  $O(n)$
- B.  $O(n*n)$
- C.  $O(\log n)$
- D.  $O(n \log n)$

What is the co-ordinate(x,y), width, and height of the intersect rectangle?

Apply the RectangleIntersect algorithm:

R1: (1,2), width=3, height=4

R2: (5,3), width=2, height=4

- A. R3: (x,y)=(0,0), width=-1, height=-1
- B. R3: (x,y)=(4,3), width=0, height=3
- C. R3: (x,y)=(2,3), width=2, height=3
- D. R3: (x,y)=(5,3), width=0, height=3

Compute the Space complexity of the following set of algorithm:

```
Algorithm ( A[ ], n)
{
    int i;
    Create B[n];
    For i=1 to n do
        B[i]=A[i];
    Print B[i];
}
```

- A.  $O(n)$
- B.  $O(\log n)$
- C.  $O(1)$
- D.  $O(n^2)$

Given numbers are 3, 5, 7, 11 and the probabilities are 0.5, 0.333, 0.111, 0.0555 respectively. The random number generated uniformly in [0.0, 1.0] is 0.757. What value would generate one of the 4 numbers according to the specified probabilities using a non uniform random number generator?

- A. 3
- B. 5
- C. 7
- D. 11

What is the output of the following code?

```
import java.util.*;
public class output {
    public static void main(String[] args) {
        List<Integer> al = new ArrayList<Integer>();
        al.add(1);
        al.add(3);
        al.add(5);
        al.add(7);
        al.add(9);
        al.add(11);
        int index=Collections.binarySearch(al, 8);
        System.out.println("index="+index);
    }
}
```

- A. index= -1
- B. index= -4
- C. index= -3
- D. index= -5

What is the output of the following code?

```
import java.util.*;
public class output {
    public static void main(String[] args) {
        ArrayList <ArrayList<Integer>> x = new ArrayList<ArrayList<Integer>>();
        x.add(new ArrayList<Integer>(Arrays.asList(3, 4, 6)));
        x.get(0).add(0, 3);
        x.add(new ArrayList<>(Arrays.asList(3, 8)));
        x.get(1).add(0, 6);
        x.add(new ArrayList<Integer>(Arrays.asList(8, 6, 7)));
        System.out.println(x);
    }
}
```

- A. [ [3, 4, 6], [6, 3, 8], [8, 6, 7] ]
- B. [ [3, 3, 4, 6], [6, 3, 8], [8, 6, 7] ]
- C. [ [3, 4, 6], [3, 8], [8, 6, 7] ]
- D. [ [3, 4, 6, 3], [3, 8, 6], [8, 6, 7] ]



Given numbers are 3, 5, 7, 11 and the probabilities are 0.5, 0.333, 0.111, 0.0555 respectively. The random number generated uniformly in [0.0, 1.0] is 0.833. What value would generate one of the 4 numbers according to the specified probabilities using a non uniform random number generator?

- A. 3
- B. 5
- C. 7
- D. 11

Check whether the given 2D array representing a fully completed Sudoku is valid or not valid.

```
ArrayList<ArrayList<Integer> > x = new ArrayList<ArrayList<Integer> >();  
x.add(new ArrayList<Integer>(Arrays.asList(7, 9, 2, 1, 5, 4, 3, 8, 6)));  
x.add(new ArrayList<Integer>(Arrays.asList(6, 4, 3, 8, 2, 7, 1, 5, 9)));  
x.add(new ArrayList<Integer>(Arrays.asList(8, 5, 1, 3, 9, 6, 7, 2, 9)));  
x.add(new ArrayList<Integer>(Arrays.asList(2, 6, 5, 9, 7, 3, 8, 4, 1)));  
x.add(new ArrayList<Integer>(Arrays.asList(4, 8, 9, 5, 6, 1, 2, 7, 3)));  
x.add(new ArrayList<Integer>(Arrays.asList(3, 1, 7, 4, 8, 2, 9, 6, 5)));  
x.add(new ArrayList<Integer>(Arrays.asList(1, 3, 6, 7, 4, 8, 5, 9, 2)));  
x.add(new ArrayList<Integer>(Arrays.asList(9, 7, 4, 2, 1, 5, 6, 3, 8)));  
x.add(new ArrayList<Integer>(Arrays.asList(5, 2, 8, 6, 3, 9, 4, 1, 7)));
```

- A. Valid
- B. Not Valid

Compute the 5 rows of the Pascal Triangle. (The row index starts from 0)

- A. [1, 4, 6, 4, 1]
- B. [1, 5, 10, 10, 5, 1]
- C. [1, 5, 10, 5, 1]
- D. [1, 4, 6, 6, 4, 1]

Compute the spiral ordering of the given 2D Array:

1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	18

- A. [1 2 3 4 8 12 16 15 14 13 9 5 6 7 11 10]
- B. [1 2 3 4 5 6 12 18 17 16 15 14 13 7 8 9 10 11]
- C. [1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18]
- D. [1 2 3 4 5 6 12 11 10 9 8 7 13 14 15 16 17 18]

The given matrix is rotated by 90 degrees in a clockwise direction. What is the output?

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

- A.
- |    |    |    |    |
|----|----|----|----|
| 1  | 2  | 3  | 4  |
| 5  | 6  | 7  | 8  |
| 9  | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 |

- B.
- |   |   |    |    |
|---|---|----|----|
| 4 | 8 | 12 | 16 |
| 3 | 7 | 11 | 15 |
| 2 | 6 | 10 | 14 |
| 1 | 5 | 9  | 13 |

- C.
- |   |    |    |    |
|---|----|----|----|
| 4 | 2  | 3  | 16 |
| 5 | 6  | 7  | 8  |
| 9 | 10 | 11 | 12 |
| 1 | 14 | 15 | 13 |

- D.
- |    |    |   |   |
|----|----|---|---|
| 13 | 9  | 5 | 1 |
| 14 | 10 | 6 | 2 |
| 15 | 11 | 7 | 3 |
| 16 | 12 | 8 | 4 |