Assignment Questions 9

Question1. 231. Power of Two

Given an integer n, return true if it is a power of two. Otherwise, return false.
An integer n is a power of two, if there exists an integer x such that n == 2x.
Example 1:

Input: n = 1
Output: true
Explanation: 20 = 1
Example 2:

Input: n = 16
Output: true
Explanation: 24 = 16
Example 3:

Input: n = 3
Output: false

code :-

```
class Solution {
    public boolean isPowerOfTwo(int n) {
        if(n<=0)
        return false;
        if(n==1)
        return true;
        if(n%2==0)
        return isPowerOfTwo(n/2);
        else
        return false;
    }
}
```

Question2.

Given a number n, find the sum of the first natural numbers.

Example 1:

Input: n = 3
Output: 6

Example 2:

Input : 5
Output : 15

code:-

```
class HelloWorld {
    public static void main(String[] args) {
        int x =sumOfN(5);
        System.out.println(x);
    }

    public static int sumOfN(int n){
        if(n==1)
        return 1;
        return n+sumOfN(n-1);
    }
}
```

Question 3.

Given a positive integer, N. Find the factorial of N.
Example 1:

Input: N = 5
Output: 120

Example 2:

Input: N = 4
Output: 24

code :-

```
class HelloWorld {
    public static void main(String[] args) {
        int x =fact(5);
        System.out.println(x);
    }

    public static int fact(int n){
        if(n<=1)
        return 1;
        return n*fact(n-1);
    }
}
```

Question 4

Given a number N and a power P, the task is to find the exponent of this number raised to the given power, i.e. N^P.
Example 1 :

Input: N = 5, P = 2
Output: 25

Example 2 :

Input: N = 2, P = 5

Output: 32

code :-

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

    int base = 2, powerRaised = 5;
    int result = power(base, powerRaised);

    System.out.println(base + "^" + powerRaised + "=" + result);
  }

  public static int power(int base, int powerRaised) {
    if (powerRaised != 0) {

      return (base * power(base, powerRaised - 1));
    }
    else {
      return 1;
    }
  }
}
```

Question 5
Given an array of integersÂ arr, the task is to find maximum element of that array using recursion.
Example 1:
Input: arr = {1, 4, 3, -5, -4, 8, 6};
Output: 8

Example 2:
Input: arr = {1, 4, 45, 6, 10, -8};
Output: 45

code :-

```
class MaximumElements {
      public static int findMax(int A[], int n)
      {
      if(n == 1)
                  return A[0];
                  return Math.max(A[n-1], findMax(A, n-1));
      }
      public static void main(String args[])
      {
                  int A[] = {1, 4, 45, 6, -50, 10, 2};
                  int n = A.length;
                  System.out.println(findMax(A, n));
      }
}
```

Question 6
Given first term (a), common difference (d) and a integer N of the Arithmetic Progression series, the task is to find Nth term of the series.
Example 1:
Input : a = 2 d = 1 N = 5
Output : 6
The 5th term of the series is : 6

Example 2:
Input : a = 5 d = 2 N = 10
Output : 23
The 10th term of the series is : 23

code:-

```
class Nth
{
	public static int NthTerm(int a, int d, int N)
	{
			return ( a + (N - 1) * d );
	}
	public static void main(String[] args)
	{
			int a = 2;
			int d = 1;
			int N = 5;
			System.out.print("The "+ N +"th term of the series is : "
+NthTerm(a, d,N));
	}
}
```

Question 7
Given a string S, the task is to write a program to print all permutations of a given string.
Example 1:
Input:
S = â€œABCâ€
Output:
â€œABCâ€, â€œACBâ€, â€œBACâ€, â€œBCAâ€, â€œCBAâ€, â€œCABâ€

Example 2:
Input:
S = â€œXYâ€
Output:
â€œXYâ€, â€œYXâ€

code :-

```
class Main
{
	private static void swap(char[] ch, int i, int j)
	{
			char temp = ch[i];
			ch[i] = ch[j];
			ch[j] = temp;
```

```
	}

	private static void permutations(char[] ch, int currentIndex)
	{
			if (currentIndex == ch.length - 1) {
				System.out.println(String.valueOf(ch));
			}
			for (int i = currentIndex; i < ch.length; i++)
			{
				swap(ch, currentIndex, i);
				permutations(ch, currentIndex + 1);
				swap(ch, currentIndex, i);
			}
	}
	public static void main(String[] args)
	{
			String s = "ABC";
			permutations(s.toCharArray(), 0);
	}
}
```

Question 8
Given an array, find a product of all array elements.
Example 1:
Input : arr[] = {1, 2, 3, 4, 5}
Output : 120

Example 2:
Input : arr[] = {1, 6, 3}
Output : 18

code :-

```
public class Multi
{
    static int arr[] = {1, 2, 3, 4, 5, 6};

    static int multiply(int a[], int n)
    {
        if (n == 0)
            return(a[n]);
        else
            return (a[n] * multiply(a, n - 1));
    }

    public static void main(String[] args)
    {

        System.out.println(multiply(arr, arr.length - 1));
        }
}
```