WIX1002 Fundamentals of Programming
Lab Report 2

1. Write a Java method that accepts an integer array as parameter and returns the median of the array in double.

Sample Input	Sample Output
{14, 3, 5, 6, 1, 2, 33}	5.0
{4, 5, 2, 24, 231, 1, 2, 9}	4.5

2. Write a Java method that accepts an integer as parameter and returns a string as an expression of the sum of powers of 2 in increasing order. (Non-duplicate)

Sample Input	Sample Output
20	20 = 4 + 16
2021	2021 = 1 + 4 + 32 + 64 + 128 + 256 + 512 + 1024

3. Write a Java method which accepts a string **s** and an integer **k** as parameters. The string s consists of digits ('0' to '9') and wildcards ('?'). The length of **s** is at most 8 and the number of wildcards is at most 3. Replace each wildcard with any digit, however, if the wildcard is in the first position of the string, you could not replace it with '0'. The method returns the total number of numbers formed which are divisible by **k**.

Sample Input	Sample Output
s = "?141", k=3	3
s = "???", k=11	81
s = "9?2253??", k=7	143

4. Write a Java method which accepts two same length arrays, **a** and **b**, as parameters and returns the maximum sum of XOR values of the two arrays with each of the elements matched. A match means one element of array **a** is uniquely matched with one element of array **b**. The lengths of the arrays are at most 10.

Sample Input	Sample Output
a = {2, 4, 5, 7, 10} b = {13, 14, 15, 16,17}	87
a = {174, 521, 24, 224, 831, 179, 712, 97} b = {281, 33, 122, 415, 611, 235, 737, 81}	5103

The maximum sum of XOR values of two arrays, a and b, in the first input is 87, with the match of (2,13), (4,15), (5,14), (7,16), (10,17).

Example, given a={1,2}, b={4,5}, there are two matches.
Match 1: (1,4), (2,5) will return total XOR value 12
Match 2: (1,5), (2,4) will return total XOR value 10

The maximum sum of XOR values is 12 with match (1,4), (2,5)

Lab Report

Prepare a report to solve the above problems. The report should contain all the sections as below for each question:

No	Section	Description
1	Problem	Description on the problem
2	Solution	Explanation on how to solve the above problems
3	Sample Input & Output	A few sets of input and output (snapshot)
4	Source Code	Java Source Code

Requirements

1. Group Assignment (4-5 students per group)
2. Cover page that includes all student matric number and full name.
3. Font: Times New Roman 12, Line Spacing: 1 ½ Spacing
4. Due Date: **31/12/2021**
5. The method of submission is based on your group lecturer.