COSC 601 Assignment 1

Due Date November 26, 2021

Place all work in a package called sdcC601Assign1. Additionally, all methods should be included as part of a class Assign1Methods.

Note: For this assignment you are not allowed to use the built in Java class Array (or associated Java collection classes) as part of your solution for any of these questions. Your Method names must be the same as given here.

Question 1 [10 Marks]

Write a method **arrayUnion** which will take two arrays as parameters and returns an array composed of entries which exist in both arrays. For example given the following array definitions

```
int[] naOne =  { 3, 19, 22, 14, 7, 8 ,9 };
int[] naTwo =  { 12, 7, 2, 8, 4 };
```

The resultant array would be the following entries {7, 8}. The method signature for this should be:

```
public static int[] arrayUnion(int[] aOne, int[] aTwo])
```

Question 2 [10 Marks]

Write a method which returns the smallest element in an array of integer values. The method signature should be :

```
public static int arrayMin(int[] arr)
```

Question 3 [10 Marks]

Write a method **getOddValues** that will take an integer array as an argument and return a new integer array that is composed of only odd values, sorted in descending order, taken from the original array. For example if given the following array

```
int[] naTest1 = { 17, 4, 12, 11, 3, 14, 7 };
```

The method would return the following array:

```
{17, 11, 7, 3}
```

The method signature for this class will be:

```
public static int[] getOddValues(int[] naTest)
```

Question 4 [10 Marks]

Write a method **joinArray** that will take in two arrays of integers and return a new array which is the combination of the two arrays (all contents of the two arrays). The Method signature for this particular class shall be:

```
public static int[] joinArray(int[] naOne, int[] naTwo)
```

Question 5 [10 Marks]

Write a method **addMatrices** that will take in two 2D arrays and return a single 2D array which is the sum of the two inputs. Note that matrix addition works by adding the value in any location in one array to the same location in the second array. The method signature should be:

```
public static int[][] addMatrices(int[][] arr1, int[][] arr2)
```

Question 6 [10 Marks]

A Palindromic prime is a prime number and also palindromic. For example, 131 is a prime and also a palindromic prime, as are 313 and 757. Write a method **pallPrimeInt** that returns the first 50 palindromic primes as an array of integers. The method signature for this will be

```
public static int[]  pallPrimeInt()
```

Question 7 [10 Marks]

Write a method **sumArrayRows** that will take in a 2D array and return a single dimension array containing the sums of each **row** in the input. So,

Input `[ 3, 19, 22, 14, 7, 8 , 9 ]` `sum = 82`

`[ 3, 1, 12, 4, 3, 8 , 2 ]` `sum = 33`

`[ 13, 9, 2, 8, 7, 14 , 9 ]` `sum = 62`

`[ 8, 27, 7, 11, 7, 5 , 20 ]` `sum = 85`

Would produce as a result: `[ 82, 33, 62, 85 ]`

The method signature will be:

```
public static int[] sumArrayRows (int[][] arr)
```

Question 8 [20 Marks]

Write a method **isCons4** which will take a square 2 dimensional array of chars and return a boolean that indicates whether or not the given 2d array has 4 consecutive identical chars occurring in a row, a column or diagonally. You might want to write helper methods (checkRow, checkCol) for this problem).

The method signature for this will be

```
public static boolean isCons4(char[][] aSample)
```

Sample 'true" arrays

K	R	C	N	K
B	B	J	M	E
B	R	Y	C	E
B	A	N	B	F
B	W	R	K	E

K	D	C	N	K
R	B	J	M	E
E	R	Y	C	E
C	A	R	B	F
B	W	R	R	E

K	R	C	N	K	G
D	B	J	M	E	L
K	R	Y	C	E	C
J	A	N	B	F	D
B	W	R	K	E	N
M	N	N	N	N	M

K	R	C	J
N	B	J	M
C	J	Y	C
J	A	N	B