

CSE 1001: Introduction to Computer Programming

Programming Assignment-VI

(Methods)

1. Design a Simple Calculator using methods in java containing the following functionalities, namely, with Addition, Subtraction, Multiplication, Remainder, Division and Square Root. The signature of the methods are given below.

➤ *public static int additionSimple(int x, int y)*

- two inputs, x and y. Return the result of adding x to y.

➤ *public static int subtractionSimple(int x, int y)*

- two inputs, x and y. Return the result of subtracting x from y i.e y-x.

➤ *public static int multiplicationSimple(int x, int y)*

- two inputs, x and y. Return the result of multiplying x to y i.e. x*y.

➤ *public static double divisionSimple(int x, int y)*

- two inputs, x and y. Return the result of dividing y by x. Please check whether x is zero before dividing.

➤ *public static int remainderSimple(int n, int m)*

- Please make sure that remainderSimple() takes two inputs, namely, a number (int) n and a number (int) m. the method should return the remainder of n divided by m.

➤ *public static double squareRootSimple(int n)*

- Takes one input, namely a number n, and returns the square root of the number. The return should be double. Please kindly make sure that the number n is positive.

2. A pentagonal number is defined as $n(3n-1)/2$ for $n = 1, 2, \dots$, and so on. Therefore, the first few numbers are 1, 5, 12, 22, \dots .

Write a method with the following header that returns a pentagonal number:

public static int getPentagonalNumber(int n)

Write a java program that uses this method to display the first 100 pentagonal numbers with 10 numbers on each line.

3. Write the methods with the following headers

// Return the reversal of an integer, i.e., reverse(456) returns 654

public static int reverse(int number)

// Return true if number is a palindrome

public static boolean isPalindrome(int number)

Use the reverse method to implement isPalindrome. A number is a palindrome if its reversal is the same as itself. Write a java program that prompts the user to enter an integer and reports whether the integer is a palindrome.

4. Write a method that returns the number of days in a year using the following header:

```
public static int numberOfDaysInAYear(int year)
```

Write a java program that displays the number of days in year from 2000 to 2020.

5. Write a method to test whether a number is prime or not using the following header.

```
public boolean isPrime(int number)
```

Write a java program by using the above method to find the number of prime numbers less than 10000.

6. 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 java program using method that displays the first 100 palindromic prime numbers. Display 10 numbers per line, separated by exactly one space, as follows:

```
2 3 5 7 11 101 131 151 181 191
313 353 373 383 727 757 787 797 919 929
```

7. Twin primes are a pair of prime numbers that differ by 2. For example, 3 and 5 are twin primes, 5 and 7 are twin primes, and 11 and 13 are twin primes.

Write a java program using method to find all twin primes less than 1,000. Display the output as follows:

```
(3, 5)
(5, 7)
...
...
```

8. A regular polygon is an n -sided polygon in which all sides are of the same length and all angles have the same degree (i.e., the polygon is both equilateral and equiangular). The formula for computing the area of a regular polygon is

$$Area = \frac{n \times s^2}{4 \times \tan(\frac{\pi}{n})}$$

Write a method that returns the area of a regular polygon using the following header:

```
public static double area(int n, double side)
```

Write a java main method that prompts the user to enter the number of sides and the side of a regular polygon and displays its area. Here is a sample run:

```
Enter the number of sides: 5
Enter the side: 6.5
The area of the polygon is 72.69017017488385
```

9. Given the two fractions a/b and c/d , write a java program using method that will compute their sum in terms of the smallest common denominator.
10. Write a method that prints characters using the following header:

```
public static void printChars(char ch1, char ch2, int numberPerLine)
```

This method prints the characters between ch1 and ch2 with the specified numbers per line.

Write a java program that prints ten characters per line from 1 to Z. Characters are separated by exactly one space.

11. Write a method that finds the number of occurrences of a specified character in a string using the following header:

```
public static int count(String str, char a)
```

For example, `count("Welcome", 'e')` returns 2. Write a java program that prompts the user to enter a string followed by a character and displays the number of occurrences of the character in the string.

12. Write java method called *count* accepts a string as input and returns the number of vowels in it.
13. Write a java method to check a string is palindrome or not.
14. Some websites impose certain rules for passwords. Write a method that checks whether a string is a valid password. Suppose the password rules are as follows:
- A password must have at least eight characters.
 - A password consists of only letters and digits.
 - A password must contain at least two digits.

Write a program that prompts the user to enter a password and displays *Valid Password* if the rules are followed or *Invalid Password* otherwise.

15. Write a java program to calculate the area of triangle, square, circle, rectangle by using method overloading.
