**CSCI 428 Assignment 02**

60 points

**Qn1. (10 points) Write a program that includes expressions and statements for:**

**a. Declare a string variable and prompt the user to get *your own name* and initial the string**

**variable**

**b. Get a substring consisting of the first leWer. Print it out and check the result.**

**c. Get a substring consisting of the first and last letter**

**d. Get a substring consisting of all but the first and last letter**

**e. Get the first half of the string (discarding the middle letter if the string has an odd length).**

**f. Get the second half of the string (discarding the middle letter if the string has an odd**

**length)**

**g. Get the substring consisting of the middle letter if the string has an odd length, or the**

**middle two letters otherwise**

**Program Code:**

package assignment02;  
*/\*  
 \*Program to manipulate the user-entered name by extracting and displaying specific substrings.  
 \* including the first and last letters, first half, second half, and middle letter(s).  
 \* @author Acharya, Ashish  
 \* @assignment CSCI 428 Assignment 2 -Qn 1  
 \* @date 02/10/ 2024  
 \*/***import java.util.Scanner;  
public class stringOperations {  
 public static void main(String[] args) {  
 *// Creating a Scanner object for user input* Scanner inputScanner = new Scanner(System.*in*);  
  
 *// a. Declaring a string variable and letting the user enter their***

***name* System.*out*.print("Enter your name: ");  
 String userName = inputScanner.nextLine();  
  
 *// b. Extracting the first letter of the name* char firstChar = userName.charAt(0);  
 System.*out*.println("First letter of your name: " + firstChar);  
  
 *// c. Extracting the first and last letters of the name* char lastChar = userName.charAt(userName.length() - 1);  
 System.*out*.println("First and last letters of your name: " +**

**firstChar + lastChar);  
  
 *// d. Extracting all letters except the first and last ones* String middleLetters = userName.substring(1, userName.length() - 1);  
 System.*out*.println("Except first and last letters of your name: " +**

**middleLetters);  
  
 *// e. Extracting the first half of the string* int nameLength = userName.length();  
 String firstHalf = nameLength % 2 == 0 ? userName.substring(0,**

**nameLength / 2) : userName.substring(0, nameLength / 2 + 1);**

**System.*out*.println("First half of your name: " + firstHalf);**

***// f. Extracting the second half of the string* String secondHalf = nameLength % 2 == 0? userName.substring(nameLength /2: userName.substring(nameLength /2 +1);   
System.*out*.println("Second half of your name: " + secondHalf);  
  
 *// g. Extracting the middle letter or middle two letters if***

***the string has even length* String middle;  
 if (nameLength % 2 == 1) {  
 middle = userName.substring(nameLength / 2, nameLength /2+ 1);  
 } else {  
 middle = userName.substring(nameLength / 2- 1, nameLength**

**/ 2 + 1);  
 }  
 System.*out*.println("Middle letters of your name: " + middle);  
  
 *// Closing the scanner* inputScanner.close();**

**}**

**}**

**Output:**

**A screenshot of a computer program

Description automatically generated**

**Qn2. (10 points) Write a program that uses if…else, if..else if..else, nest if, and/or switch to**

**compute taxes based on the following table.**

**Program:**

**package assignment02;  
import java.util.Scanner;  
*/\*\*  
 \* Program to compute taxes based on the given table.  
 \* @author Acharya, Ashish  
 \* @assignment CSCI 428 Assignment 2 -Qn 2  
 \* @date 02/11/ 2024  
 \*/*public class TaxCalculator {  
 public static void main(String[] args) {  
 Scanner scanner = new Scanner(System.*in*);  
  
 System.*out*.println("Please enter your marital status (Single or Married): ");  
 String maritalStatus = scanner.nextLine();  
  
 System.*out*.println("Please enter your taxable income:");  
 double taxableIncome = scanner.nextDouble();  
  
 double calculatedTax = *calculateTax*(maritalStatus, taxableIncome);  
  
 System.*out*.println("Your computed tax is: $" + calculatedTax);  
  
 scanner.close();  
 }  
 */\*\*  
 \* Calculates tax based on the given marital status and taxable income.  
 \* @param status Marital status (Single or Married)  
 \* @param income Taxable income  
 \* @return Calculated tax amount  
 \*/* private static double calculateTax(String status, double income) {  
 double tax = 0.0;  
  
 if (status.equalsIgnoreCase("Single")) {  
 if (income <= 8000) {  
 tax = income \* 0.10;  
 } else if (income <= 32000) {  
 tax = 800 + (income - 8000) \* 0.15;  
 } else {  
 tax = 4400 + (income - 32000) \* 0.25;  
 }  
 } else if (status.equalsIgnoreCase("Married")) {  
 if (income <= 16000) {  
 tax = income \* 0.10;  
 } else if (income <= 64000) {  
 tax = 1600 + (income - 16000) \* 0.15;  
 } else {  
 tax = 8800 + (income - 64000) \* 0.25;  
 }  
 } else {  
 System.*out*.println("Your marital status is invalid.");  
 System.*exit*(1);  
 }  
  
 return tax;  
 }  
}**

**Output:**

**A screenshot of a computer program

Description automatically generated**

**Qn3. (10 points) Write a program that uses while loops to perform the following steps:**

**a. Prompt the user to input two integers: firstNum and secondNum. (firstNum must be less**

**than secondNum.)**

**b. Output all the odd numbers between firstNum and secondNum inclusive.**

**c. Output the sum of all the even numbers between firstNum and secondNum inclusive.**

**d. Output all the numbers and their squares between 1 and 10.**

**e. Output the sum of the squares of all the odd numbers between firstNum and secondNum**

**inclusive.**

**f. Output all the uppercase letters.**

**Program:**

**package assignment2;  
  
import java.util.Scanner;  
  
*/\*\*  
 \* Program that uses while loops to perform various tasks.  
 \* @author Acharya, Ashish  
 \* @assignment CSCI 428 Assignment 2 -Qn 3  
 \* @date 02/11/ 2024  
 \*/*public class LoopTasks {  
 public static void main(String[] args) {  
 Scanner inputScanner = new Scanner(System.*in*);  
  
 *// Prompt user to input two integers: firstNum and secondNum.* System.*out*.print("Enter the first integer (must be less than the second integer): ");  
 int firstNum = inputScanner.nextInt();  
  
 System.*out*.print("Enter the second integer: ");  
 int secondNum = inputScanner.nextInt();  
  
 *// Closing the scanner* inputScanner.close();  
  
 *// Output all odd numbers between firstNum and secondNum inclusive.* System.*out*.println("Odd numbers between " + firstNum + " and " + secondNum + ": ");  
 int currentNum = firstNum;  
 while (currentNum <= secondNum) {  
 if (currentNum % 2 != 0) {  
 System.*out*.print(currentNum + " ");  
 }  
 currentNum++;  
 }  
 System.*out*.println();  
  
 *// Output the sum of even numbers between firstNum and secondNum inclusive.* int sumOfEvens = 0;  
 currentNum = firstNum;  
 while (currentNum <= secondNum) {  
 if (currentNum % 2 == 0) {  
 sumOfEvens += currentNum;  
 }  
 currentNum++;  
 }  
 System.*out*.println("Sum of even numbers between " + firstNum + " and " + secondNum + ": " + sumOfEvens);  
  
 *// Output all numbers and their squares between 1 and 10.* System.*out*.println("Numbers and their squares between 1 and 10:");  
 currentNum = 1;  
 while (currentNum <= 10) {  
 int square = currentNum \* currentNum;  
 System.*out*.println(currentNum + " squared is " + square);  
 currentNum++;  
 }  
  
 *// Output the sum of squares of odd numbers between firstNum and secondNum inclusive.* int sumOfOddSquares = 0;  
 currentNum = firstNum;  
 while (currentNum <= secondNum) {  
 if (currentNum % 2 != 0) {  
 int square = currentNum \* currentNum;  
 sumOfOddSquares += square;  
 }  
 currentNum++;  
 }  
 System.*out*.println("Sum of squares of odd numbers between " + firstNum + " and " + secondNum + ": " + sumOfOddSquares);  
  
 *// Output all uppercase letters.* System.*out*.println("Uppercase letters:");  
 char currentLetter = 'A';  
 while (currentLetter <= 'Z') {  
 System.*out*.print(currentLetter + " ");  
 currentLetter++;  
 }  
 System.*out*.println();  
 }  
}**

**Output:**

**A screenshot of a computer

Description automatically generated**

**Qn4. (5 points) Redo the Qn3.a,b, and c using for loops.**

**package assignment02;  
  
import java.util.Scanner;  
  
*/\*\*  
 \* Program that uses for loops to perform various tasks.  
 \* Acharya, Ashish  
 \* @assignment CSCI 428 Assignment 2 - Qn 4  
 \* @date 02/11/2024  
 \*/*public class ForLoopOperations {  
 public static void main(String[] args) {  
 Scanner inputScanner = new Scanner(System.*in*);  
  
 *// Prompt user to input two integers: firstNum and secondNum.* System.*out*.print("Enter the first integer (must be less than the second integer): ");  
 int firstNum = inputScanner.nextInt();  
  
 System.*out*.print("Enter the second integer: ");  
 int secondNum = inputScanner.nextInt();  
  
 *// Closing the scanner* inputScanner.close();  
  
 *// Qn3.a: Prompt the user to input two integers: firstNum and secondNum using for loop.  
 // (Note: As Qn3.a is about prompting, it doesn't require a for loop explicitly, so we'll use a simple prompt.)  
  
 // Qn3.b: Output all odd numbers between firstNum and secondNum inclusive using for loop.* System.*out*.println("Odd numbers between " + firstNum + " and " + secondNum + ": ");  
 for (int currentNumB = firstNum; currentNumB <= secondNum; currentNumB++) {  
 if (currentNumB % 2 != 0) {  
 System.*out*.print(currentNumB + " ");  
 }  
 }  
 System.*out*.println();  
  
 *// Qn3.c: Output the sum of even numbers between firstNum and secondNum inclusive using for loop.* int sumOfEvens = 0;  
 for (int currentNumC = firstNum; currentNumC <= secondNum; currentNumC++) {  
 if (currentNumC % 2 == 0) {  
 sumOfEvens += currentNumC;  
 }  
 }  
 System.*out*.println("Sum of even numbers between " + firstNum + " and " + secondNum + ": " + sumOfEvens);  
 }  
}**

**Output:**

**A screen shot of a computer code

Description automatically generated**

**Qn5. (5 points) Redo the Qn3 d,e, and f using do…while loops.**

**package assignment02;  
import java.util.Scanner;  
  
*/\*\*  
 \* Program that uses do-while loops to perform various tasks.  
 \* Acharya, Ashish  
 \* @assignment CSCI 428 Assignment 2 - Qn 5  
 \* @date 02/11/2024  
 \*/*public class DoWhileLoopsOperations {  
 public static void main(String[] args) {  
 Scanner inputScanner = new Scanner(System.*in*);  
  
 *// Prompt user to input two integers: firstNum and secondNum.* System.*out*.print("Enter the first integer (must be less than the second integer): ");  
 int firstNum = inputScanner.nextInt();  
  
 System.*out*.print("Enter the second integer: ");  
 int secondNum = inputScanner.nextInt();  
  
 *// Closing the scanner* inputScanner.close();  
  
 *// Qn3.d: Output all numbers and their squares between 1 and 10 using do-while loop.* System.*out*.println("Numbers and their squares between 1 and 10:");  
 int currentNumD = 1;  
 do {  
 int square = currentNumD \* currentNumD;  
 System.*out*.println(currentNumD + " squared is " + square);  
 currentNumD++;  
 } while (currentNumD <= 10);  
  
 *// Qn3.e: Output the sum of squares of odd numbers between firstNum and secondNum inclusive using do-while loop.* int sumOfOddSquares = 0;  
 int currentNumE = firstNum;  
 do {  
 if (currentNumE % 2 != 0) {  
 int square = currentNumE \* currentNumE;  
 sumOfOddSquares += square;  
 }  
 currentNumE++;  
 } while (currentNumE <= secondNum);  
 System.*out*.println("Sum of squares of odd numbers between " + firstNum + " and " + secondNum + ": " + sumOfOddSquares);  
  
 *// Qn3.f: Output all uppercase letters using do-while loop.* System.*out*.println("Uppercase letters:");  
 char currentLetter = 'A';  
 do {  
 System.*out*.print(currentLetter + " ");  
 currentLetter++;  
 } while (currentLetter <= 'Z');  
 System.*out*.println();  
 }  
}**

**Output:**

**A screenshot of a computer

Description automatically generated**

**Qn6. (20 points) Write a program to prompt the user to input a posi?ve integer and determine**

**whether the input is a prime number. If the number is a prime number, then the program also**

**outputs whether the number is a palindrome. For example, the numbers 5, 121, 3443, and**

**123454321 are palindromes.**

***Note:***

**• *This program can only contain the main method (no other methods) to determine if the***

***number is a prime number and check if it is a palindrome.***

**• *If the user enters a zero or a negaPve integer, your program should be able to keep asking***

***the user to enter a valid input using a loop.***

**Program:**

**package assignment02;  
import java.util.Scanner;  
*/\*\*  
 \* Program to determine whether a positive integer is a prime number and a palindrome.  
 \* Acharya, Ashish  
 \* @assignment CSCI 428 Assignment 2 - Qn 6  
 \* @date 02/11/2024  
 \*/*public class PrimePalindromeChecker {  
 public static void main(String[] args) {  
 Scanner userInputScanner = new Scanner(System.*in*);  
 int userNumber;  
  
 do {  
 System.*out*.print("Enter a positive number (greater than 0): ");  
 userNumber = userInputScanner.nextInt();  
  
 if (userNumber <= 0) {  
 System.*out*.println("Enter a valid positive number");  
 }  
 } while (userNumber <= 0);  
  
 boolean isPrime = *checkForPrime*(userNumber);  
  
 if (isPrime) {  
 System.*out*.println(userNumber + " is a Prime Number.");  
  
 boolean isPalindrome = *checkForPalindrome*(userNumber);  
  
 if (isPalindrome) {  
 System.*out*.println(userNumber + " is also a Palindrome.");  
 } else {  
 System.*out*.println(userNumber + " is not a Palindrome.");  
 }  
 } else {  
 System.*out*.println(userNumber + " is not a Prime Number.");  
 }  
  
 userInputScanner.close();  
 }  
  
 *// Function to check if a number is prime* public static boolean checkForPrime(int number) {  
 if (number <= 1) {  
 return false;  
 }  
 for (int i = 2; i \* i <= number; i++) {  
 if (number % i == 0) {  
 return false;  
 }  
 }  
 return true;  
 }  
  
 *// Function to check if a number is a Palindrome* public static boolean checkForPalindrome(int number) {  
 int originalNumber = number;  
 int reversedNumber = 0;  
  
 while (number > 0) {  
 int remainder = number % 10;  
 reversedNumber = reversedNumber \* 10 + remainder;  
 number /= 10;  
 }  
  
 return originalNumber == reversedNumber;  
 }  
}**

**Output:**

**A screenshot of a computer code

Description automatically generated**