Question:

Write a program which performs multiple operations:

a) check for palindrome number
b) prints the pattern of stars in decreasing order based on the input
c) check the input number is prime number
d) print fibonacci series of size n with first two numbers as 0, 1

Using Switch case and do-While loop provide all the above functionality, such that user can select the functions that he/she needs to perform and exit the program based on the input.

Function Explanations in Brief:

1. **Palindrome number:**
   The numbers which give the same value when reversed are called palindrome numbers.
   Example: 121, 12321, 512215, etc.,

2. **Pattern of stars:**
   Based on the input integer, the levels in the pattern and number of stars in each level is decided. In every level the number of stars is 1 less than the previous level.

   Example: If input number is 4, then the output will be
   ****
   ***
   **
   *

   if input no is 5, then the output will be
   *****
   ****
   ***
   **
   *

   If input no is 2, then output will be

   **
   *

3. **Prime number:**

The numbers which are only divisible by 1 & itself are called prime numbers.

(Or)

The numbers which have factors 1 and itself are called prime numbers.

Example_1: If the input number is 23
Factors of 23 are 1, 23 and other than 1 it is divisible by 23 only
Hence the number is prime.

Example_2: If the input number is 22
Factors of 22 are 1,2, 11, 22 and are divisible by 2 and 11.
Hence the number is not a prime number.

4. **Fibonacci series:**

The series of numbers whose next number is the sum of its previous two numbers is called Fibonacci series.

Example_1: If the input number is 5,
The fibonacci series is: 0, 1, 1, 2, 3, 5 (by default first two numbers are 0 and 1)

Example_2: If the input number is 7 and the first two numbers are 3 and 4,
The fibonacci series is: 0, 1, 1, 2, 3, 5 , 8, 13

Exit:

The program should ask the user to choose the task they want to perform after executing a task till the choice 0 is entered to exit the program.

STUB CODE :

```
import java.util.Scanner;

public class Main {

        Scanner sc = new Scanner(System.in);

       //function to checkPalindrome
        public void checkPalindrome() {

        }

        //function to printPattern
        public void printPattern() {

        }

       //function to check no is prime or not
        public void checkPrimeNumber() {

        }

       // function to print Fibonacci Series
        public void printFibonacciSeries() {

                //initialize the first and second value as 0,1 respectively.
                int first = 0, second = 1;

        }

//main method which contains switch and do while loop

        public static void main(String[] args) {

                Main obj = new Main();

                int choice;
                Scanner sc = new Scanner(System.in);

                do {
                        System.out.println("Enter your choice from below list.\n" + "1. Find
palindrome of number.\n"
```

```
                                        + "2. Print Pattern for a given no.\n" + "3. Check whether
the no is a  prime number.\n"
                                        + "4. Print Fibonacci series.\n" + "--> Enter 0 to Exit.\n");
                        System.out.println();

                        choice = sc.nextInt();
                        switch (choice) {

                        case 0:
                                choice = 0;
                                break;

                        case 1: {
                                obj.checkPalindrome();
                        }
                        break;

                        case 2: {

                                obj.printPattern();
                        }
                        break;

                        case 3: {
                                obj.checkPrimeNumber();
                        }
                        break;

                        case 4: {

                                obj.printFibonacciSeries();
                        }
                        break;

                        default:
                                System.out.println("Invalid choice. Enter a valid no.\n");
                        }

                } while (choice != 0);
                System.out.println("Exited Successfully!!!");
                sc.close();
        }

}
```

Test cases:

1. **For choice 1:**

Input:	1	121	897
Output:	1 is a palindrome	121 is a palindrome	897 is not palindrome

2. **For choice 2:**

Input:	2	5	1
Output:	** *	***** **** *** ** *	Enter valid no

3. **For choice 3:**

Input:	23	41	2017
Output:	23 is not a prime number	41 is a prime number	2017 is a prime number

4. **For choice 4:**

Input:	4	0	3
Output:	The fibonacci series is: 0,1,1,2,3	The fibonacci series is: 0	The fibonacci series is: 0, 1,1,2

Solution:

```
//package com.greatlearning.corejava;

import java.util.Scanner;

public class Main {

	Scanner sc = new Scanner(System.in);

	public void checkPalindrome() {

		int remainder, sum = 0, temp;
		System.out.println("Enter a number to check if it is a palindrome \n");
		int value = sc.nextInt();

		temp = value;
		while (value > 0) {
			remainder = value % 10; // getting remainder
			sum = (sum * 10) + remainder;
			value = value / 10;
		}
		if (temp == sum)
			System.out.println(temp + " is a palindrome\n");
		else
			System.out.println(temp + " is not palindrome\n");
	}

	public void printPattern() {
		String pattern = "";
		System.out.println("Enter a number to print the pattern.\n");
		int value = sc.nextInt();
		if (value > 0) {
			for (int i = value; i > 0; i--) {
				for (int j = 0; j < i; j++) {
					pattern += "*";
				}
				System.out.println(pattern);
				pattern = "";
			}
			System.out.println();
		} else
			System.out.println("enter valid no \n");
	}
```

```
	public void checkPrimeNumber() {

		System.out.println("Enter a number to check whether it a prime no \n");
		int value = sc.nextInt();
		boolean flag = false;
		for (int i = 2; i <= value / 2; ++i) {

			// condition for non-prime number
			if (value % i == 0) {
				flag = true;
				break;
			}
		}

		if (!flag)
			System.out.println(value + " is a prime number.");
		else
			System.out.println(value + " is not a prime number.");
		System.out.println();
	}

	public void printFibonacciSeries() {

		System.out.println("Enter a number to print the Fibonacci series of the
number.\n");
		int value = sc.nextInt();
		int first = 0, second = 1, sum = 0;

		if (value == 0) {
			System.out.println("The fibonacci series is: " + first);
		} else if (value == 1) {
			System.out.println("The fibonacci series is: " + first + ", " + second);
		} else {
			System.out.print("The fibonacci series is: " + first + ", " + second);

			while (value > 1) {
				sum = first + second;
				System.out.print(", " + sum);
				first = second;
				second = sum;
				value -= 1;
			}
		}
```

```
            System.out.println();
            System.out.println();
        }

        public static void main(String[] args) {

            Main obj = new Main();

            int choice;
            Scanner sc = new Scanner(System.in);

            do {
                System.out.println("Enter your choice from below list.\n" + "1. Find
palindrome of number.\n"
                        + "2. Print Pattern for a given no.\n" + "3. Check whether
the no is a  prime number.\n"
                        + "4. Print Fibonacci series.\n" + "--> Enter 0 to Exit.\n");
                System.out.println();

                choice = sc.nextInt();
                switch (choice) {

                case 0:
                    choice = 0;
                    break;

                case 1: {
                    obj.checkPalindrome();
                }
                break;

                case 2: {

                    obj.printPattern();
                }
                break;

                case 3: {
                    obj.checkPrimeNumber();
                }
                break;

                case 4: {
```

```
                    obj.printFibonacciSeries();
                }
                break;

                default:
                    System.out.println("Invalid choice. Enter a valid no.\n");
                }

            } while (choice != 0);
            System.out.println("Exited Successfully!!!");

            sc.close();
        }

}
```