

COMP1236 Group Project

Use the Bash shell for the completion of this project.

Develop a shell scripting application that allows the user to perform some advanced mathematical operations.

Your application should allow the user to perform these three tasks:

- Task 1: Find the even multiples of any number – the user should specify the multiples of which number they want to print and how many of them (for example if the user chooses the number 7 and would like to print four even multiples, the program should print 14, 28, 42, 56)
- Task 2: Find the terms of any linear sequence given by the rule $U_n = an + b$, where a and b are integers specified by the user and n is a positive integer, and print them in increasing order (for example if the user inputs $a=3$, $b=-4$, the first few terms that should be printed are -1, 2, 5, 8, 11...). The user also will specify how many terms the program should print. The user should be allowed to choose another sequence and for the number of terms chosen the program should calculate and print their sum.
- Task 3: Find the numbers that can be expressed as the product of two nonnegative integers in succession and print them in increasing order. (For example, 30 is such a number as it can be written as the product of 5 and 6 ($30=5 \times 6$), which are two numbers in succession.) The user should specify a maximum value and the program should print all said numbers smaller than or equal to that value. The program should keep a count of how many numbers were printed and should output that count, as well as the numbers.

Your application should be user friendly. First, you create an initial menu that the user sees when they execute the application. The menu should display the list of operations (the three tasks) that the application can perform.

In your menu design, if user enters M or m, the application should print a list of the multiples of the number (Task 1). The user determines how many numbers they want to see.

If the user enters S or s, the application should print a list of the terms for the chosen sequence (Task 2). The user determines how many terms should be printed.

If the user enters P or p, the program should print a list of the numbers which are products of two numbers in succession (Task 3). The maximum value of the numbers printed should not exceed the value specified by the user.

The program should display the user's selection before printing the output. If the user enters a selection which is different from the choices offered, the program should output an error message. After a task has been completed, the user should be given the option to select another task, or to exit.

Before writing the code, you should work on the problem solving part of the application development process. Draw the flowcharts for each of the tasks separately. Next, you need to draw the main flowchart which will show the logic of your entire application.

Marks: 20% of course grade

Task	Possible marks	Description
Problem Solving - Flowcharts	15	The flowchart shows the logic of your program correctly
Application Menu Interaction	10	The application menu displays correctly. This includes each task's interaction with the user while getting the input
Task 1 Functionality	15	The application displays the required multiples correctly
Task 2 Functionality	15	The application displays the required sequence numbers correctly
Task 3 Functionality	15	The application displays the required amount of numbers correctly
Application Functionality	20	The user can switch between tasks and everything works correctly as a whole.
Code Documentation and Conventions	10	Comments are entered appropriately and best conventions discussed in class are followed.