**Programming**

**2g**

*Worksheet*

**Problem 1**

1. **Scenario 1:**

Inside a loop a user enters a single number, one at a time.

This is added to a sum value.

Once the sum exceeds 20 the program exits the loop.

How would this be coded? What type of loop is the right one to use? What is the right mechanism to check the sum and exit? Write a small program that attempts to solve this problem. One of the issues is that the exit condition is connected to a calculation based on the input.

* 1. **Variation 1:** Before entering the loop the user enters an upper limit.

Scenario 1 is then repeated with the following change:

Inside the loop, the user enters a single number, one at a time.

This is added to a sum value.

Once the sum exceeds the upper limit the program should exit the loop.

But, instead of simply exiting the program the user is asked a question: “do you wish to increase the upper limit?”

If the user wants to increase the upper limit the program asks the user to specify the amount to add to the upper limit.

This is added to the upper limit and the program continues until the new upper limit is reached.

The user is not asked a second time to increase the upper limit.

How would you code this variation?

* 1. **Variation 2:** Expand variation 1 as follows: Every time the user inputs a number it is only added to the sum if it is a prime number.
  2. **Variation 3:** The number is added to the sum if it is not a factor of the sum.

**Problem 2**

Code your solutions only using a single while loop and nested if statements and loops. You can break up your code into static methods in the same file as the main(). See below if you wish to try this. As a member of staff for guidance if you get stuck.

1. **Scenario 2:** Inside a loop a user enters a single number, one at a time. Each number is added to a string e.g. “3,4,5,1,0”. Output the string variable after the sum of the numbers exceeds 20.
   1. **Variation 1**: Inside a loop a user enters a single number, one at a time. This is added to a string e.g. “3,4,5,1,0”. Output the string variable once 5 numbers have been added.
   2. **Variation 2:** Inside a loop a user enters a single number, one at a time. This is added to a string e.g. “3,4,5,1,0”, which is sorted (lowest to highest) after each number is entered. The sorted string is displayed after each number is entered. Exit the loop once 5 numbers have been added.
   3. 

**Static Methods\***

If you wish to split up your code into smaller functions here is some sample code showing how you could do this. You do not have to use this. Only use this if you understand it. We cover it elsewhere in the course.

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| **public** **static** **void** **main**(String[] args) {    **while**(**true**){  /\*\*\*\*\*\*\*\*\*\*\*INPUT\*\*\*\*\*\*\*\*\*\*\*\*\*\*/  **int** age = getInput("Please enter your age: ");  /\*\*\*\*\*\*\*\*\*\*\*PROCESS\*\*\*\*\*\*\*\*\*\*\*\*\*\*/  //Calculate year of birth  **int** discount = calculateDiscount(age);  /\*\*\*\*\*\*\*\*\*\*\*OUTPUT\*\*\*\*\*\*\*\*\*\*\*\*\*\*/  display(discount);  }  }  **public** **static** **int** **getInput**(String textPrompt){    Scanner input = **new** Scanner(System.in);  System.out.println("Please enter your age: ");  **int** age = input.nextInt();  **return** age;    }    **public** **static** **int** **calculateDiscount**(**int** age){    **int** discount = **0**;  **if** (age < **18**) {  discount = **30**;  }  **else** **if** (age >= **18** && age <= **30**) {  discount = **45**;  }  **else** **if** (age > **30**) {  discount = **25**;  }  **return** discount;  }    **public** **static** **void** **display**(**int** discount){    System.out.println("Your discount is "+ discount);  } |