Exercise 1 :

Write an algorithm to calculate the average of a set of students (we don't know their count).

Solution :

```
START

    set SUM to zero

    set COUNTER to zero

    ask user to enter the first student mark and save it in MARK

    While MARK doesn't equal -1

            add MARK to SUM and save it in SUM

            ask user to enter the next mark and save it in MARK

            increment COUNTER

    END While

    divide SUM by COUNTER and save it in AVG

    print "The average is " AVG

END
```

Exercise 2 :

Write an algorithm to print the number of passes and the number of failures in a class of n students, also let the program print the failure percentage.

Solution :

START

    set COUNTER to zero

    set PASS to zero

    set FAIL to zero

    ask user to enter the first mark and save it as MARK

    While MARK doesn't equal -1

        IF MARK is more than 60 THEN

            increment PASS

        ELSE

            increment FAIL

        END IF

        increment COUNTER

    END While

    divide FAIL by COUNTER and save it in PERCENTAGE

    print "The number of passed student is " PASS

    print "The number of faild student is " FAIL

    print "The failure percentage is " PERCENTAGE

END

Exercise 3 :

Design an algorithm that will prompt for and receive prices of several items. After the last price is entered, the sentinel amount of –1 is entered. The algorithm should calculate the number of items purchased, total cost of the purchase before tax and with the tax of 7.5%, and display the results on the screen.

Solution :

START

    set COUNTER to zero

    set TOTAL to zero

    ask user to enter the first price and save it as PRICE

    While PRICE doesn't equal -1

        add PRICE to TOTAL and save it in TOTAL

        ask user to enter another price and save it in PRICE

        increment COUNTER

    END While

    multiply TOTAL by 1.075 and save it in TOTAL_WITH_TAX

    print "The number of items purchased is " COUNTER

    print "The total cost of the purchase before tax is " TOTAL

    print "The total cost of the purchase with tax is "TOTAL_WITH_TAX

END

Exercise 4 :

Write an Algorithm to do the function of a simple calculator which should be able to do +,-,*,% operations.

Solution :

START

    ask user to enter the first number and save it as NUM1

    ask user to enter the operation and save it in OP

    ask user to enter the second number and save it in NUM2

    IF OP is equal to "+"

        add NUM1 to NUM2 and save it in RESULT

    ELSE IF OP is equal to "-"

        subtract NUM2 from NUM1 and save it in RESULT

    ELSE IF OP is equal to "*"

        multiply NUM1 with NUM1 and save it in RESULT

    ELSE IF OP is equal to "%"

        save the mod of NUM1 on NUM2 in RESLUT

    END IF

    print RESLUT

END

Exercise 5 :

Write an algorithm to print the sum of the given series, take first 8 terms A=1! +2! +3! +4! +5! +…

Solution :

START

    RR = 1

    AA = 1

    sum = 0

    While AA is less than 9

        let N = AA

        While N is more than zero

            multiply RR by N and save it in RR

            decrement N

        increment AA

        add RR to sum and save it in sum

    print sum

END

Exercise 6 :

Find the maximum and the minimum elements for a set of n integers.

Solution :

START

    ask user to enter the number of integers and save it as N

    ask user to enter the first integer MAX

    let COUNTER = N

    While COUNTER is more than zero

        ask user to enter the next integer and save it in INT

        IF INT > MAX

            let MAX = INT

        END IF

    END While

    print MAX

END