EXAMPLE PROGRAM SUM AND PRODUCT REPORT

1. Requirements

To build a program that takes two integers as input, and outputs their sum and product.

2. Design

A top down analysis is presented in Table 1.

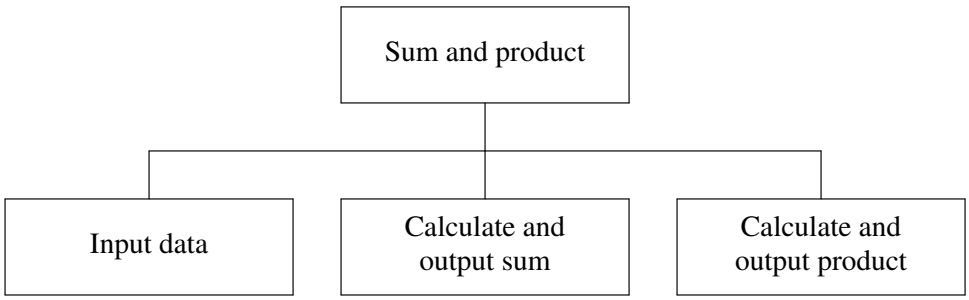

Table 1: *Top down analysis*

A single procedure will suffice to address the identified operations.

1) `SUM_AND_PROD` (top level procedure): Input data, and calculate and output sum and product.

NAME	USAGE	TYPE	RANGE
X_VALUE	Formal parameter	INTEGER	Default
Y_VALUE	Formal parameter	INTEGER	Default

A Nassi-Shneiderman chart detailing this procedure is given in Table 2.

Input X_VALUE
Input Y_VALUE
Output sum X_VALUE and Y_VALUE
Output product X_VALUE and Y_VALUE

Table 2: *Nassi-Shneiderman Chart*

3. Implementation

Implementation is as presented in Table 3:

```
-- SUM AND PRODUCT
-- 15 August 1997
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with CS_IO;
use CS_IO;

procedure SUM_AND_PROD is
        X_VALUE, Y_VALUE: INTEGER;
begin
-- Input data items
        PUT_LINE("Give two whole numbers! ");
        GET(X_VALUE);
        GET(Y_VALUE);
-- Calculate sum
        PUT("The sum of the numbers is: ");
        PUT(X_VALUE+Y_VALUE);
        NEW_LINE;
-- Calculate product
        PUT("The product of the numbers is: ");
        PUT(X_VALUE*Y_VALUE);
        NEW_LINE;
end SUM_AND_PROD;
```

Table 3: *Implementation*

4. Testing

Test using all nine possible combinations of positive, negative and zero input values for the two input variable `X_VALUE` and `Y_VALUE` as shown in Table 4.

TEST CASE		EXPECTED RESULT	
X_VALUE	Y_VALUE	SUM	PRODUCT
0	0	0	0
0	12	12	0
0	-12	-12	0
4	0	4	0
4	12	16	48
4	-12	-8	-48
-4	0	-4	0
-4	12	8	-48
-4	-12	-16	48

Table 4: *Test cases*

A screen dump illustrating the output produced as a result of running the above test cases is given in Table 5.

```
kuban-288 $ sum_and_prod
Give two whole numbers!
0 0
The sum of the numbers is:           0
The product of the numbers is:           0

kuban-289 $ sum_and_prod
Give two whole numbers!
0 12
The sum of the numbers is:          12
The product of the numbers is:           0

kuban-290 $ sum_and_prod
Give two whole numbers!
0 -12
The sum of the numbers is:         -12
The product of the numbers is:           0

kuban-291 $ sum_and_prod
Give two whole numbers!
4 0
The sum of the numbers is:           4
The product of the numbers is:           0

kuban-292 $ sum_and_prod
Give two whole numbers!
4 12
The sum of the numbers is:          16
The product of the numbers is:          48

kuban-293 $ sum_and_prod
Give two whole numbers!
4 -12
The sum of the numbers is:          -8
The product of the numbers is:         -48

kuban-294 $ sum_and_prod
Give two whole numbers!
-4 0
The sum of the numbers is:          -4
The product of the numbers is:           0

kuban-295 $ sum_and_prod
Give two whole numbers!
-4 12
The sum of the numbers is:           8
The product of the numbers is:         -48

kuban-296 $ sum_and_prod
Give two whole numbers!
-4 -12
The sum of the numbers is:         -16
The product of the numbers is:          48
```

Table 5: *Test output*