Python Programming for CSEC® Information Technology

PYTHON is an interpreted language: in an interpreted language instructions are executed directly without the need for compilation.

You can type these examples directly into the PYTHON IDLE (Integrated Development and Learning Environment).

Input and Output instructions

The simplest input and output instructions are input and print

input (VariableName);

print (VariableName) or print ('Any text to be output')

Examples of input and output

```
firstNumber = input ('Please give the first number ')
print ('Welcome to Caribbean Travel Services')
print (firstNumber)
```

Assignment statements with values, simple expressions and expressions

An assignment statement is a VariableName = value or an Expression

An Expression is a SimpleExpression followed by
<, <=, =, !=, >=, >, **and, or** followed by another SimpleExpression

and a SimpleExpression is a VariableName followed by *, /, + followed by another VariableName.

Examples of assignment statements with values, simple expressions and expressions

```
testScore = 55
homework1 = 23
homework2 = 17
homeScore = homework1 + homework2 * 2
passTest = (testScore >= 50) and (homeScore >= 25)
print (passTest)
```

Example of int and float functions

As we have seen in PYTHON variables do not need to be declared. Use the functions int(variable) to convert a variable into an integer and float(variable) to convert into a real.

Example of int and float functions

```
decimalNumber = 32.56
print (decimalNumber)
print (int(decimalNumber))
wholeNumber = 17
print (wholeNumber)
print (float(wholeNumber))
```

For loop

Note: the indentation is important in Python

FOR VariableName **in range** (InitialValue, EndCounter):
    Loop statements

Example of a for loop counting from 1 to 10

```
for counter in range(1, 11):
        print (counter)
```

While loops

Python does not have a Repeat Until loop so use a While loop.

while (condition is TRUE):
    Loop statements

A condition is an Expression that gives a TRUE or FALSE result. The int(..) function converts currentNumber into an integer.

Example of a while loop used to repeat until the currentNumber is 0.

Examples of input and output

```
currentNumber = -1
while (int(currentNumber) != 0):
        currentNumber = input ('Guess another number ')
```

For an example of a Repeat Until/ While loop, see pages 303 - 306 in the book

If Then statement

IF (condition is TRUE)
    Decision statements

```
IF (int(kms) >=100000):
   print ('YES Service required')
```

If Then and If Then Else statements

IF (condition is TRUE):
    Condition TRUE statements
ELSE:
    Condition is FALSE statements

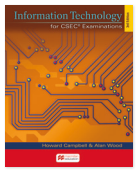
Example of If Then Else

```
if int(kmsCovered) > 100000:
  print ('YES vehicle needs a service')
else:
  print ('NO service needed on this vehicle')
```

What is the difference between IF-THEN and IF-THEN-ELSE? Find out on page 270 in the book

A simple guessing game written in Python

```
print ('Guessing game. Guess the number between 1 and 20. You have 10 guesses')
while (int(counter) != 10) and (int(guess) != 7):
    guess = input ('Please guess again')
    print (int(guess))
    counter = counter + 1
if (int(guess) == 7):
    print ('You win in only ',counter, ' guesses')
else:
    print ('Sorry! You lose')
```



Pascal Programming for CSEC® Information Technology

All PASCAL programs start with a program name and declaration of variables.

You can type these examples directly into FreePascal.

Common DataType:

Common DataType are:

INTEGER,
REAL,
CHAR,
STRING,
BOOLEAN

A data type specifies what sort of values a variable or constant can hold. For more information on the different data types see page 267 in the book.

Program

All PASCAL programs start with a program name and declaration of variables.

PROGRAM ProgramName;
VAR
VariableName : DataType;

Example

```
PROGRAM Passengers;
VAR
 firstNumber, secondNumber : INTEGER;
 average : REAL;
 routeLetter : CHAR;
 driverName : STRING[32];
 seatBelts : BOOLEAN;
```

Begin and End

Every program starts with Begin and finishes with End.

BEGIN
Program statements
END.

Simple Input and Output Instructions

The simplest input and output instructions are Read and Write or Writeln (write a line)

READ (VariableName);
WRITE (VariableName) or WRITE('Any text to be output');
WRITELN (VariableName) or WRITELN('Any text to be output');

Examples of input and output

```
READ (firstNumber);
WRITE (total);
WRITELN ('Welcome to CTS ');
```

There are various types of potential errors in source code: syntax, logic and run-time errors. What is a syntax error? Find out on page 292 in the book.

Assignment statements with values, simple expressions and expressions

An assignment statement is a VariableName := value or an Expression
An Expression is a SimpleExpression followed by **<, <=, =, <>, >=, >, AND, OR** followed by another SimpleExpression
and a SimpleExpression is a VariableName followed by MOD, DIV, *, /, + followed by another VariableName.

Examples of assignment statements with values, simple expressions and expressions

```
firstNumber := 25;
doubleNumber := firstNumber * 2;
pass := (test >= 5) AND (homework >= 6);
```

For loop

FOR VarName := start **TO** stop **DO**
BEGIN
Loop statements
END;

Example

```
FOR counter := 1 TO 10 DO
BEGIN
        WRITELN (counter);
END;
```

Repeat Until loop

REPEAT
Loop statements
UNTIL (condition is TRUE);
A condition is an Expression that gives a TRUE or FALSE result.

Example

```
REPEAT
  WRITELN ('Please have another guess');
READ (currentNumber);
UNTIL (currentNumber = 0);
```

While Do Loop

WHILE (condition is TRUE)
BEGIN
Loop statements
END;

Example

```
WHILE (objectDetected = 'N') DO
  BEGIN
WRITELN('Brakes OFF');
  END;
```

If Then statement

IF (condition is TRUE) **THEN**
BEGIN
Decision statements
END;

Example of If Then

```
IF (kms >=100000) THEN
 BEGIN
  WRITELN ('YES Service required');
 END;
```

If Then Else statement

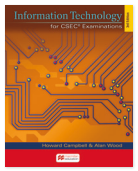
IF (condition is TRUE) **THEN**
BEGIN
Condition TRUE statements
END
ELSE
BEGIN
Condition is FALSE statements
END;

Example of If Then Else

```
IF (kms >=100000) THEN
  BEGIN
   WRITELN ('YES Service required');
  END
ELSE
  BEGIN
   WRITELN('No Service required');
  END;
```

A simple guessing game program written in Pascal

```
PROGRAM Guessinggame;
VAR
guess : INTEGER;
counter : INTEGER;
BEGIN
  counter := 0;
  WRITELN ('Guess the number game');
  REPEAT
    WRITELN ('Have another guess ');
    READ (guess);
    counter := counter + 1;
  UNTIL ((guess = 7) OR (counter = 10));
  IF (guess = 7) THEN
    BEGIN
      WRITELN ('Win ',counter, ' guesses');
    END
  ELSE
    BEGIN
      WRITELN ('Sorry! You lose');
    END;
  WRITELN ('Press any key to finish ');
  READLN;
END.
```



Information Technology for CSEC® Examinations, Third Edition
Fully updated for the latest CSEC® syllabus, and containing examples and practice programming for Python and Pascal.

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