Pseudocode 2 - Pseudo to Python

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Lesson Objectives

- Demonstrate the use of pseudocode to write code

Pseudocode is a way of expressing an algorithm in a structured way without having to worry much about the exact syntax or whether or not the code will compile - with pseudocode all we're interested in is being able to clearly explain how to solve a particular problem.

There is no formal way of writing pseudocode but we tend to use the following constructs.

Structure	Pseudocode	Python
Variable creation & initialisation	x AS INTEGER x ← 0	x = 0
Assignment	x ← 4	x = 4
Arithmetic operations	y ← x * 7	y = x * 7
Output	OUTPUT x	print(x)
Input	INPUT x	x = input()

Selection: If statement	IF x = 4 THEN
	  y = 8
	ELSE
	  y = 6
	END IF
		if x == 4:
		  y = 8
		else:
		  y = 6

Selection: Select-case	SELECT x
	  CASE 1:
	  OUTPUT a
	  CASE 2:
	  OUTPUT b
	  CASE 3:
	  OUTPUT c
	  CASE ELSE:
	  OUTPUT d
	END SELECT
		if x == 1:
		  print(a)
		elif x == 2:
		  print(b)
		elif x == 3:
		  print(c)
		else:
		  print(d)

Iteration: While loop	WHILE x > 4 DO
	  x ← x - 1
	END WHILE
		while x > 4:
		  x = x -1

Iteration: For loop	FOR x = 1 TO 5
	  y ← y + x
	END FOR
		for x in range(1,5):
		  y = y + x

Procedure	PROCEDURE square (x AS INTEGER)
	  x ← x * x
	  OUTPUT x
	END PROCEDURE
		def square(x):
		  x = x * x
		  print(x)

Function	FUNCTION square (x AS INTEGER)
	  x ← x * x
	  RETURN x
	END FUNCTION
		def square(x):
		  x = x * x
		  return x

Examples
Try to code the following examples in Python:

1. Multiplier

```
OUTPUT "Choose a number to multiply."
INPUT num AS INTEGER
OUTPUT "Multiply it by?"
INPUT mult AS INTEGER
ans AS INTEGER
ans ← num * mult
OUTPUT ans
```

Code	
Screenshot	

2. Adder

```
total AS INTEGER
total ← 0
OUTPUT "How many numbers to add?"
INPUT nums as INTEGER
FOR x = 1 TO nums
  INPUT num AS INTEGER
  total ← total + num
END FOR
OUTPUT total
```

Code	
Screenshot	

3. Driving

```
age AS INTEGER
age ← 0
WHILE age <=0 OR age > 100
  OUTPUT "How old are you?"
  INPUT age
  IF age <= 0 OR age > 100 THEN
    OUTPUT "That is not a valid age"
  END IF
END WHILE

OUTPUT "You are " + age + " years old."

IF age >= 18 THEN
  OUTPUT "You can drive."
ELSE
  OUTPUT "You cannot drive."
```

Code	
Screenshot	

4. Random Number Game

```
MyNum AS INTEGER
MyNum ← RANDOM NUMBER 1-10

YourGuess AS INTEGER
YourGuess ← 0

WHILE YourGuess != MyNum

  OUTPUT "Guess my number"
  INPUT MyGuess

  IF YourGuess > MyNum THEN
    OUTPUT "Too big"
  ELSE IF YourGuess < MyNum THEN
    OUTPUT "Too small"
  ELSE
    OUTPUT "You win"
  END IF

END WHILE

OUTPUT "Game Over"
```

Code	
Screenshot	

5. Factorial Function

```
FUNCTION factorial( n AS INTEGER)
  IF n = 0 THEN
    RETURN 1
  ELSE
    RETURN factorial(n * (n - 1))
END FUNCTION

OUTPUT "Enter a number"
INPUT x AS INTEGER
OUTPUT "The factorial of that number is"
OUTPUT factorial(x)
```

Code	
Screenshot	