PSEUDOCODES & ACTIVITIES

THINGS TO DO TODAY

GRAD 10 STUDENTS

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IGCSE CS 0478 CANDIDATES

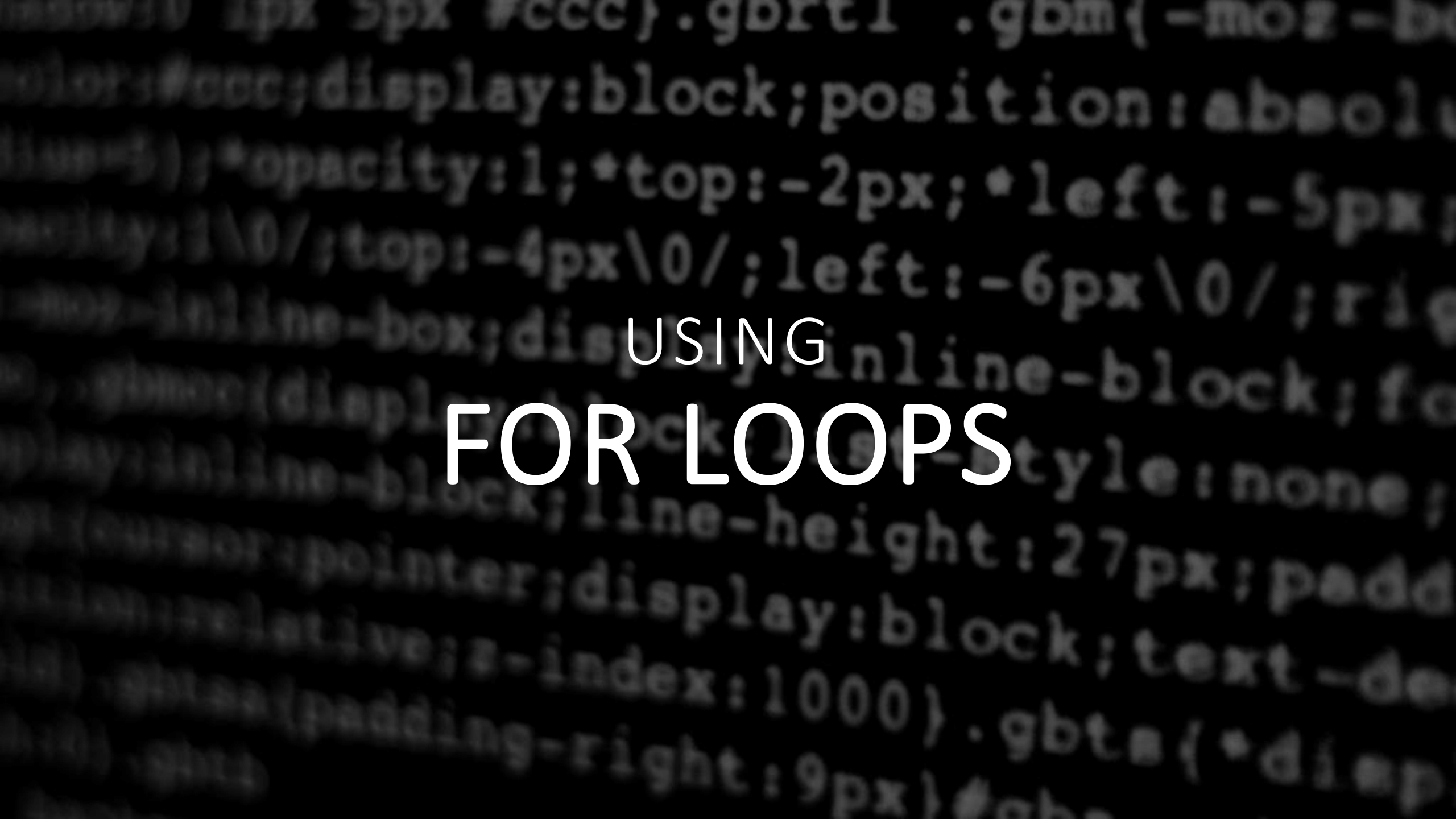
Take the front row and pay attention with the activities for PSEUDOCODEs.

LOOPS IN PSEUDOCODES

Loops are used to repeat a set of instructions some number of times. This is a programming concept known as iteration or repetition.

In the python programming language, there are two different loop structures that we can use. One structure is a for loop, and the other structure is a while loop.

When writing pseudocode, we can still use **FOR loops and WHILE loops**, but there is also a third loop structure using the **REPEAT command**.


USING
FOR LOOPS

For loops

Example 1

```
for x in range(10):
    print(x)
```

Example 2

```
Num = int(input())
for x in range(1,11):
    print(Num * x)
```

Example 3

```
Sum = 0
for x in range(5):
    Num = int(input())
    Sum = Sum + Num
print(Sum)
```

For loops

Example 1

```
for x in range(10):
    print(x)
```

Example 1

```
FOR X ← 0 TO 9
    PRINT X
NEXT X
```

Example 2

```
Num = int(input())
for x in range(1,11):
    print(Num * x)
```

Example 3

```
Sum = 0
for x in range(5):
    Num = int(input())
    Sum = Sum + Num
print(Sum)
```

For loops

Example 1

```
for x in range(10):
    print(x)
```

Example 2

```
Num = int(input())
for x in range(1,11):
    print(Num * x)
```

Example 3

```
Sum = 0
for x in range(5):
    Num = int(input())
    Sum = Sum + Num
print(Sum)
```

Example 1

```
FOR X ← 0 TO 9
    PRINT X
NEXT X
```

Example 2

```
INPUT Num
FOR X ← 1 TO 10
    PRINT Num * X
NEXT X
```

For loops

Example 1

```
for x in range(10):
    print(x)
```

Example 2

```
Num = int(input())
for x in range(1,11):
    print(Num * x)
```

Example 3

```
Sum = 0
for x in range(5):
    Num = int(input())
    Sum = Sum + Num
print(Sum)
```

Example 1

```
FOR X ← 0 TO 9
    PRINT X
NEXT X
```

Example 2

```
INPUT Num
FOR X ← 1 TO 10
    PRINT Num * X
NEXT X
```

Example 3

```
Sum ← 0
FOR X ← 1 TO 5
    INPUT Num
    Sum ← Sum + Num
NEXT X
PRINT Sum
```

For loops

```
for x in range(5):
    print(x)
```

```
for x in range(1,4):
    Num = int(input())
    print(Num ** 2)
```

```
for Count in range(100):
    print(Values[Count])
```

```
Product = 1
for i in range(1,5):
    Num = int(input())
    Product = Product * Num
print(Product)
```

```
for Count in range(20):
 Number = int(input())
 A[Count] = Number
print(A)
```

```
Max = int(input())
for Count in range(Max):
   print(Count)
```

For loops

```
for x in range(5):
    print(x)
```

```
for x in range(1,4):
    Num = int(input())
    print(Num ** 2)
```

```
for Count in range(100):
    print(Values[Count])
```

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Product = 1
for i in range(1,5):
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    Product = Product * Num
print(Product)
```

```
for Count in range(20):
 Number = int(input())
 A[Count] = Number
print(A)
```

```
Max = int(input())
for Count in range(Max):
   print(Count)
```

(a)
```
FOR x ← 0 TO 4
  PRINT x
NEXT x
```

(b)
```
FOR x ← 1 TO 4
  INPUT Num
  PRINT Num ^ 2
NEXT x
```

(c)
```
FOR Count ← 1 TO 100
  PRINT Values[Count]
NEXT Count
```

(d)
```
Product ← 1
  FOR i ← 1 TO 4
  INPUT Num
  Product ← Product * Num
  NEXT i
PRINT Product
```

(e)
```
FOR Count ← 1 TO 20
  INPUT Number
  A[Count] ← Number
  NEXT Count
PRINT A
```

(f)
```
INPUT Max
  FOR Count ← 1 TO Max
  PRINT Count
NEXT Count
```

For loops

- ```
  for x in range(5):
      print(x)
  ```

- ```
  for x in range(1,4):
      Num = int(input())
      print(Num ** 2)
  ```

- ```
  for Count in range(100):
      print(Values[Count])
  ```

- ```
  Product = 1
  for i in range(1,5):
      Num = int(input())
      Product = Product * Num
  print(Product)
  ```

- ```
  for Count in range(20):
   Number = int(input())
   A[Count] = Number
  print(A)
  ```

- ```
  Max = int(input())
  for Count in range(Max):
     print(Count)
  ```

(a)
```
FOR x ← 0 TO 4
  PRINT x
NEXT x
```

(b)
```
FOR x ← 1 TO 4
  INPUT Num
  PRINT Num ^ 2
NEXT x
```

(c)
```
FOR Count ← 0 TO 99
  PRINT Values[Count]
NEXT Count
```

(d)
```
Product ← 1
  FOR i ← 1 TO 5
  INPUT Num
  Product ← Product * Num
  NEXT i
PRINT Product
```

(e)
```
FOR Count ← 1 TO 20
  INPUT Number
  A[Count] ← Number
  NEXT Count
PRINT A
```

(f)
```
INPUT Max
  FOR Count ← 1 TO Max
  PRINT Count
NEXT Count
```

For loops

- ```
  for x in range(5):
      print(x)
  ```

- ```
  for x in range(1,4):
      Num = int(input())
      print(Num ** 2)
  ```

- ```
  for Count in range(100):
      print(Values[Count])
  ```

- ```
  Product = 1
  for i in range(1,5):
      Num = int(input())
      Product = Product * Num
  print(Product)
  ```

- ```
  for Count in range(20):
   Number = int(input())
   A[Count] = Number
  print(A)
  ```

- ```
  Max = int(input())
  for Count in range(Max):
     print(Count)
  ```

(a)
```
FOR x ← 0 TO 4
  PRINT x
NEXT x
```

(b)
```
FOR x ← 1 TO 4
  INPUT Num
  PRINT Num ^ 2
NEXT x
```

(c)
```
FOR Count ← 0 TO 99
  PRINT Values[Count]
NEXT Count
```

(d)
```
Product ← 1
  FOR i ← 1 TO 5
  INPUT Num
  Product ← Product * Num
  NEXT i
PRINT Product
```

(e)
```
FOR Count ← 1 TO 20
  INPUT Number
  A[Count] ← Number
  NEXT Count
PRINT A
```

(f)
```
INPUT Max
  FOR Count ← 1 TO Max
  PRINT Count
NEXT Count
```

For loops

```
for x in range(5):
    print(x)
```

```
for x in range(1,4):
    Num = int(input())
    print(Num ** 2)
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for Count in range(100):
    print(Values[Count])
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Product = 1
for i in range(1,5):
    Num = int(input())
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```
for Count in range(20):
 Number = int(input())
 A[Count] = Number
print(A)
```

```
Max = int(input())
for Count in range(Max):
   print(Count)
```

(a)
```
FOR x ← 1 TO 5
  PRINT x
NEXT x
```

(b)
```
FOR x ← 1 TO 4
  INPUT Num
  PRINT Num ^ 2
NEXT x
```

(c)
```
FOR Count ← 1 TO 100
  PRINT Values[Count]
NEXT Count
```

(d)
```
Product ← 1
  FOR i ← 1 TO 5
  INPUT Num
  Product ← Product * Num
  NEXT i
PRINT Product
```

(e)
```
FOR Count ← 1 TO 20
  INPUT Number
  A[Count] ← Number
  NEXT Count
PRINT A
```

(f)
```
INPUT Max
  FOR Count ← 1 TO Max
  PRINT Count
NEXT Count
```

For loops

```
Total = 0
Values = int(input())
for Count in range(Values):
    Number = int(input())
    Total = Total + Number
print(Total)
```

For loops

```
Total = 0
Values = int(input())
for Count in range(Values):
    Number = int(input())
    Total = Total + Number
print(Total)
```

(g)

```
Total ← 0
INPUT Values
FOR Count ← 1 TO Values
  INPUT Number
  Total ← Total + Number
NEXT Count
PRINT Total
```

For loops worded problems

DECLARE ANY VARIABLES, CONSTANTS OR ARRAYS USED BY YOUR ALGORITHM.

1. Write an algorithm, using pseudocode containing a `FOR` loop, to print "Hello" five times.

2. Write an algorithm, using pseudocode with a `FOR` loop, to print the numbers from 1 to 20.

3. Write an algorithm, using pseudocode containing a `FOR` loop, to:
   - ask the user to enter 50 numbers
   - work out the total of the numbers entered, and output the result
   - work out the average of the numbers entered, and output the result

4. The 1D array `Heights` contains the heights of 25 students in a class.
   - Write an algorithm, using pseudocode containing a `FOR` loop, to find and output the height of the tallest student in the class.

```
Write down your PSEUDOCODEs
Follow the Cambridge IGCSE 0478 Standards
```

For loops worded problems

DECLARE ANY VARIABLES, CONSTANTS OR ARRAYS USED BY YOUR ALGORITHM.

1. Write an algorithm, using pseudocode containing a FOR loop, to print "Hello" five times.

```
DECLARE Count : INTEGER
FOR Count ← 1 TO 5
    PRINT "Hello"
NEXT Count
```

2. Write an algorithm, using pseudocode with a FOR loop, to print the numbers from 1 to 20.

```
DECLARE Count : INTEGER
FOR Count ← 1 TO 20
    PRINT Count
NEXT Count
```

For loops worded problems

DECLARE ANY VARIABLES, CONSTANTS OR ARRAYS USED BY YOUR ALGORITHM.

3. Write an algorithm, using pseudocode containing a `FOR` loop, to:
   - ask the user to enter 50 numbers
   - work out the total of the numbers entered, and output the result
   - work out the average of the numbers entered, and output the result

4. The 1D array `Heights` contains the heights of 25 students in a class.
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For loops worded problems

DECLARE ANY VARIABLES, CONSTANTS OR ARRAYS USED BY YOUR ALGORITHM.

3. Write an algorithm, using pseudocode containing a `FOR` loop, to:
   - ask the user to enter 50 numbers
   - work out the total of the numbers entered, and output the result
   - work out the average of the numbers entered, and output the result

```
DECLARE Num : INTEGER
DECLARE Total : INTEGER
DECLARE Count : INTEGER
Total ← 0
FOR Count ← 1 TO 50
      INPUT Num
      Total ← Total + Num
NEXT Count
PRINT Total / 50
```

For loops worded problems

DECLARE ANY VARIABLES, CONSTANTS OR ARRAYS USED BY YOUR ALGORITHM.

4. The 1D array `Heights` contains the heights of 25 students in a class.
   - Write an algorithm, using pseudocode containing a `FOR` loop, to find and output the height of the tallest student in the class.

For loops worded problems

DECLARE ANY VARIABLES, CONSTANTS OR ARRAYS USED BY YOUR ALGORITHM.

4. The 1D array `Heights` contains the heights of 25 students in a class.
   - Write an algorithm, using pseudocode containing a `FOR` loop, to find and output the height of the tallest student in the class.

```
DECLARE Count : INTEGER
DECLARE Max : Real
Max ← 0
FOR Count ← 1 TO 25
  IF Heights[Count] > Max
    THEN Max ← Heights[Count]
  ENDIF
NEXT Count
PRINT Max
```

For loops worded problems

DECLARE ANY VARIABLES, CONSTANTS OR ARRAYS USED BY YOUR ALGORITHM.

3. Write an algorithm, using pseudocode containing a `FOR` loop, to:
   - ask the user to enter 50 numbers
   - work out the total of the numbers entered, and output the result
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For loops worded problems

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   - ask the user to enter 50 numbers
   - work out the total of the numbers entered, and output the result
   - work out the average of the numbers entered, and output the result

```
DECLARE Num : INTEGER
DECLARE Total : INTEGER
DECLARE Count : INTEGER
Total ← 0
FOR Count ← 1 TO 50
      INPUT Num
      Total ← Total + Num
NEXT Count
PRINT Total / 50
```

For loops worded problems

DECLARE ANY VARIABLES, CONSTANTS OR ARRAYS USED BY YOUR ALGORITHM.

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   - Write an algorithm, using pseudocode containing a `FOR` loop, to find and output the height of the tallest student in the class.

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   - Write an algorithm, using pseudocode containing a `FOR` loop, to find and output the height of the tallest student in the class.

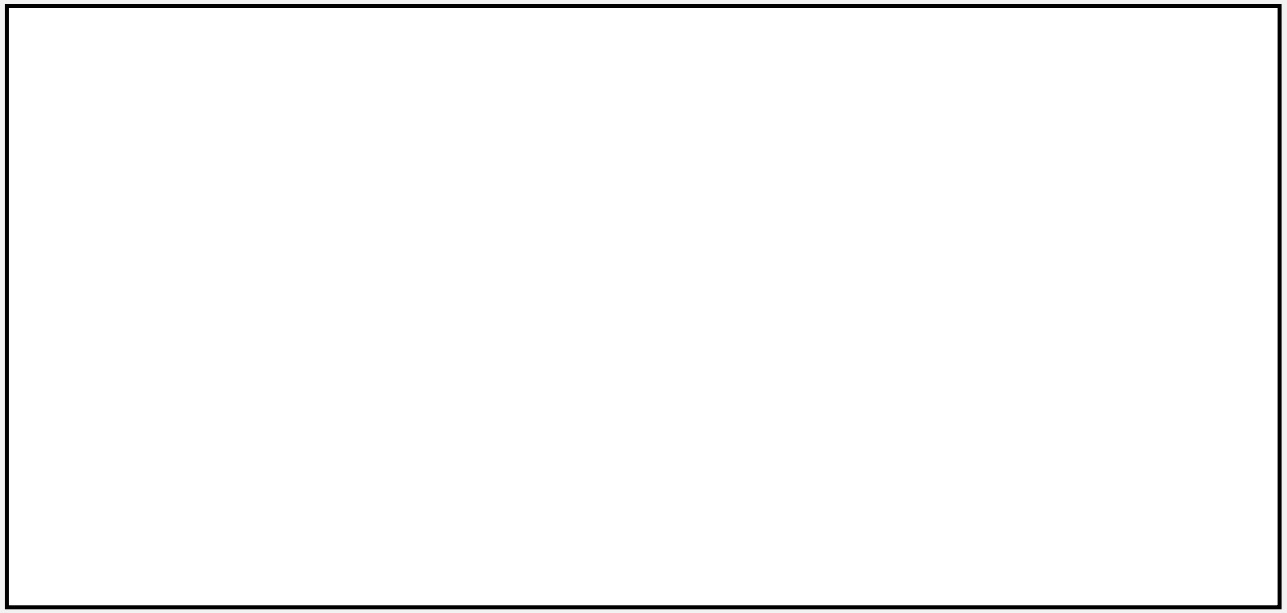
```
DECLARE Count : INTEGER
DECLARE Max : Real
Max ← 0
FOR Count ← 1 TO 25
  IF Heights[Count] > Max
    THEN Max ← Heights[Count]
  ENDIF
NEXT Count
PRINT Max
```

For loops worded problems

DECLARE ANY VARIABLES, CONSTANTS OR ARRAYS USED BY YOUR ALGORITHM.

4. Write an algorithm, using pseudocode with a FOR loop, to input 100 numbers into an array.

5. Write an algorithm, using pseudocode with a FOR loop, to output 30 names stored in an array.



For loops worded problems

DECLARE ANY VARIABLES, CONSTANTS OR ARRAYS USED BY YOUR ALGORITHM.

4. Write an algorithm, using pseudocode with a FOR loop, to input 100 numbers into an array.

5. Write an algorithm, using pseudocode with a FOR loop, to output 30 names stored in an array.

```
4. DECLARE A : ARRAY [1:100] OF REAL
   DECLARE Count : INTEGER
   FOR Count ← 1 TO 100
        INPUT A[Count]
   NEXT Count
```

For loops worded problems

DECLARE ANY VARIABLES, CONSTANTS OR ARRAYS USED BY YOUR ALGORITHM.

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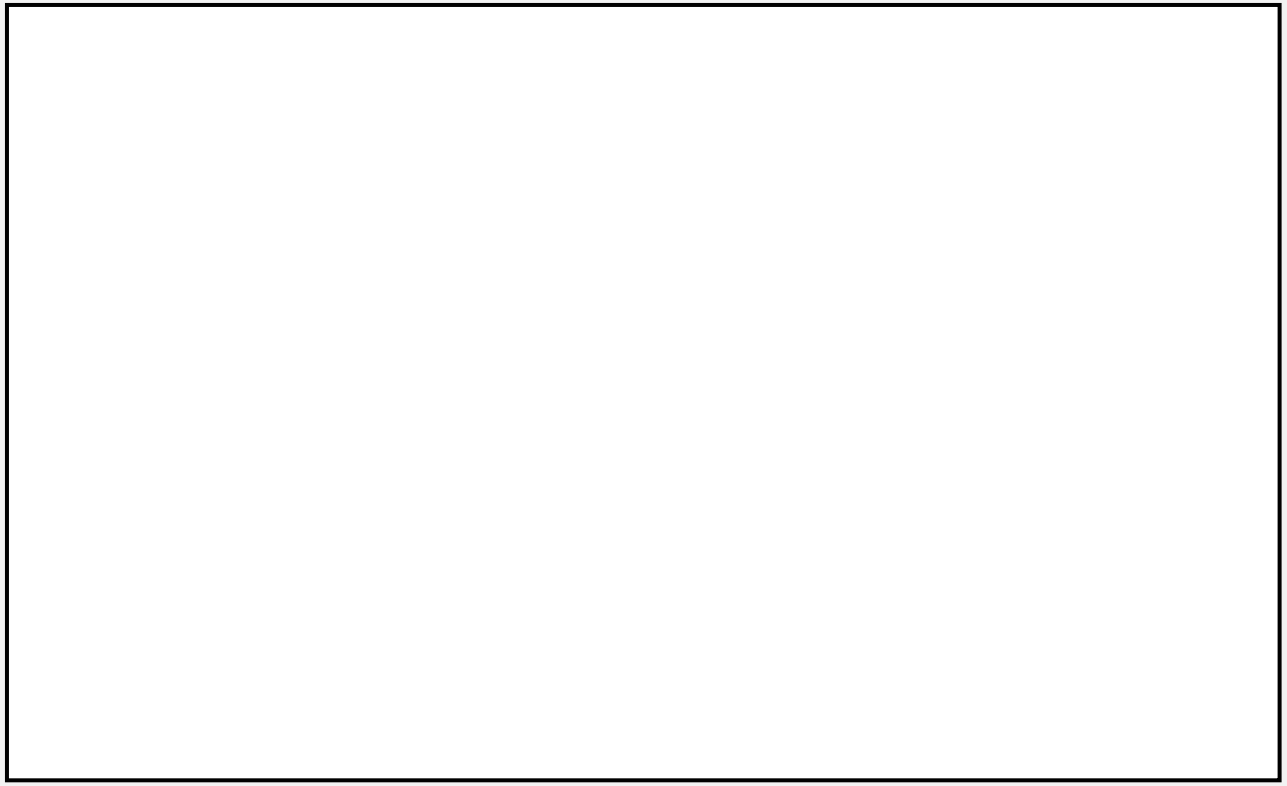

For loops worded problems

DECLARE ANY VARIABLES, CONSTANTS OR ARRAYS USED BY YOUR ALGORITHM.

4. Write an algorithm, using pseudocode with a FOR loop, to input 100 numbers into an array.

5. Write an algorithm, using pseudocode with a FOR loop, to output 30 names stored in an array.

```
4.  DECLARE A : ARRAY [1:100] OF REAL
    DECLARE Count : INTEGER
    FOR Count ← 1 TO 100
         INPUT A[Count]
    NEXT Count


5. DECLARE A : ARRAY [1:30] OF STRING
    DECLARE Count : INTEGER
    FOR Count ← 1 TO 30
         PRINT A[Count]
    NEXT Count
```

For loops worded problems

DECLARE ANY VARIABLES, CONSTANTS OR ARRAYS USED BY YOUR ALGORITHM.

6. Write an algorithm, using pseudocode containing a FOR loop, to:

ask the user to enter a whole number output all the positive integers up to and including their number

7. Write an algorithm, using pseudocode containing a FOR loop, to:

ask the user to enter a number output the first three multiples of the number (e.g.first three multiples of 4 are 4, 8, 12)

For loops worded problems

DECLARE ANY VARIABLES, CONSTANTS OR ARRAYS USED BY YOUR ALGORITHM.

6. Write an algorithm, using pseudocode containing a FOR loop, to:

ask the user to enter a whole number output all the positive integers up to and including their number

```
6.  DECLARE Num : INTEGER
    DECLARE Count : INTEGER
    INPUT Num
    FOR Count ← 1 TO Num
        PRINT Count
    NEXT Count
```

7. Write an algorithm, using pseudocode containing a FOR loop, to:

ask the user to enter a number output the first three multiples of the number (e.g.first three multiples of 4 are 4, 8, 12)

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ask the user to enter a number output the first three multiples of the number (e.g.first three multiples of 4 are 4, 8, 12)

7.
```
DECLARE Num : INTEGER
DECLARE Count: INTEGER
INPUT Num
FOR Count ← 1 TO 3
      PRINT Num * Count
NEXT Count
```

For loops worded problems

DECLARE ANY VARIABLES, CONSTANTS OR ARRAYS USED BY YOUR ALGORITHM.

6. Write an algorithm, using pseudocode containing a FOR loop, to:

ask the user to enter a whole number output all the positive integers up to and including their number

```
6.  DECLARE Num : INTEGER
    DECLARE Count : INTEGER
    INPUT Num
    FOR Count ← 1 TO Num
          PRINT Count
    NEXT Count
```

7. Write an algorithm, using pseudocode containing a FOR loop, to:

ask the user to enter a number output the first three multiples of the number (e.g.first three multiples of 4 are 4, 8, 12)

```
7.  DECLARE Num : INTEGER
    DECLARE Count: INTEGER
    INPUT Num
    FOR Count ← 1 TO 3
          PRINT Num * Count
    NEXT Count
```

For loops worded problems

DECLARE ANY VARIABLES, CONSTANTS OR ARRAYS USED BY YOUR ALGORITHM.

8. Write an algorithm, using pseudocode containing a FOR loop, to:

•ask the user to enter a whole number
•work out the first twelve multiples of the number, storing the results in an array

9. Write an algorithm, using pseudocode containing a FOR loop, to:

•ask the user to enter 50 numbers
•work out the total of the numbers entered, and output the result
•work out the average of the numbers entered, and output the result

For loops worded problems

DECLARE ANY VARIABLES, CONSTANTS OR ARRAYS USED BY YOUR ALGORITHM.

8. Write an algorithm, using pseudocode containing a FOR loop, to:

•ask the user to enter a whole number
•work out the first twelve multiples of the number, storing the results in an array

9. Write an algorithm, using pseudocode containing a FOR loop, to:

•ask the user to enter 50 numbers
•work out the total of the numbers entered, and output the result
•work out the average of the numbers entered, and output the result

8.
```
DECLARE A : ARRAY [1:12] OF INTEGER
DECLARE Num : INTEGER
DECLARE Count: INTEGER
INPUT Num
FOR Count ← 1 TO 12
     A[Count] ← Num * Count
NEXT Count
```

For loops worded problems

DECLARE ANY VARIABLES, CONSTANTS OR ARRAYS USED BY YOUR ALGORITHM.

8. Write an algorithm, using pseudocode containing a FOR loop, to:

•ask the user to enter a whole number
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•ask the user to enter 50 numbers
•work out the total of the numbers entered, and output the result
•work out the average of the numbers entered, and output the result

9.
```
DECLARE Num : INTEGER
DECLARE Total : INTEGER
DECLARE Count : INTEGER
Total ← 0
FOR Count ← 1 TO 50
      INPUT Num
      Total ← Total + Num
NEXT Count
PRINT Total / 50
```

For loops worded problems

DECLARE ANY VARIABLES, CONSTANTS OR ARRAYS USED BY YOUR ALGORITHM.

8. Write an algorithm, using pseudocode containing a FOR loop, to:

•ask the user to enter a whole number
•work out the first twelve multiples of the number, storing the results in an array

9. Write an algorithm, using pseudocode containing a FOR loop, to:

•ask the user to enter 50 numbers
•work out the total of the numbers entered, and output the result
•work out the average of the numbers entered, and output the result

8.
```
DECLARE A : ARRAY [1:12] OF INTEGER
DECLARE Num : INTEGER
DECLARE Count: INTEGER
INPUT Num
FOR Count ← 1 TO 12
     A[Count] ← Num * Count
NEXT Count
```

9.
```
DECLARE Num : INTEGER
DECLARE Total : INTEGER
DECLARE Count : INTEGER
Total ← 0
FOR Count ← 1 TO 50
     INPUT Num
     Total ← Total + Num
NEXT Count
PRINT Total / 50
```

For loops worded problems

DECLARE ANY VARIABLES, CONSTANTS OR ARRAYS USED BY YOUR ALGORITHM.

16. The 1D array Scores contains the results of 1000 students who entered a maths challenge. Any students with a score of 80 or more qualify to take part in the next round.

Write an algorithm, using pseudocode containing a FOR loop, to find and output the number of students who qualify for the next round.

For loops worded problems

DECLARE ANY VARIABLES, CONSTANTS OR ARRAYS USED BY YOUR ALGORITHM.

16. The 1D array Scores contains the results of 1000 students who entered a maths challenge. Any students with a score of 80 or more qualify to take part in the next round.

Write an algorithm, using pseudocode containing a FOR loop, to find and output the number of students who qualify for the next round.

16.
```
DECLARE Count : INTEGER
DECLARE Qualify : INTEGER
Qualify ← 0
FOR Count ← 1 TO 1000
  IF Scores[Count] >= 80 THEN
    Qualify ← Qualify + 1
  ENDIF
NEXT Count
PRINT Qualify
```

For loops worded problems

DECLARE ANY VARIABLES, CONSTANTS OR ARRAYS USED BY YOUR ALGORITHM.

17. A store manager is thinking about prices of the 250 items in her store.
Last year's prices are recorded in a 1D array called OldPrices.
To work out each item's new price, the manager needs to multiply its price from last year by the number 1.05
The variable ItemNo stores the number of items for sale in her store.
Write an algorithm, using pseudocode containing a FOR loop, to calculate the new price for each item, storing the prices in an array.

For loops worded problems

DECLARE ANY VARIABLES, CONSTANTS OR ARRAYS USED BY YOUR ALGORITHM.

17. A store manager is thinking about prices of the 250 items in her store.
Last year's prices are recorded in a 1D array called OldPrices.
To work out each item's new price, the manager needs to multiply its price from last year by the number 1.05
The variable ItemNo stores the number of items for sale in her store.
Write an algorithm, using pseudocode containing a FOR loop, to calculate the new price for each item, storing the prices in an array.

17.
```
DECLARE Count : INTEGER
CONSTANT Multiplier ← 1.05
CONSTANT ItemNo ← 250
DECLARE NewPrices : ARRAY [1:ItemNo] OF REAL
FOR Count ← 1 TO ItemNo
  NewPrices[Count] ← OldPrices[Count] * Multiplier
NEXT Count
```

For loops worded problems

DECLARE ANY VARIABLES, CONSTANTS OR ARRAYS USED BY YOUR ALGORITHM.

18. A TV researcher records the viewing figures each day for 3 channels over one week. The data he collected is shown below:

Channel 1	7.2	8.6	6.5	4.7	12.3	14.2	9.6
Channel 2	5.6	7.1	2.3	2.4	4.8	6.0	5.1
Channel 3	4.3	5.8	8.9	6.4	11.3	12.8	10.7

The viewing figures are stored in a 2D array called `TVData`.

Write an algorithm, using pseudocode containing `FOR` loops, to find and store the highest viewing figure for each channel.

For loops worded problems

DECLARE ANY VARIABLES, CONSTANTS OR ARRAYS USED BY YOUR ALGORITHM.

18. A TV researcher records the viewing figures each day for 3 channels over one week. The data he collected is shown below:

Channel 1	7.2	8.6	6.5	4.7	12.3	14.2	9.6
Channel 2	5.6	7.1	2.3	2.4	4.8	6.0	5.1
Channel 3	4.3	5.8	8.9	6.4	11.3	12.8	10.7

The viewing figures are stored in a 2D array called `TVData`.

Write an algorithm, using pseudocode containing `FOR` loops, to find and store the highest viewing figure for each channel.

18.
```
CONSTANT Channels ← 3
CONSTANT Days ← 7
DECLARE ChannelCount : INTEGER
DECLARE DayCount : INTEGER
DECLARE Highest : ARRAY [1:Channels] OF INTEGER
FOR ChannelCount ← 1 TO Channels
   Highest[ChannelCounter] ← 100
NEXT ChannelCount
FOR ChannelCount ← 1 TO Channels
 FOR DayCount ← 1 TO Days
  IF TVData[ChannelCount,DayCount] < Highest [ChannelCount]
   THEN Highest[ChannelCount] ← TVData[ChannelCount,DayCount]
  ENDIF
 NEXT DayCount
NEXT ChannelCount
```

For loops worded problems

DECLARE ANY VARIABLES, CONSTANTS OR ARRAYS USED BY YOUR ALGORITHM.

19. A manager records, for each day in February, the number of employees who are late. The data he collected is shown below:

Week 1	2	2	3	1	0
Week 2	1	2	2	0	4
Week 3	4	7	8	5	2
Week 4	1	0	2	1	1

The numbers of late employees are stored in a 2D array called `LateData`.
Write an algorithm, using pseudocode containing `FOR` loops, to calculate and store the total number of late employees for each week.

For loops worded problems

DECLARE ANY VARIABLES, CONSTANTS OR ARRAYS USED BY YOUR ALGORITHM.

19.
```
CONSTANT Weeks ← 4
CONSTANT DaysInWeek ← 5
DECLARE WkCount : INTEGER
DECLARE DayCount : INTEGER
DECLARE Totals : ARRAY [1:Weeks] OF INTEGER
FOR WkCount ← 1 TO Weeks
  Totals[WeekCount] ← 0
NEXT WkCount
FOR WkCount ← 1 TO Weeks
  FOR DayCount ← 1 TO DaysInWeek
    Totals[WkCount] ← Totals[WkCount] + LateData[WkCount,DayCount]
  NEXT DayCounter
NEXT WkCounter
```

For loops worded problems

DECLARE ANY VARIABLES, CONSTANTS OR ARRAYS USED BY YOUR ALGORITHM.

20. A clinic is interested in the blood sugars of its patients.

Each patient at the clinic has their blood sugar measured `10` times.

The 2D array `BloodData` contains all the blood sugar measurements, for each patient.

The variable `PatientNo` stores the number of patients at the clinic.

If blood sugar is below 3.9 *mmol/L*, this is classed as low.

Write an algorithm, using pseudocode containing `FOR` loops, to find, for each patient, how many times their blood sugar was low.

For loops worded problems

DECLARE ANY VARIABLES, CONSTANTS OR ARRAYS USED BY YOUR ALGORITHM.

20.
```
DECLARE PatientCount : INTEGER
DECLARE MeasurementCount : INTEGER
DECLARE Lows : ARRAY [1:PatientNo] OF INTEGER
CONSTANT Measurements ← 10
CONSTANT Low ← 3.9
FOR PatientCount ← 1 TO PatientNo
  Lows[PatientCount] ← 0
NEXT PatientCount
FOR PatientCount ← 1 TO PatientNo
  FOR MeasurementCount ← 1 TO Measurements
    IF BloodData[PatientCounter,MeasurementCount] < Low THEN
      Lows[PatientCount] ← Lows[PatientCount] + 1
    ENDIF
  NEXT MeasurementCount
NEXT PatientCount
```

For loops worded problems

DECLARE ANY VARIABLES, CONSTANTS OR ARRAYS USED BY YOUR ALGORITHM.

21. The coach of a go-karting team wants to assess each of the 5 drivers in the team. Each driver completes a timed lap of a karting circuit, and the time is recorded. This is repeated so that each driver performs 10 timed laps.

The 1D array `Names` contains the names of the drivers in the team.

The 2D array `Times` contains the time for each lap, for each driver.

The position of each driver's data in the two arrays is the same. For example, the driver in position 3 in `Names` and `Times` is the same.

Write an algorithm, using pseudocode containing `FOR` loops, that performs the following:

- calculates and stores the total time for the 10 laps for each driver.
- calculates and stores the average lap time for each driver.
- outputs for each driver:

  - name
  - total time for the 10 laps
  - average lap time

For loops worded problems

DECLARE ANY VARIABLES, CONSTANTS OR ARRAYS USED BY YOUR ALGORITHM.

21.
```
CONSTANT Drivers ← 5
CONSTANT Laps ← 10
DECLARE Driver: INTEGER
DECLARE Lap: INTEGER
DECLARE Totals : ARRAY [1:Drivers] OF REAL
DECLARE Averages: ARRAY [1:Drivers] OF REAL
FOR Driver ← 1 TO Drivers
  Totals[Driver] ← 0
NEXT Driver
FOR Driver ← 1 TO Drivers
   FOR Lap ← 1 TO Laps
      Totals[Driver] ← Totals[Driver] + Times[Driver,Lap]
   NEXT Lap
   Averages[Driver] ← Totals[Driver] / Laps
   OUTPUT "Name:", Names[Driver]
   OUTPUT "Total time:", Totals[Driver]
   OUTPUT "Average time:", Averages[Driver]
NEXT Driver
```

THANK YOU

CREDIT

Credit to text, illustrations, images, videos, recordings, etc. owners in this presentation.

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