Pseudocode

*“Code that resembles a programming language but that uses a less strict syntax to express an algorithm and is independent of any real programming language.”*

Below are some examples of how the given pseudocode can be implemented using Python.

# Examples

## Sequence

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| **Pseudocode** | **Python** |
| Input Name  Input Age  Print Name, " in dog years you are"  Output Age \* 7 | Name = input("Your name: ")  Age = int(input("Your age: "))  print(Name, "in dog years you are", Age \* 7) |

## Assignment

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| **Pseudocode** | **Python** |
| Age ← 17 | Age = 17 |
| City ← "Manchester" | City = "Manchester" |
| Names ← ["Bob", "Baz", "Ann"] | Names = ["Bob", "Baz", "Ann"] |

## Selection

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| **Pseudocode** | **Python** |
| IF BobMood = "happy" THEN  BobEmotion = ":)"  ENDIF | if BobMood == "happy":  BobEmotion = ":)" |
| IF Lives > 0 THEN  Print ‘Carry on!’  ELSE  Print ‘Game over.’  ENDIF | if Lives > 0:  print("Carry on!")  else:  print("Game over.") |
| IF Order < 50 THEN  Discount ← 5  ELSEIF Order < 100 THEN  Discount ← 10  ELSEIF Order < 200 THEN  Discount ← 15  ELSE  Discount ← 20  ENDIF | if Order < 50:  Discount = 5  elif Order < 100:  Discount = 10  elif Order < 200:  Discount = 15  else:  Discount = 20 |

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| **Pseudocode** | **Python** |
| FOR Num ← 1 To 10 DO  Print Num  ENDFOR | for Num in range(1, 11):  print(Num) |
| Count ← 10  WHILE Count <> 5 DO  Count ← Count - 1  ENDWHILE | Count = 10  while Count != 5:  Count = Count - 1 |
| FOR EACH x IN [2, 4, 6, 8] DO  Print x  ENDFOR | for x in range(2, 9, 2):  print(x) |

## Repetition

**Tip**: to check what values a range produces.

In your console type

>>> list(range(2, 9, 2))

x takes on each value in turn as the loop repeats.

# Exercises (assignment and sequence)

Have a go at writing the Python equivalents for the provided pseudocode.

Write your answers in Python column next to the pseudocode. Make sure that the syntax is correct. If unsure test by writing out the code actually in Python and testing it.

Fill this document in electronically please.

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|  | Pseudocode | Python |
| 1 | Discount ← 20 | Discount = 20 |
| 2 | Nickname ← "Jolly Green Giant" | Nickname = "Jolly Green Giant" |
| 3 | Input Name | Name = input(“”) |
| 4 | Ptr ← Ptr + 1 | Ptr = Ptr + 1 |
| 5 | Num ← 17  Remainder ← Num MOD 7 | Num = 17  Remainder = Num%7  # MOD returns the remainder value from a division. Here Remainder=17 MOD 7. So Remainder=3 as 17/7 gives 2 remainder 3 |
| 6 | Numbers ← [20, 13, 16, 34] | Numbers = [20, 13, 16, 34] |
| 7 | Print Numbers[3] | Print(Numbers[3]) |
| 8 | Index ← 1  Print Numbers[Index + 1] | Index = 1  Print (Numbers, index + 1) |
| 9 | Input Number1  Input Number2  Sum ← Number1 + Number2  Average ← Sum / 2  Output Sum, Average | Number1 = int(input(“”))  Number2 = int(input(“”))  Sum = (Number1 + Number2)  Average = (Sum / 2)  Print (sum, Average) |

# Exercises (selection)

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|  | Pseudocode | Python |
| 1 | IF Name = "Santa" THEN  Print Hohohohoho  ENDIF | if Name == “Santa”:  Print (“Hohohohoho”) |
| 2 | IF Num > 14 AND Num < 67 THEN  Print Accepted  ENDIF | If Num > 14 or num < 67  Print (“Accepted”) |
| 3 | IF Number MOD 2 = 0 THEN  Print Even  ELSE  Print Odd  ENDIF | If number%2 = 0  Print(“even”)  Else:  Print(“Odd”) |
| 4 | IF Date = 24 THEN  Print "It’s Christmas Eve"  ELSEIF Date = 25 THEN  Print "It’s Christmas Day"  ELSEIF Date = 26 THEN  Print "It’s Boxing Day"  ELSE  Print "Not quite Christmas"  ENDIF | If Date == ‘24’:  Print ("It’s Christmas Eve")  Elif Date == ‘25’:  Print ("It’s Christmas Day")  Elif Date == ‘26’:  Print ("It’s Boxing Day")  Else:  Print ("Not quite Christmas") |

# Exercises (repetition)

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|  | Pseudocode | Python |
| 1 | x ← 1  WHILE x < 6 DO  x ← x + 1  ENDWHILE | X = (“1”)  While x < 6  X = (x + 1) |
| 2 | Input Guess  WHILE Guess <> "secret" DO  Output "Invalid code"  Input Guess  ENDWHILE | Guess = input(“”)  While Guess <> (“Secret”)  print (“invalid cod”)  Guess = input(“”) |
| 3 | Table ← 4  FOR Count1 ← 1 TO 10 DO  Print Table \* Count1  ENDFOR | Table = ‘4’:  For Count1 == [1,10]  Print (Table\* count1) |
| 4 | FOR EACH i IN [20,16,12,8,4] DO  Print i  ENDFOR | For ‘i’ in [20,16,12,8,4]  Print i |
| 5 | Lets ← ["a", "e", "i", "o", "u"]  HowMany ← 5  FOR Count1 ← 1 TO HowMany DO  Print Lets[Count1]  ENDFOR | Lets = ["a", "e", "i", "o", "u"]  HowMany = 5  For count1 = 1(“HomManey”)  Print(Lets[count1]) |
| 6 | MyNums ← [18,58,12,25,36]  Max ← 5  Sum ← 0  FOR Count1 ← 1 TO Max DO  Sum ← Sum + MyNums[Count1]  ENDFOR  Print Sum | myNums = [18,58,12,25,36]  max = 5  sum = 0  for count1 = ([1,max])  sum = (sum + MyNumbs[count1])  print(Sum) |

# Exercises (programs)

Previous sections have not been complete programs. The following are all complete programs.

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|  | Pseudocode | Python |
| 1 | Input b, c  a ← Sqrt(b\*b + c\*c)  Output a  The math module and sqrt function might be of use here.  <http://docs.python.org/3.2/library/math.html#math.sqrt>  # import math  # math.sqrt(Number) | Import math.sq  b,c = (input(“”),input(“”))  a = Sqrt(b\*b + c\*c)  print(a) |
| 2 | Input Number  y ← 3  Result ← 1  WHILE y <> 0 DO  Result ← Result \* Number  y ← y – 1  ENDWHILE  Print Number | Number = input(“”)  Y = 3  Result = 1  While y == ‘0’  Result =(result\*result)  Y =(y-1)  Print(Number) |
| 3 | Count ← 1  Old ← 1  New ← 1  Input Limit  Print Old  WHILE New <= Limit DO  Count ← Count + 1  Print New  Temp ← Old  Old ← New  New ← Old + Temp  ENDWHILE  Print CONCAT(Count, "terms up to", Limit) | Count = 1  Old = 1  New = 1  Limit = input()  Print Old  While New <= Limit  Count = Count + 1  Print(New)  Temp = (Old)  Old = (New)  New = (Old+Temp)  Print CONCAT(Count, “terms up to”) |
| 4 | Items ← [35, 47, 10, 89, 31, 3]  Input SearchTerm  Found ← FALSE  Max ← 6  Count ← 0  WHILE Found = FALSE AND Count < Max DO  IF Items[Count] = SearchTerm THEN  Found ← TRUE  ELSE  Count ← Count + 1  ENDIF  ENDWHILE | Item = [35, 47, 10, 89, 31, 3]  SearchTerm = input()  Found = FALSE  Max = 6  Count = 0  While Found = FALSE, Count < Max  If Item[count] = searchTerm  Found = TRUE  ELSE:  Count = Count + 1 |
| 5 | Scores ← [12, 23, 20, 21, 58, 45, 61, 83]  Max ← 8  FOR Count1 ← 1 TO Max DO  Swapped ← FALSE  FOR Count2 ← 1 TO Max DO  IF Scores[Count2] > Scores[Count2 + 1] THEN  Temp ← Scores[Count2]  Scores[Count2] ← Scores[Count2 + 1]  Scores[Count2 + 1] ← Temp  Swapped ← TRUE  ENDIF  ENDFOR  IF Swapped = FALSE THEN  EXITLOOP  ENDIF  ENDFOR | Scores = [12, 23, 20,  21, 58, 45, 61, 83]  Max = 8  For Count1 = 1 to max do  Swapped = FALSE  FOR count2 = 1 to max do  IF Scores[Count2] > Scores[Count2 + 1]  Temp = scores[count2]  Scores[Count2] = Scores[Count2 + 1]  Scores[Count2 + 1] = Temp  Swapped = TRUE  If swapped = FALSE |