Worksheet 1: Pseudo Code Translation

The goal of this worksheet is to practice converting Pseudo Code into Java.

Each Pseudo code program will come with sample input and sample output. When you have written the program, you should test it by checking that the sample input produces the correct output.

Remember that because none of these algorithms are associated with a larger concept (i.e. a data structure), they should be implemented as static methods.

NOTE: Each program should be written in a seperate class and the program() algorithm should be implemented as the main() method. The class name for each program should take the form W1Qx.java where x is the question number.

You are required to submit 4 questions from the worksheet. The remainder are for practice. The mandatory questions are: Q2, Q5, Q8, Q9.

Before starting the questions I have provided some example pseudo code translations to help you to understand what you are supposed to be doing. Also, it is important to point out the following mappings between assumed pseudo code functions and Java:

print()	System.out.print()
println()	System.out.println()
read()	an appropriate method from the java.util.Scanner class (see example 2 below)

Example 1

Pseudo Code:

Algorithm program()
Input: none
Output: none
print("hello world")

Java Code:

```
public class W1E1 {
	public static void main(String[] args) {
		System.out.println("hello world");
	}
}
```

Expected Input: none

Expected Output:

```
hello world
```

Example 2

Pseudo Code;

Algorithm program()
Input: none
Output: none
print(“enter number: ”)
num ← read()
print(“you entered “ + num)

Java Code:

```
import java.util.Scanner;

public class W1E2 {

	public static void main(String[] args) {
		// User scanner class to read user input
		Scanner input = new Scanner(System.in);;

		System.out.print("enter number: ");
		int num = input.nextInt();
		System.out.print("you entered " + num);

		// Shutdown the scanner (being a good boy)
		input.close();
	}

}
```

Expected Input: 5

Expected Output:

```
enter number: 5
you entered 5
```

Question 1

Pseudo Code;

Algorithm program()
Input: none
Output: none
x ← 5
y ← 7
s ← x + y
println(x + " plus " + y + " is " + s)

Expected Input:none

Expected Output:

```
5 plus 7 is 12
```

Question 2

Pseudo Code;

Algorithm program()
Input: none
Output: none
print("enter a number: ")
num ← read()
print("you entered: ")
if (num < 10000) print("0")
if (num < 1000) print("0")
if (num < 100) print("0")
if (num < 10) print("0")
println(num)

Expected Input:45

Expected Output:

```
enter a number: 45
00045
```

Question 3

Pseudo Code;

Algorithm program()
    Input: none
    Output: none
    print(“enter a number: “)
    x← read()
    print(“enter a number: “)
    y← read()
    print(“result: “)
    if x > y **then** println(y + “,” + x)
    else if x < y **then** println(x + “,” + y)
    else println(x + “,” + y)

Expected Input:5 and 3

Expected Output:

```
enter a number: 5
enter a number: 3
result: 3,5
```

Question 4

Pseudo Code;

Algorithm program()
    Input: none
    Output: none
    i ← 0
    s ← 0
    while i < 100 do
        if i % 10 == 0 then s ← s + i
        i ← i + 1
    println(“result: “ + s)

Expected Input:none

Expected Output:

```
result: 450
```

Question 5

Pseudo Code;

Algorithm program()
Input: none
Output: none
i ← 20
while i >= 0 do
if i < 20 then print(“,”)
print(i)
i ← i - 2

Expected Input:none

Expected Output:

```
20,18,16,14,12,10,8,6,4,2,0
```

Question 6

Pseudo Code;

Algorithm program()
Input: none
Output: none
Let A be an array containing the string “HAPPY”
l ← 0
r ← 4
while l < r do
t ← A[l]
A[l] ← A[r]
A[r] ← t
l ← l + 1
r ← r – 1
for each value, j, in the range 0 to 4 do
print(A[j])

Expected Input:none

Expected Output:

YPPAH

Question 7

Pseudo Code;

Algorithm program()
Input: none
Output: none
num ← 0
A ← 0
j ← 0
while num <> -1 do
num ← read()
if num <> -1 then
A ← A + num
j ← j + 1
println(j + " numbers entered with result: " + (A / j))

Expected Input: 17, 3, 9, 21, 4, 8, 12, -1, 5

Expected Output:

```
17 3 9 21 4 8 12 -1 5
7 numbers entered with result: 10
```

Question 8

Pseudo Code;

Algorithm program()
Input: none
Output: none
Let A be an array containing { 5, 7, 3, 12, 6, 11, 1, 19, 9, 4 }
j ← 1
t ← A[0]
while j < 10 do
A[j-1] ← A[j]
j ← j + 1
A[j-1] ← t
for each value, j, in the range 0 to 9 do
print(A[j] + " ")

Expected Input:none

Expected Output:

```
7 3 12 6 11 1 19 9 4 5
```

Question 9

Pseudo Code;

```
Algorithm fn(num, digits)
        Input: num and digits
        Output: output
        output ← “”
        mult = 1
        for each value, j, in the range 1 to digits do
                if num < mult then output ← output + “0”
                mult = mult * 10
        output ← output + num
        return output

Algorithm program()
        Input: None
        Output: None
        println(fn(75, 6))
```

Expected Input: none

Expected Output:

```
000075
```

Question 10

Pseudo Code;

```
Algorithm program()
        Input: none
        Output: none
        Let A be an array containing { 5, 7, 3, 12, 6, 11, 1, 19, 9, 4 }
        j ← 0
        while j < 10 do
                m ← j
                for each value, k, in the range j+1 to 9 do
                        if A[m] > A[k] then m ← k
                if m <> j then
                        t ← A[j]
                        A[j] ← A[m]
                        A[m] ← t
                j ← j + 1
        for each value, j, in the range 0 to 9 do
                print(A[j] + “ “)
```

Expected Input:none

Expected Output:

1 3 4 5 6 7 9 11 12 19