

Java Programming AP Edition

U1R1 Review on Unit 1

PSEUDO CODE

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What is pseudo code?

Simple definition:

Use **English** or **English-like** language to describe a program for a computation.

Formal Definition:

Pseudocode is an **artificial** and **informal** language that helps programmers develop algorithms. **Pseudocode** is a "text-based" detail (algorithmic) design tool.

The rules of Pseudocode are reasonably straightforward. All statements showing "dependency" are to be indented. These include while, do, for, if, switch.



Pseudo Code Standard

http://www.engr.sjsu.edu/bjfurman/courses/ME30/ME30pdf/Notes_on_Algorithms.pdf

It does not need a standard because it is free style.

But if you need some reference, this one can be a good reference source.



Method for Developing an Algorithm

1. **Define the problem:** State the problem you are trying to solve in clear and concise terms.
2. **List the inputs (information needed to solve the problem) and the outputs** (what the algorithm will produce as a result)
3. **Describe the steps** needed to convert or manipulate the inputs to produce the outputs. Start at a high level first, and keep refining the steps until they are effectively computable operations.
4. **Test the algorithm:** choose data sets and verify that your algorithm works!



Pseudocode (or Program Design Language)

- ❑ Consists of natural language-like statements that precisely describe the steps of an algorithm or program
- ❑ **Statements** describe actions
- ❑ Focuses on the logic of the **algorithm** or program
- ❑ **Avoids** language-specific elements
- ❑ Written at a level so that the desired programming code can be generated almost automatically from each statement.
- ❑ Steps are numbered. Subordinate numbers and/or indentation are used for dependent statements in selection and repetition structures.



Pseudocode Language Constructs

- ❑ Computation/Assignment
 - ❑ **Compute** var1 as the sum of x and y
 - ❑ **Assign** expression to var2
 - ❑ **Increment** counter1

- ❑ Input/Output
 - ❑ Input: **Get** var1, var2, ...
 - ❑ Output: **Display** var1, var2, ...



Pseudocode Language Constructs

□ Selection

Single-Selection IF

1. **IF** condition **THEN** (IF condition is true, then do subordinate statement 1, etc. If condition is false, then skip statements)

1.1 statement 1

1.2 etc.



Pseudocode Language Constructs

Double-Selection IF

2. **IF** *condition* **THEN** (IF condition is true, then do subordinate statement 1, etc. If condition is false, then skip statements and execute statements under ELSE)
 - 2.1 statement 1
 - 2.2 etc.
3. **ELSE** (else if condition is not true, then do subordinate statement 2, etc.)
 - 3.1 statement 2
 - 3.2 statement 3
4. **SWITCH** expression **TO**
 - 4.1 case 1: action1
 - 4.2 case 2: action2
 - 4.3 etc.
 - 4.4 default: actionx



Pseudocode Language Constructs

□ Repetition

5. **WHILE** condition (while condition is true, then do subordinate statements)

5.1 statement 1

5.2 etc.

DO – WHILE structure (like WHILE, but tests condition at the end of the loop. Thus, statements in the structure will always be executed at least once.)

6. **DO**

6.1 statement 1

6.2 etc.

7. **WHILE** condition



Pseudocode Language Constructs

FOR structure (a specialized version of WHILE for repeating execution of statements a specific number of times)

8. **FOR** bounds on repetition

8.1 statement 1

8.2 etc.



Pseudo Code Example 1: Plain English

To find maximum from a group of data:

set the maximum to one of the element.

each time compare the maximum to one of the rest of elements in the group.

 If the element picked is larger than our maximum

 Then, set the element to be the new maximum

 look at the next element to repeat the comparison

After all of the elements have been compared, then the maximum is found.



Pseudocode Example 2:

(in your own language. This is only an example.)

FIND MAX (ARRAY X):	; program start
SET MAXIMUM to the first element of X.	; set initial condition
WHILE $i < X$'s length THEN	; iterate through X array
BEGIN	
IF $X[i] > \text{MAXIMUM}$ THEN	; update maximum if
ASSIGN $X[i]$ to MAXIMUM	; a greater element found
INCREMENT i	; find next element
END	
RETURN MAXIMUM	; return maximum



Personal Experience

- I personally just use C/C++ or Java-like language as pseudo language to describe a program if it is not coded yet.
- Java is a good candidate for pseudo language as well.



Homework (Honor code)

Write a pseudo code to perform a task of

How to prepare breakfast with:

English Muffins

Bacon

A Fried Egg

Orange Juice

Fruit Cup