Basic programming review

Christian Rodríguez Bustos

Object Oriented Programming

Basic programming review



Basic

concepts

Agenda

Control

Structures Operators Arrays



Basic programming review

Basic concepts

Algorithm

Flow diagram

Speudo code

Basic programming review



An algorithm is a step-by-step procedure

Any computing problem can be solved by executing a series of actions in a specific order.



Finite Deterministic Precision



Basic programming review

An algorithm is a step-by-step procedure

Problem that we want to solve

Going to work

1. Get out

of bed

2. Take off

pajamas

3. Take a

shower

4. Get

dressed

5. Eat

breakfast

6. Take the

bus

7. Arrive

workplace





Basic programming review

Algorithms can be represented in several ways Pseudo Code

Algorithm

representation

Basic programming review

Flow

diagram/chart

UML activity

diagram



Pseudo codes are informal descriptions of algorithms

Informal descriptions or languages help programmers to develop algorithms without having to worry about the strict details of a programming language syntax.

All pseudo codes should be:

• Human readable

***Set*** *grade counter to one*

***While*** *grade counter is less than or equal to ten*

***Input*** *the next grade*

***Add*** *the grade into the total*

***Set*** *the class average to the total divided by ten*

***Print*** *the class average.*

I am a pseudo code

• Can easily be converted to any programming language



Basic programming review

Flow diagrams are used to represent algorithms

Document

Process, task, action,

or operation

Tape

Input or

output

We are used to represent

processes flows

Page

Begin or End

Subroutine

or function

Decision

connector

Connector

Data

Storage

Resource: What do the different flowchart shapes mean? 

Basic programming review

These Flow diagram and Pseudo code are equivalent Basic programming review

Activity diagrams describe the workflow of a system

Activities

Decisions

Start (split) or end (join) of concurrent

activities

The start (initial state) of the workflow

The end (final state).



Basic programming review

Activity diagrams describe the workflow of a system 

I am a UML activity diagram



Basic programming review

Control Structures

Sequence Structure

Selection Statements

Repetition Statements



Control Structures

Programs are formed by combining as many sequence, selection and repetition statements.

selection repetition

if while

if…else do…while

switch for



Basic programming review

Sequence structure

An ordered execution of two or more

statements are called sequence structure Basic programming review



IF Selection Statement

If student’s grade is greater than or equal to 60

Print “Passed”



Basic programming review

IF..ELSE Selection Statement

If student’s grade is greater than or equal to 60

Print “Passed”

Else

Print “Failed” Basic programming review

IF..ELSE Selection Statement abbreviated form 





Basic programming review

Nested IF..ELSE Selection Statement

If student’s grade is greater than or equal to 90

Print “A”

else

If student’s grade is greater than or equal to 80

Print “B”

else

If student’s grade is greater than or equal to 70

Print “C” 

else

If student’s grade is greater than or equal to 60

Print “D”

else

Print “F”



Basic programming review

Indent both body

statements of an

if…else statement.



Do not forget… 1 



Always using braces in an if…else (or other) statement helps prevent their accidental omission

Basic programming review



I like my code !!

Do not be the beast

Ugly code is written by ugly people. Basic programming review



Do not worry, we can format the code automatically Eclipse NetBeans

Basic programming review

WHILE Repetition Statement

While product is less or equal than 100 products

Multiply by 3 the number of products 

Be careful with infinite loops!!

Basic programming review

FOR Repetition Statement

?????

Basic programming review



FOR Repetition Statement

Basic programming review

FOR Repetition Statement

Basic programming review

FOR Statements header examples

Vary the control variable from 1 to 100 in increments of 1 

Vary the control variable from 100 to 1 in decrements of 1 Vary the control variable from 7 to 77 in increments of 7 Vary the control variable from 20 to 2 in decrements of 2 

Vary the control variable over the following sequence of 

values: ?, ?, ?, ?, ?, ?, ?

Vary the control variable over the following sequence of 

values: ?, ?, ?, ?, ?,?, ?, ?, ?, ?

Basic programming review



FOR Statements header examples

Vary the control variable from 1 to 100 in increments of 1 

Vary the control variable from 100 to 1 in decrements of 1 Vary the control variable from 7 to 77 in increments of 7 Vary the control variable from 20 to 2 in decrements of 2 

Vary the control variable over the following sequence of 

values: 2, 5, 8, 11, 14, 17, 20

Vary the control variable over the following sequence of 

values: 99, 88, 77, 66, 55,44, 33, 22, 11, 0

Basic programming review



FOR Statement example





Basic programming review

DO…WHILE Repetition Statement



Remember always include braces !!!



Basic programming review

SWITCH Multiple-Selection Statement

Basic programming review

SWITCH Multiple-Selection Statement Basic programming review

BREAK and CONTINUE Statements

Break Continue

Basic programming review



Basic programming review

Summary



Basic programming review

Operators

Logical Operators

Assignment Operators

Increment and Decrement Operators



Logical Operators

Conditional AND (&&) Conditional OR (||) Logical Negation (!) 

Basic programming review



Logical Operators - Truth tables

Basic programming review



Assignment Operators

variable = variable operator expression; 



Basic programming review

Compound Assignment Operators Basic programming review



Increment and Decrement Operators





Basic programming review

Prefix and Postfix Example





Basic programming review

Java Primitive Types

Basic programming review

Arrays



Arrays are containers

Container object that holds a fixed number of values of a single type







or



Basic programming review

Arrays use example 1

Basic programming review

Arrays use example 2

? ? ? ? ? ?



Basic programming review

Arrays use example 2

Basic programming review

Arrays use example 3

? ? ? ? ? ?



Basic programming review

Arrays use example 3



Basic programming review



Working with multidimensional arrays 

Basic programming review



Basic programming review

Multidimensional array use example

Method 1

(function)

Method 2

(function)



Multidimensional array use example 

Basic programming review



Class Exercise

1. Do the Eclipse HelloWord!! or NetBeans HelloWord!! 2. Modify the “Multidimensional array use example ”code in order to:

– print the main diagonal of the next two multidimensional arrays

| a | b | c | d |
| --- | --- | --- | --- |
| e | f | g | h |
| i | j | k | l |
| m | n | o | p |

| 1 | 2 | 3 |
| --- | --- | --- |
| 4 | 5 | 6 |
| 7 | 8 | 9 |

Numbers array

Letters array

Basic programming review

References

• [Deitel] H.M. Deitel and P.J. Deitel, Java How to Program: Early Objects Version, Prentice Hall, 2009.

• Oracle – Java Lesson: Language Basics

– http://download.oracle.com/javase/tutorial/java/nutsandbolt s/index.html



Basic programming review