University of Human Development
College of Science and Technology
Department of IT
Course book of Principle
Programming
2015-2016

Contents:

Course coordinator

Course name: Principle of Programming
Tutor's name: Assist. Lecturer : Tara Qadr Kaka Muhamad
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Course overview

This course. Principle of Programming, covers the fundamentals of Programming in general, and uses Java programming language as a case study. The aim of this course is to teach students the benefit of programming and how to program using Java , Java has been chosen by the scientific committee because, has proven to be a pleasant, expressive, and versatile language for wide variety of programs. This course is intended for students with no prior academic background in a field of computer science or programming, who wish to embark on a course of study that will prepare them for employment as professional software developers. Students who interact on a business basis with software development professionals and need to improve communications through better understanding of the concepts and terminology used by professional programmers will also benefit equally. A computer program is a sequence of logical sentences written in a specific programming language to tell the machine to perform a specific task. The aim of writing computer program is to automation what we have to do periodically. This process, also, named creating software. This year, students teach theoretically how to write a program, and practically write some programs based on theory lectures. To prepare students for a complete path in computer programming for next years.

Course objective

The aims of this course it to teach students Principle of Programming with Java. At the end of this
course, students have to:
1. Understand programming concepts and techniques
2. Be familiar with Java as one programming languages
3. Utilize predefined classes to design and construct new classes
4. Understand the formal rules governing JAVA program and be able to construct and
develop elegant and efficient coded programs in JAVA.
5. Learn the structure of a JAVA program
6. Describe the main features of the JAVA language
7. Develop the ability to logically plan and develop Java programs
8. Work with all aspects of controlling a program
9. Learn ways to present their mini programming projects

Course reading list

Books:

1. Y. Daniel Liang INTRODUCTION TO JAVA PROGRAMMING COMPREHENSIVE VERSION 10th Edition
2. paul Deitel , "JAVA HOW TO PROGRAM ", 9thed.

Syllabus

Title of the subject	weeks	Tutor's name
Chapter 1: Introduction to Computer, Programing , and java	1	Tara Qadr
Chapter 2: Elementary Programing	3	Tara Qadr
Chapter 3: Decision making	3	Tara Qadr
Chapter 4 Control Structures	3	Tara Qadr
Chapter 5: Single Dimension Array	2	Tara Qadr

Chapter 6: Multi Dimension Array	2	Tara Qadr
Chapter 7: Methods and Files	3	Tara Qadr

Chapter one: Introduction to Computer, Programing , and java

Objectives:
At the end of the lesson, the student should be able to:

- To understand computer basics
- To review computer basics.
- To review programs, and operating systems.
- Overview history of Java
- To know Java's advantages.
- To distinguish the terms API, IDE, and JDK.

Chapter two: Elementary Programing

Objectives:
At the end of the lesson, the students will be able to:
• Write simple Java program
• Understand what is data type, and differentiate between primitive and reference data types
• Use arithmetic operations
• Understand the logic of precedence of operations
• Use and write comments
• Be familiar with the String class
• Describe the different phases of a Java program
• Differentiate among Java literals, primitive data types, variable types identifiers and operators

The Scientific contents:
Start programming with Java
Variables
Data types
Operations
Type casting

Precedence of operations
Comments
String data type
Literals

Chapter three: Decision making :

Objectives:
At the end of the lesson, the student should be able to:
• Learn reading data using input streams
• Read data using Scanner
• Create an interactive Java program that gets input from the keyboard
• Develop a simple valid Java program using the concepts learned in this lesson

The Scientific contents:

- Input Streams
- Class Scanner
- Output Streams
- System.out package
- If statement
- Switch case

Chapter four: Control Structures

Objectives:
At the end of the lesson, the student should be able to:

- To write programs for executing statements repeatedly using a while loop .
- To follow the loop design strategy to develop loops .
- To control a loop with a sentinel value.
- To write loops using do-while statements
- To write loops using for statements
- To discover the similarities and differences of three types of loop statements
- To write nested loops .
- To implement program control with break and continue .

Chapter Five: Java single Dimension Arrays

Objectives:
At the end of the lesson, the student should be able to:
• Manipulate a collection of data values, using an array
• Declare and use an array in writing a program
• Study some applications of array (searching in array, sorting, selecting an element,...)

Chapter Six: java multi dimension Array

Objectives:
At the end of the lesson, the student should be able to:
• Declare and use an 2 D array in writing a program.

Chapter seven: Methods and Files

Objectives:
At the end of the lesson, the student should be able to:

• Create user specific method
• Understand the structure of a method
• Describe main parts of a method Header (access modifier, method type (instance, class), return type, name, parameter) Block method
• Write to file and read them back from, using FileInputStream and FileOutputStream.
• Write text data to a file and read them back from the file, using PrintWriter and BufferedReader
• Read a text file using Scanner

Sample of expect questions and their answers

Questionl: (1 point for each branch)
Select the correct answers (multiple choices)
1.
A. public static int main(char args(l)
B. public static void main(String args[])
C. public static void MAIN(String args|l)
D. public static void main(String args)
E. public static void main(char argsll)
2.
A. Defining variable is declaration without initialization
B. Defining variable is declaration with initialization
C. Declaring variable is definition with initialization
D. Declaring variable is definition without initialization
3.
A. char is a primitive data type.

B. char is a reference data type.
C. int is a reference data type.
D. Array is a primitive data type

4.
A. Method header enclosed in braces {}
B. Method header composed of only return type and method name
C. Method body must always has return type
D. Method body enclosed in braces {}
5.
A. Index of a String begin with 1
B. Index of Array begin with 1
C. Index of String begin with 0
D. Beginning index of a String depends on its value

6.
A. Casting is possible only from lower data type to higher data type
B. Casting is possible only from higher data type to lower data type
C. Casting is possible from lower data type to higher data type with loss of precision
D. Casting from higher data type to lower data type is possible with loss of precision

Answers
1- B
2- B
3- A
4- D
5- C
6- D|

Question2: (2 points for each branch)

1- What is the output of this program?

```
public class NestedLoops {
public static void main(String args[]) {
for(int i = 0; i < 3; i++) {
for(intj = 3;j>= 0; j-) {
if(i == j) break;
```

```
System.out.println("i=" + i + " j="+j);
}
}       }
```

i

Answer

i=0j=3
i=0j=2
i=Oj=l
i=lj=3
i=lj=2
i=2j=3

2. Write the output of this program

```
public class TestingBooleans {
public static void main(String args[]) {
int x = 3;
inty = 2;
double z = 3*x+y/4;
boolean test = (z%2==0)?true:false;
System.out.println("The value of test is " + test);
String country = "Kurdistan Region of Iraq";
System.out. println(country.contains!11 Reg" )?true:false);
)
```

i

Answer

The value of test is true
true

Question3: (5 points for each branch)

1. Write a program to input a String, create two substrings from this String and then re-create
the original String from the two new Strings.

Answer

```
import Java.util.*;
public class StringTreatments {
public static void main(String[] args){
Scanner myScanner = new Scanner(System.in);
System.out.println("Please enter your text:");
String input = myScanner.nextLine();
int numberOfCharacters = input.Iength();
String firstHalf =     input.substring)©,     numberOfCharacters/2);String
secondHalf =
input.substring(numberOfCharacters/2,input. length)));

String concatenate = firstHalf + secondHalf;
System.out.println(concatenate);
}
```

2- Write a program to solve the second degree equation (ax2 + bx + c = 0). Use Scanner to
data values.

Answer

```
import Java.util.*;
public class Chapter2 {
public static void main(String[] args){
Scanner xReader = new Scanner(System.in);
System.out.printlnf'Please input the value of x");
double x = xReader.nextlnt();
Scanner aReader = new Scanner(System.in);
System.out.printlnf'Please input the value of a");
double a = aReader.nextlnt();
Scanner bReader = new Scanner(System.in);
System.out.printlnf'Please input the value of b");
double b = bReader.nextlnt();
Scanner cReader = new Scanner(System.in);
System.out.printlnf'Please input the value of c");
double c = cReader.nextlnt();
double delta = Math.pow(b, 2)-4*a*c;
double rootl = 0.0;
double root2 = 0.0;
```

```
if(delta>0)
{
rootl = (-b-delta)/2*a;
root2 = (-b+delta)/2*a;
System.out.println("rootl = " + rootl + "\troot2 = " + root2);
}
else if (delta == 0)
{
rootl = root2 = -b/(2*a);
System.out.println("rootl = " + rootl + "\troot2 = " + root2);
}
else if(delta<0)
System.out.println("Has no real solution");
}
}
```

Question3: (5 points for each branch)
Find errors in the following programs
1.

```
public class FindErrorl {
public static void main(String[] args){
int x = 3;
int y = 4;
int z = x/y;
double k = 254/z;
System.out.println("k = "+k);
i
i
```

2.

```
public class FindError2 {
public static void main(String[] args){
char letterA = 65;
char_letterA= 'A1;
int letterB = 66;
int letterAB = letterA + letterB;
Double alpha = 5%_letterA;
SYStem.out.println(letterA+ll\t,,+_letterA+M\t,l+letterAB+M\t,,+alpha);
i
```

i

Answers
1. The value of z = 0. And z is a denominator of k. which causes the problem of division by
zero.
2. alpha is double and the right side of the equation is of type int. it must cast the data type
of right side.

External examiner
From now on every course should have its own external examiner with identified roles.
The one who can play the role of an external examiner should:

- Have an academic post with the scientific rank of assistant Professor and higher.
- He/she should be an active, reputable and experienced academic staff in his field or a field to the course.
- He/she should have not participated in lecturing or administering of the course. The roles of the external examiner are:
- Evaluating the contents and the program of the course.

Prior to the exam, he/she should contribute to choosing the questions and looking at the ideal answers.

- Evaluating the process of the examinations: he/she should see all the marked exam papers, and then choose randomly nine marked papers: three with high marks, three with medium and three with low marks.
- Evaluating the students' feedbacks
- He/she should participate in the final meeting of the first round examinations committee and give his assessment on the entire course and the examination process, then to give his opinion about the final results.
- He/she should participate in the final meeting of the second round examinations committee and should have a main vote on those problems that may face them.

- Then the lecturer/ tutor in charge will respond to the external examiner's questions and will reply officially to all the questions and clarify the reasons.