



UNIVERSITY OF COLOMBO, SRI LANKA



UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING
(Successor to the Institute of Computer Technology (ICT), University of Colombo)



DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)
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IT1202: Fundamentals of Programming
14th February 2004
(TWO HOURS)

Important Instructions :

- The duration of the paper is **2 (two) hours**.
- The medium of instruction and questions is English.
- The paper has 50 questions and 14 pages.
- All questions are of the MCQ (Multiple Choice Questions) type.
- All questions should be answered.
- Each question will have 5 (five) choices with **one or more** correct answers.
- All questions will carry equal marks.
- There will be a penalty for incorrect responses to discourage guessing.
- The mark given for a question will vary from -1 (*All the incorrect choices are marked & no correct choices are marked*) to +1 (*All the correct choices are marked & no incorrect choices are marked*).
- Answers should be marked on the special answer sheet provided.
- Note that questions appear on both sides of the paper.
If a page is not printed, please inform the supervisor immediately.
- Mark the correct choices on the question paper first and then transfer them to the given answer sheet which will be machine marked. **Please completely read and follow the instructions given on the other side of the answer sheet before you shade your correct choices.**

1) Which of the following is/are the correct statement/s regarding Java?

- (a) Java was developed by James Gosling at Apple Corp.
- (b) It was developed in the early 1990's.
- (c) Was initially called 'Oak'
- (d) Was originally intended for embedded consumer electronic devices
- (e) Was specially developed for the Intel platform

2) From where did Java inherit its syntax?

- | | | |
|----------------|------------|-------------|
| (a) C Language | (b) Pascal | (c) Fortran |
| (d) Cobol | (e) C# | |

3) When the 'javac' command is used on a Java source file, what happens?

- (a) It works as a compiler.
- (b) It works as an interpreter.
- (c) It generates Java byte code.
- (d) Is a command which is no longer used
- (e) Invokes the JVM interpreter

4) Java is considered a very robust language. Which of the following reaffirm(s) this?

- (a) Java syntax is very similar to C syntax.
- (b) Java takes care of the memory allocation/deallocation.
- (c) Java byte source code is interpreted.
- (d) Java supports multithreaded applications.
- (e) Java has good exception handling capabilities.

5) Consider the following Java source code file:

Example.Java

What is/are the relevant step/steps to execute it?

- | | |
|--|-----------------------------|
| (a) javac Example.Java
java Example | (b) java Example.java |
| (c) java Example.Java
javac Example | (d) No steps can execute it |
| (e) javac Example | |

6) If the command "c:\>javac HelloWorld.java" is executed, what can be said regarding this?

- (a) Here, 'javac' refers to the JVM interpreter.
- (b) HelloWorld.java refers to a Java bytecode file.
- (c) It will execute the HelloWorld.java program's intended output.
- (d) It will result in the creation of the HelloWorld.class file.
- (e) It could result in run time errors in the HelloWorld program.

7) What is an 'Exception' in terms of error handling?

- | | |
|----------------------|-------------------------------|
| (a) A syntax error | (b) A syntax or logical error |
| (c) A run time error | (d) An error of the compiler |
| (e) A logical error | |

8) Select the most basic parts one has to consider when defining a method in a class.

- (a) The name of the method
- (b) The type of object or primitive type returned by the method
- (c) A list of parameters
- (d) The body of the method
- (e) Number of variables within the method

9) In Java, an object is passed to a method as

- (a) a Copy of that object.
- (b) a method called call by value.
- (c) a method called call by address.
- (d) an address of the object.
- (e) a public modifier.

10) Consider the following class defined and variables declared.

```
class Question{  
    String colour;  
    String sex;  
    int age;  
}
```

Select the correct statement/s from the following on the variable declaration above.

- (a) The local variables are colour, sex and age.
- (b) While colour and age are class variables, sex is a local variable.
- (c) The instance variables are colour, sex and age.
- (d) While sex and age are instance variables, colour is a constant.
- (e) The constants are colour, sex and age.

11) Consider the following program.

```
class Question{  
    public static void main(String args[]){  
        final int myValue = 7;  
        myValue = 9;  
        System.out.println(myValue);  
    }  
}
```

What will the output be?

- (a) 7
- (b) 9
- (c) 16
- (d) Compilation error
- (e) Run time error

12) Select from among the following, the groups/users who do not need to use documentation in Program Design.

- (a) Programmers
- (b) Bank managers
- (c) Computer Operators
- (d) Auditors
- (e) Off-Line users

13) Consider the following statements.

- (i) A constant is a variable with a value that never changes.
- (ii) Constants are useful in defining shared values for all methods of an object.
- (iii) In Java, the following is a correct constant variable declaration.
`float final pi = 3.141592;`
- (iv) One can create constants for instance and class variables, but not for local variables.

Choose the **incorrect** statement/s from among the following.

- (a) (i) is correct but (ii), (iii) and (iv) are incorrect.
- (b) (i) and (ii) are correct but (iii) and (iv) are incorrect.
- (c) (i) and (iv) are correct but (ii) and (iii) are incorrect.
- (d) (i), (ii) and (iii) are correct but (iv) is incorrect.
- (e) (ii) and (iii) are correct but (i) and (iv) are incorrect.

14) Consider the following declarations.

```
static int sum = 6;  
static final int total = 10;
```

Select from among the following, the correct statement/s of the above declarations.

- (a) sum and total are both instance variables.
- (b) The value of sum can be changed during the program execution but not the value of total.
- (c) sum and total are both class variables.
- (d) Declaration of the total variable is invalid while sum has been declared validly.
- (e) sum and total are both affected to by a class as a whole rather than being stored individually in an object of a class.

15) Notations used for algorithm specification must conform to a basic set of criteria. They are:

- (a) One should be able to describe the solution to a problem without writing multiple pages of text.
- (b) The description of the procedure can be open to alternative interpretations.
- (c) The actions described must be capable of translation into precise executable operations.
- (d) The tool must ensure that programmers refrain from using practicing at the design time stage to prevent poor programming styles during implementation.
- (e) Writing descriptive statements giving different views of solutions to the problem.

16) If a method does return the value of a number, which of the following is used at the returning part of the method?

- | | | |
|----------|------------|------------|
| (a) int | (b) float | (c) String |
| (d) Char | (e) double | |

17) Select from among the following, the correct statement/s about the word *extends*.

- (a) It is used to allocate memory for instance variables.
- (b) It is a keyword in Java.
- (c) It has a strong relationship with the object-oriented concept called inheritance.
- (d) It has a direct relationship with the object-oriented concept called polymorphism.
- (e) It is a primitive data type.

- 18) Match the program design evolution stages listed in **Column A** with the relevant descriptions for them which are listed in the **Column B**.

Column A		Column B	
1	Programming as an art form	J	Considers the structure of a program also as important as its logic
2	Modular programming	K	Considers that a program consists of a combination of 3-control structures, namely, sequence, selection and iteration
3	Structured programming	L	Considers to organize programs to mirror the way these objects are organized in the real world
4	Object oriented programming	M	Considers mainly the logic of a program

The correct sequence of matching is/are:

- | | |
|------------------------|------------------------|
| (a) 1→J, 2→K, 3→L, 4→M | (b) 1→K, 2→L, 3→M, 4→J |
| (c) 1→M, 2→J, 3→K, 4→L | (d) 1→K, 2→M, 3→L, 4→J |
| (e) 1→L, 2→M, 3→J, 4→K | |

- 19) Consider the following paragraph.

“When creating an instance of a class using a *new* operator, values of the instance variables are initialized to either ____ (i) ____ or to default values like ____ (ii) ____ for objects, ____ (iii) ____ for numbers, ____ (iv) ____ for Boolean storage areas or ____ (v) ____ for characters.”

Blanks in the paragraph have to be filled and they are numbered (i) through (v).

Select the correct order of blank number and the word from the following options to fill the blanks in the paragraph.

‘\0’ , false , initial values , null , 0

(a) (i) initial values	(ii) null	(iii) 0	(iv) false	(v) ‘\0’
(b) (i) ‘\0’	(ii) initial values	(iii) null	(iv) 0	(v) false
(c) (i) false	(ii) ‘\0’	(iii) initial values	(iv) null	(v) 0
(d) (i) 0	(ii) false	(iii) ‘\0’	(iv) initial values	(v) null
(e) (i) null	(ii) 0	(iii) false	(iv) ‘\0’	(v) initial values

- 20) Which of the following is a/(are) correct statement(s) in connection with Java?

- | |
|---|
| (a) The language that is so popular on the Internet can be used for general-purpose software developments as well. |
| (b) It is available for free on the web http://Java.sun.com which contains a set of commands, tools for writing, compiling and testing a program. |
| (c) It is available for free on the web http://microsoft.sun.com which contains a set of commands, tools for writing, compiling and testing a program. |
| (d) It is running on different operating systems and on different processors. |
| (e) It is a high level language and is characterised by the following features, such as being multithreaded, dynamic, robust and secure. |

Use the following Java program to answer the questions 21 - 26.

Line Number	
1	class RangeClass{
2	
3	int[] makeRange(int lower, int upper){
4	int arr[]=new int[(upper - lower) +1];
5	for (int i=0;i<arr.length;i++){
6	arr[i]=lower++;
7	}
8	return arr;
9	}
10	
11	public static void main(String arguments[]){
12	int theArray[];
13	RangeClass theRange=new RangeClass();
14	
15	theArray = theRange.makeRange(1,10);
16	System.out.print("The array: [");
17	for(int i =theArray.length ; i<0;i--){
18	System.out.print(theArray[i] + " ");
19	}
20	System.out.println("]");
21	}
22	}

21) In the program, the term RangeClass refers to

- | | |
|--------------------------|--------------------------------------|
| (a) a name of a class. | (b) a name of a primitive data type. |
| (c) a name of an array. | (d) a name of an instance variable. |
| (e) a name of an object. | |

22) In the program, the term arr[] represents

- | | |
|--------------------------|--------------------------------------|
| (a) a name of a class. | (b) a name of a primitive data type. |
| (c) a name of an array. | (d) a name of an instance variable. |
| (e) a name of an object. | |

23) Consider the following statement which is written within the above program.

RangeClass theRange=new RangeClass();

Identify and select the correct statement/s of the terms RangeClass and RangeClass() from among the following.

- | |
|---|
| (a) RangeClass refers to a name of a class and RangeClass() refers to a special method within a class. |
| (b) RangeClass refers to an instance and RangeClass() refers to a constructor. |
| (c) RangeClass refers to an instance variable and RangeClass() refers to a class variable. |
| (d) RangeClass and RangeClass() both refer to key words in Java. |
| (e) RangeClass refers to a template or mould which we use to instantiate, and RangeClass() is used to allocate memory in the program. |

24) In the program, the term theRange represents

- | | |
|--------------------------|--------------------------------------|
| (a) a name of a class. | (b) a name of a primitive data type. |
| (c) a name of an array. | (d) a name of an instance variable. |
| (e) a name of an object. | |

25) When the program is executed what would be the output?

- | | |
|---------------------------------------|---------------------------------------|
| (a) The array: [1 2 3 4 5 6 7 8 9 10] | (b) [1 2 3 4 5 6 7 8 9 10] |
| (c) The array: [] | (d) The array: [10 9 8 7 6 5 4 3 2 1] |
| (e) The array: [9 8 7 6 5 4 3 2 1 0] | |

26) If the statement

```
int[ ] makeRange(int lower, int upper)
```

is replaced with the statement

```
int makeRange(int lower, int upper)[ ]
```

without changing the rest of the program, what can be said about the output when the program is **compiled**?

- | | |
|----------------------------------|----------------------|
| (a) Error in line 3 | (b) Error in line 9 |
| (c) No errors will be generated. | (d) Error in line 15 |
| (e) Error in line 19 | |

Use the following Java program to answer the questions 27 - 28.

```
class Question{
    int x = 0;
    int y = 1;
    int z = 2;

    void show(){
        System.out.println(x+" "+y+" "+z);
    }
}

class ShowClass extends Question{
    int z = 3;
    void show(){
        System.out.println(x+" "+y+" "+z);
    }

    public static void main(String args[]){
        ShowClass obj=new ShowClass();
        obj.show();
    }
}
```

27) What are the object-oriented concepts which have been used in the program?

- | | |
|--|------------------------|
| (a) Data abstraction and encapsulation | (b) Inheritance |
| (c) Polymorphism | (d) Method overloading |
| (e) Method overriding | |

28) What would be the output of the program when it is executed?

- | | | |
|-------------|-------------|-----------|
| (a) 0 1 2 | (b) 0 1 2 3 | (c) 0 1 3 |
| (d) 0 1 3 2 | (e) 3 1 2 0 | |

29) Consider the following data types and their sizes.

Type	Size
(i) byte	8 bits
(ii) short	16 bits
(iii)short	32 bits
(iv)int	16 bits
(v) long	64 bits
(vi)double	64 bits

Which of the above data types are valid integers with their sizes?

- | | |
|--------------------------------------|-----------------------------|
| (a) (i), (iii) and (iv) only | (b) (i), (ii) and (iv) only |
| (c) (i), (ii) and (v) only | (d) (i), (iii) and (v) only |
| (e) (i), (ii),(iv),(v) and (vi) only | |

30) Consider the following terms in **Part A**:

Part A

- (i) public
- (ii) static
- (iii) void
- (iv) main
- (v) args[]

The best definition from **Part B** that follows has to be chosen for each of the above terms

Part B

- (p) The contents of the following block are accessible from all other classes.
- (q) This can be used to declare variables and methods.
- (r) It is the first function called by the interpreter.
- (s) It indicates that this function is not returning anything.
- (t) All functions take zero or more arguments enclosed within parenthesis.

Which of the following is the best choice?

- | |
|---|
| (a) (i)→(t), (ii)→(q), (iii)→(r), (iv)→(s), (v)→(p) |
| (b) (i)→(p), (ii)→(r), (iii)→(q), (iv)→(s), (v)→(t) |
| (c) (i)→(p), (ii)→(s), (iii)→(r), (iv)→(q), (v)→(t) |
| (d) (i)→(p), (ii)→(q), (iii)→(s), (iv)→(r), (v)→(t) |
| (e) (i)→(q), (ii)→(p), (iii)→(r), (iv)→(s), (v)→(t) |

34) Consider the following Java Expressions.

Condition 1: boolean unusual1= (Age <30) & (GirlfriendAge >=50);

Condition 2: boolean unusual2= (weight >30) || (GirlfriendAge >=50);

Which of the following statements is/are correct in connection with the above conditions?

- (a) If Age < 30 and GirlfriendAge<50, then, value of the unusual1 is true.
- (b) If both of the expressions in Condition 1 are true, the value true is assigned to the variable unusual1.
- (c) If either of the expressions in Condition 2 is true, the value true is assigned to the variable unusual2.
- (d) If value of weight=50, then unusual2 is true.
- (e) If value of weight=50, then unusual1 is true.

35) Consider the following Java program.

```
class Question{
    public static void main (String [] args)
    { System.out.print(0);
      int fi0=0;
      int fi1=1;
      int fi2=fi1+fi0;
      while ( fi2 < 500)
      { fi0=fi1;
        fi1=fi2;
        fi2=fi1+fi0;
        {
          System.out.print(“,”+fi1);
        }
      }
    }
}
```

The output of the above program is

- (a) 0,1,2,3,5,8,13,21,34,55,89,144,233,
- (b) 0,1,2,3,5,8,13,21,23,34,55,89,144,233,377
- (c) 0,1,2,3,5,8,13,21,34,55,89, 233,377
- (d) 0,1,2,3,5,8,13,21,34,55,89,144,233,377,499
- (e) 0,1,2,3,5,8,13,21,34,55,89,144,233,377

36) Consider the following statements in Java in connection with arrays.

- (i) An array is an object that consists of a sequence of numbered elements which have the same type.
- (ii) The elements are indexed beginning with 0 and can reference by their number using subscript operator [].
- (iii) Arrays are widely used.
- (iv) The element type of an array can be any one of the eight primitive types or a reference type.

Which of the following is/are correct in connection with the above statements?

- | | | |
|-------------------------|----------------------------|-----------------------------|
| (a) (i) and (iv) only | (b) (i),(ii) and (iv) only | (c) (i),(iii) and (iv) only |
| (d) (iii) and (iv) only | (e) All the statements | |

37) An applet

- (a) is a serious security threat to a computer.
- (b) should be scanned using an Anti-virus software.
- (c) needs a Java compatible web browser.
- (d) is a stand-alone program.
- (e) can run only on the Windows environment.

38) Consider the following Java program.

Line Number	
1	import java.awt.point;
2	
3	class Question{
4	public static void main (string arguments []) {
5	point pt1,pt2;
6	pt1=new point (50,50);
7	pt2=pt1;
8	
9	pt1.x=100;
10	pt1.y=100;
11	System.out.println(" point 1 ",pt1.y);
12	System.out.println(" point 2",pt2.y);
13	}
14	}

Which of the following correctly describe the above program statements?

- (a) Line 11-12 : the x and y variables of pt1 are both set to 100, and then all variables of pt1 and pt2 are displayed on screen.
- (b) Line 5 : two point objects are created.
- (c) Line 6 : a new point object is assigned to pt1.
- (d) Line 7: creates a reference to pt1.
- (e) Line 11-12: displays on screen, point1=50 point2=100

39) Consider the following Java program.

```
class Question{
    public static void main(String args[]){
        int d=0;
        int a=42/d;
    }
}
```

Select from among the following the correct statement(s) regarding the type of output/outputs which will be generated when the program is executed.

- (a) The program executes without any errors.
- (b) The program generates an Arithmetic Exception.
- (c) It generates a Null pointer Exception.
- (d) It generates a syntax error.
- (e) A blank space.

40) Consider the following Java program.

```
class Question{
public static void main (String args[] ){
    int [] [] a = { { 70,30,80},
                    { 10,50,20,90},
                    { 60,40}};
    for (int i=0; i< a.length; i++)
    {
        for ( int j=0; j< a.length; j++)
            for (int k=0; k< a[j].length; k++)
                System.out.print(" "+a[i][j][k]);
            System.out.println();
        }
    }
}
```

The correct output of the above program is

- | | |
|---|--------------------------------------|
| (a) 70,30,80, 10,50,20,90,60,40 | (b) 70 30 80
10 59 20
90 60 40 |
| (c) 0 30 80
10 59 20 90
60 40 | (d) 10 20 30 40 50 60 70 80 90 |
| (e) 70 30 70 30 70 30
10 50 10 50 10 50
60 40 60 40 60 40 | |

41) Applets are executed by

- | | |
|------------------------------------|-----------------------|
| (a) the Java run time interpreter. | (b) an applet viewer. |
| (c) the Java enabled web browser. | (d) any compiler. |
| (e) the Java doc utility. | |

42) Applets are

- | | |
|----------------------------------|---------------------------------|
| (a) windows based programs. | (b) console based programs. |
| (c) event driven programs. | (d) non compiled java programs. |
| (e) executed on the server side. | |

43) The init() method in an applet

- | |
|---|
| (a) is where variable initialisation is normally done. |
| (b) is the first method to be called. |
| (c) is called only once during run time. |
| (d) is called every time when applet output is redrawn. |
| (e) is an optional method which is no longer called. |

44) Consider the following statements.

- (i) Exceptions can be generated by the Java run-time system.
- (ii) Exceptions can be generated by the user code.
- (iii) Exceptions thrown by Java relate to violations of its language rules.

Which of the above statements regarding exception handling is/are true?

- | | | |
|-----------|----------------|--------------------------|
| (a) All. | (b) Only (i). | (c) Only (ii) and (iii). |
| (d) None. | (e) Only (ii). | |

45) Consider the following Java program.

```
class Question{
    public static void main(String args[]){
        int d,a;
        try{
            d=0;
            a=45/d;
            System.out.println("It works!");
        }
        catch(ArithmeticException e)
        {
            System.out.println("It is over!");
        }
        System.out.println("The program ends");
    }
}
```

Identify the correct output from among the following when the program is executed.

- | | |
|-------------------------------------|---|
| (a) It is over!
The program ends | (b) It works!
The program ends |
| (c) It is over
It works! | (d) It is over
It works!
The program ends |
| (e) 45 | |

46) Which of the following is a/are correct statement(s) regarding command-Line arguments?

- | |
|---|
| (a) They pass information into a program when it is run. |
| (b) Arguments passed to the Java compiler cannot be considered as command-line arguments. |
| (c) They are stored as Strings in the String array passed to main(). |
| (d) Command-line parameters passed can be of any data type. |
| (e) All command line parameters are passed as Strings. |

47) Consider the statements given below regarding "Streams" and determine which of them is/are correct.

- | |
|--|
| (a) Java programs perform I/O through streams. |
| (b) A stream is a kind of a data driven checking. |
| (c) A stream is linked to a physical device by the Java I/O system. |
| (d) It helps to write code, which does not have to change according to specific I/O devices. |
| (e) Java implements streams with the java.io package hierarchy. |

48) For an 'Applet', which of the following correctly describes the packages necessarily required?

- | | | |
|-------------------------|-----------------------|------------------------------|
| (a) Java.applet package | (b) Java.io package | (c) No packages are required |
| (d) Sql.applet package | (e) Java.lang package | |

49) Select from among the following the correct statement/s regarding desk checking.

- | |
|--|
| (a) Once the algorithm has been expressed in Pseudocode, it is subjected to a kind of a testing called desk checking. |
| (b) Desk checking should be applied to each procedure within a program and involves selecting sample values of test data for input to the procedure. |
| (c) In desk checking, the program is regarded as a "black box" ensuring that it gives a correct output for all input data. |
| (d) Before desk checking is done, the correct result has to be determined independently of the program algorithm. |
| (e) A user of the program as an alternative to a programmer can do desk checking. |

50) Consider the following program.

```
import java.awt.*;  
public class Question extends java.applet.Applet{  
    Label what=new Label("What");  
  
    public void init(){  
        add(what);  
    }  
}
```

Then consider the following segment of program that is executed by invoking the **appletviewer** utility.

```
<applet code="Question.class" height=60 width=300>  
</applet>
```

Select from among the following, that output one can expect as the result on the appletviewer.


