



**NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY**

Faculty of Computing and Informatics

Department of Computer Science

QUALIFICATION: Bachelor of Computer Science	
QUALIFICATION CODE: 07BACS	LEVEL: 5
COURSE: Object Oriented Programming	COURSE CODE: OOP521S
DATE: January 2019	SESSION: 2
DURATION: 3 HOURS	MARKS: 100

SECOND OPPORTUNITY / SUPPLEMENTARY EXAMINATION	
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THIS EXAM PAPER CONSISTS OF 5 PAGES
(Excluding this front page)

INSTRUCTIONS

1. This is a closed book examination with 3 sections, A, B, and C.
2. Answer ALL questions on the examination booklet provided.
3. Total marks per section are indicated in bold [].
4. For sections B and C, begin each new question on a new page.
5. NUST's examination rules and regulations apply.

SECTION A: MULTIPLE CHOICE (1.5 marks each)**[15marks]**

1. Consider the following pieces of code:

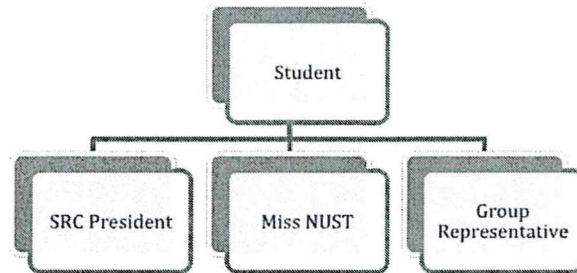
```
public class Output{  
    public static int result1 = 21;  
    public int result2 = 5;  
}
```

```
Output x = new Output();  
Output y = new Output();  
x.result1 = 3;  
y.result1 = 41;  
x.result2 = 2;  
y.result2 = 40;  
System.out.println(x.result1);
```

What will be printed as output?

- a) 21
 - b) 5
 - c) 3
 - d) 41
 - e) 2
2. The statement below is an example of _____.
- ```
Grocery grocery1 = new Grocery("milk", 3, 23.13f);
```
- a) constructor overloading
  - b) instantiation
  - c) method invocation
  - d) class definition
  - e) releasing memory
3. Which of the following statement is consistent with the statement below:
- ```
account.deposit(500);
```
- a) account is a method;
 - b) account is an object
 - c) account is a class
 - d) deposit is a class
 - e) deposit is an object
4. Which object is responsible for the actual writing to the physical medium?
- a) FileInputStream
 - b) FileOutputStream
 - c) FileReader
 - d) FileWriter
 - e) None

5. Below is a hierarch of student classes:



Which of the following is the correct syntax to create a subclass:

- a) Student extends SrcPresident{ }
 - b) Student implements GroupRepresentative{ }
 - c) MissNust extends Person{ }
 - d) SrcPresident extends Student
 - e) Student extends Person{ } implements HealthInterface{ }
6. Something seems terribly wrong with the piece of code below, despite it compiling correctly.

```
try{  
    //statements come here  
}catch(Exception ex){  
    //handle exception here  
}catch(ArithmeticException ex){  
    //handle exception here  
}
```

What could be the problem?

- a) the *finally* statement is missing
 - b) there is unreachable code
 - c) two catch blocks instead on one
 - d) it was supposed to use a try with resources statement
 - e) there is nothing wrong
7. Which of the following is an object oriented concept?
- a) method invocation
 - b) method overriding
 - c) method overloading
 - d) all of the above
 - e) none
8. How best can you define a *raw type*?
- a) a generic class or interface without any type arguments;
 - b) a type used in concurrency software;
 - c) a multiple type parameters;
 - d) none of the above;
 - e) a type that is not be understood in Java

9. Consider the code below and answer the question that follows.

```
public class OuterClass{
    public int x = 0;

    class InnerClass{
        public int x = 1;

        void demoMethod(int x){
            System.out.println(x)
        }
    }
}
```

What will be the output after passing 23 to *demoMethod*?

- a) 23
 b) 1
 c) 0
 d) 0, 1, and 23
 e) 1 and 23
10. The code below is an example _____.

```
26 public Person(String firstName, String surname, String tribe, int age, Address address) {
27     this.firstName = firstName;
28     this.surname = surname;
29     this.tribe = tribe;
30     this.age = age;
31     this.address = address;
32 }
```

- a) class method
 b) object creation
 c) constructor
 d) inheritance
 e) setters and getters

SECTION B: STRUCTURED QUESTION

[55 marks]

1. Access modifiers determine whether other classes can use a particular field or invoke a particular method in a class. Complete the table below with a **yes** or **no** to indicate the level of access: (0.5 marks each) [5 marks]

Modifier	Class	Package	Subclass	World
public	yes			yes
protected		yes		no
none				
private	yes	no		

2. The following non-generic **Box** class operates on objects of any type. You are required to write the generic version of the Box class. [5 marks]

```
public class Box{
    private Object obj;

    public void setObj(Object obj){
        this.obj = obj;
    }

    public Object get(){
        this.obj = obj;
    }
}
```

3. Explain in detail the advantages of object-oriented programming. [10marks]

4. Distinguish the following terms from one another. Give examples where necessary. [15 marks]

- constructor Vs method
- class Vs object
- Deadlock Vs Starvation
- Error Vs Exception
- Byte Stream Vs Data Stream

5. Carefully analyse the code below and answer questions that follow.

```
8 import java.io.FileInputStream;
9 import java.io.FileNotFoundException;
10 import java.io.IOException;
11
12 public class ByteStreams {
13     public static void main(String[] args) throws FileNotFoundException, IOException {
14
15         try(FileInputStream in = new FileInputStream("F:\\iolab.txt")
16         ) {
17             int c; //c is used with a FileInputStream read() method which returns int (c
18             char output;
19
20             while((c = in.read()) != -1){ //read() returns -1 if it reaches the end of
21                 output = (char)c;
22                 System.out.print(output);
```

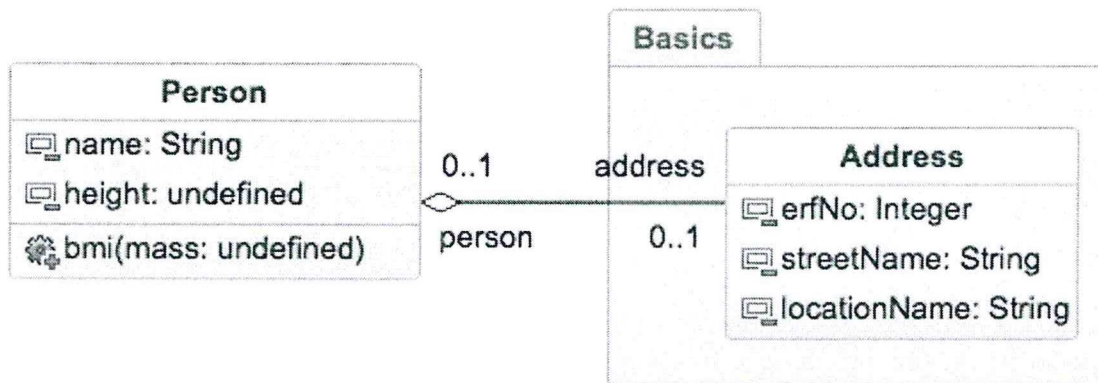
- Identify the lines where the exceptions in line 13 could possibly be thrown. Explain why. [4marks]
 - Modify the given code and use the `FileOutputStream` to write all the contents of `iolab.txt` to another file called `copy.txt` in the same drive as `iolab.txt`. In your solution, also use the `finally` block to release any resources being used for input and output. [6marks]
6. With example code, explain how you can define a thread. [5 marks]

7. When is it preferable to use interfaces instead of abstract classes? [5 marks]

SECTION C: CODE

[30marks]

Consider a class diagram below and write code to fulfil the requirements given underneath .



1. Create the required classes as given in the class diagram. Add at least two constructors for each class, including a full constructor in each. [10marks]
2. Implement the method *bmi* that returns a quotient of *mass* and the square of the *height* (kg/m^2), where kg stands for kilograms and m for metres. [3 marks]
3. In the driver class, create an array list of **Person** objects and name it *persons*. [2 marks]
4. Add at least two **Person** objects using the constructors you created in (1). [4marks]
5. The *height* of a person changes as he/she grows. Add a method *adjustHeight* in the driver class that will enable the user to accomplish this task. [5 marks]
6. Lastly, display the contents of **Person** objects in the array list *persons*. [6marks]
7. Comments, readability and use of conventions. [3 bonus marks]

[END]