

Activity #1 – Variables

Instructions

- Carefully analyze the given Java program.
- Trace the references and memory changes step-by-step.
- Complete all required tables and questions.
- Show your logical reasoning where necessary.
- Write your answers in a yellow paper (handwritten).
- Take a clear photo or scan of your work.
- Upload your file in Canvas on or before the deadline.
- Submission Format: Section_LastName_FirstName_CodeAnalysisActivity#1.pdf

Please review the code below.

```
class Student {
    String name;
    int grade;

    Student(String n, int g) {
        name = n;
        grade = g;
    }
}

public class TestStudent {
    public static void main(String[] args) {

        Student s1 = new Student("John", 85);
        Student s2 = new Student("Maria", 90);
        Student s3 = s2;

        s1.grade = 95;
        s3.name = "Ana";

        System.out.println(s1.name + " " + s1.grade);
        System.out.println(s2.name + " " + s2.grade);
        System.out.println(s3.name + " " + s3.grade);
    }
}
```

* PART A - VARIABLE IDENTIFICATION TABLE

VARIABLE NAME	DATA TYPE	VARIABLE TYPE	STORED IN
name	String	Instance	Heap
grade	int	Instance	Heap
s1	student	Local	stack
s2	student	Local	stack
s3	student	Local	stack
n	string	Local	stack
g	int	Local	stack

* PART B - EXPLANATION.

STATEMENT	WHAT HAPPENS?	MEMORY IMPACT
student s1 = new student("John", 85);	* CREATES A NEW STUDENT AND STORES IT AT s1, "John" 85	* CREATED IN HEAP. → s1 STACK
student s2 = new student("Maria", 90);	* CREATES A NEW STUDENT AND STORES IT AT s2, "Maria" 90	* CREATED IN HEAP. → s2 STACK
student s3 = s2;	* s3 IS ASSIGNED THE SAME AS s2 Maria 90 → s3	* s2 & s3 → SAME IN HEAP
s1.grade = 95;	* UPDATES THE GRADE OF s1 John 95	* s1 GRADE BECOMES 95
s3.name = "Ana";	* UPDATES THE NAME OF s3 Ana 90	* s2 NAME BECOMES "Ana" WHICH ALSO BECOMES s3

* PART C - OUTPUT

</> TestStudent	HOW IT WORKS	IT PRINTS
John 95	• s1 = name = "John", grade = 85	• s1 = John 95
Ana 90	• s2 = name = "Maria", grade = 90	• s2 = Ana 90 😊
Ana 90	• SINCE s3 = s2, IT WILL REFERENCE	• s3 = Ana 90
	• s1.grade = name = "John", grade = 95	
	• s3.name = name = "Ana", grade = 90	