IT 314 – Software Engineering

Lab 7

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GCD and LCM Code

Program Inspection

Question 1. How many errors are there in the program? Mention the errors you have identified.

Comparison Error in finding the larger or the smaller number from the given input of x and y as well as based on the modulus being equal or not equal to zero.

Question 2. Which category of program inspection would you find more effective?

For this question, the Category D of the program inspection, the Comparison errors were the most effective, as the failure of the code was due to the use of wrong comparisons.

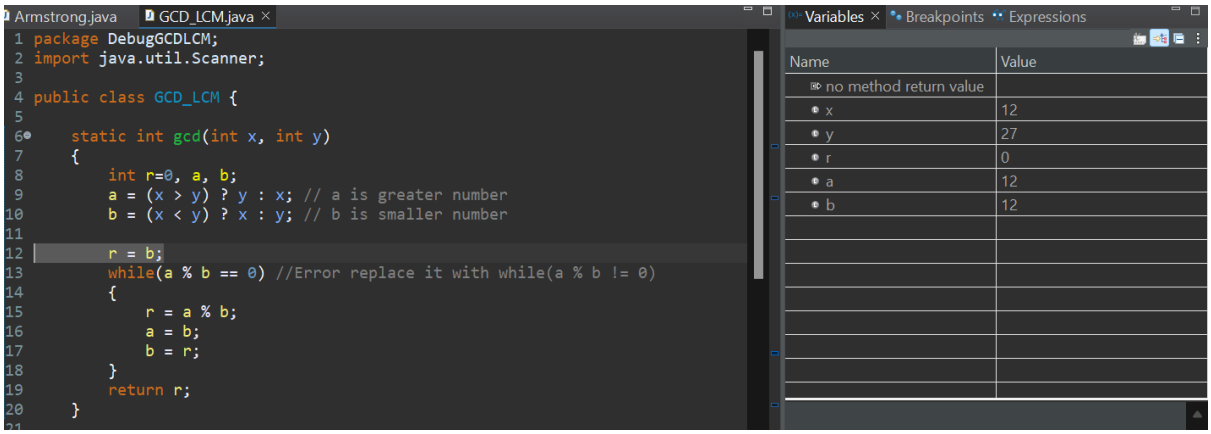
Question 3. Which type of error you are not able to identified using the program inspection?

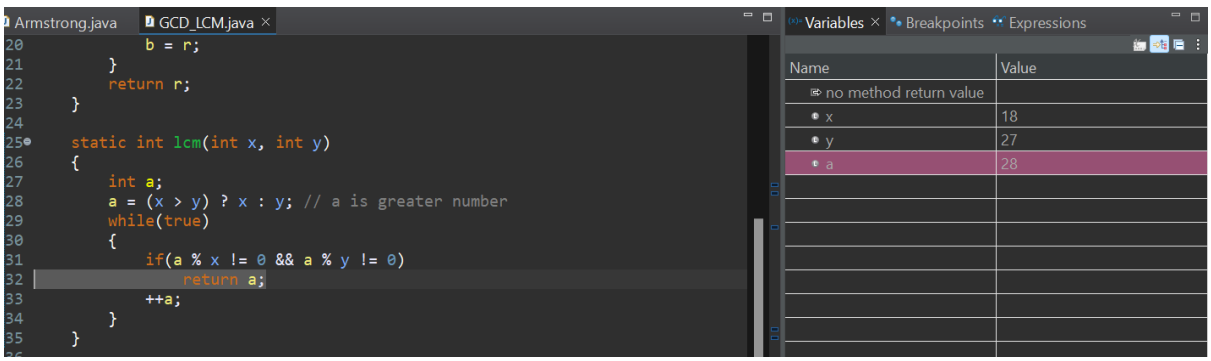
In this example, all the errors in the document were identifiable using the program inspection method.

Question 4. Is the program inspection technique is worth applicable?

Due to the small length of the code and easy to find comparison errors, the program inspection technique is worth applicable here.

Code Debugging





Question 1. How many errors are there in the program? Mention the errors you have identified.

There were 3 errors in the program. Firstly, the wrong calculation of a, the value greater among x and y. The other 2 errors were the comparison of the modulus operator with 0, where in the case of GCD, we need to run the loop till its not equal to zero, and in the LCM, we return when the modulus is equal to zero.

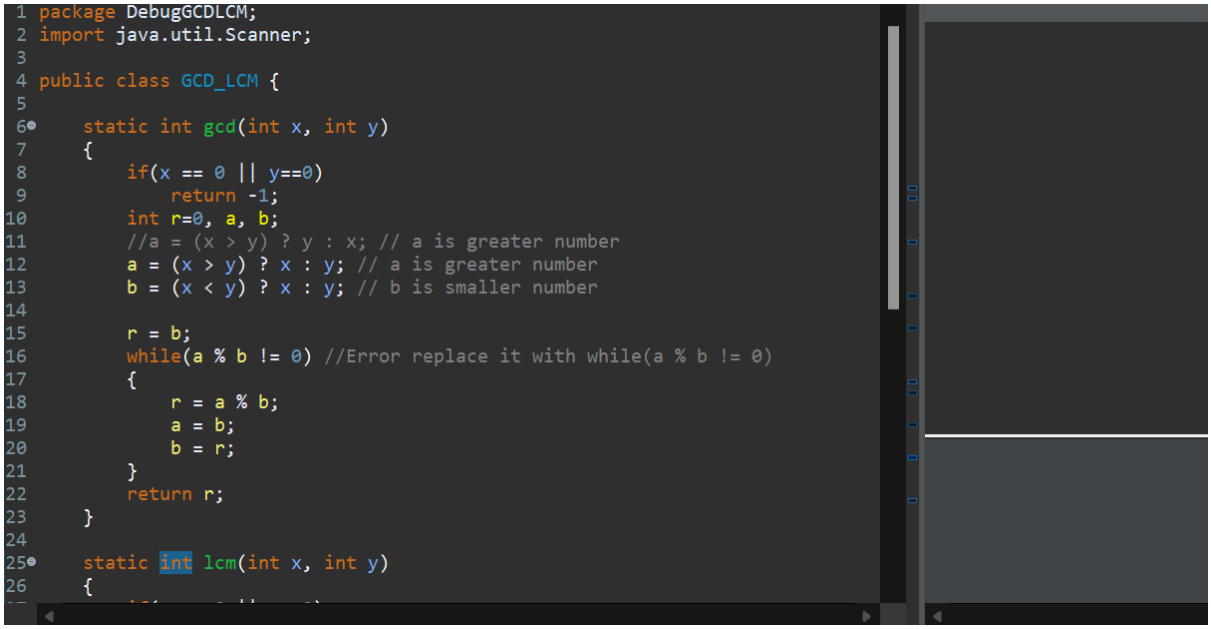
Also, the code would give an error if any one of the numbers is zero, since modulus operator won't be defined for it.

Question 2. How many breakpoints you need to fix those errors? What are the steps you have taken to fix the error you identified in the code fragment?

We required 3 break points. One at the start of the loop for the GCD calculator, one at the end of the loop. We could find both the mistakes in comparison of the calculation of a, as well as the error in the loop condition.

The other 2 break points are at the start and end of the loop of the LCM calculator, which would tell us the mistake in calculating the LCM due to wrong condition in the return statement.

Question 3. Submit your complete executable code.



```java
package DebugGCDLCM;
import java.util.Scanner;

public class GCD_LCM {

    static int gcd(int x, int y)
    {
        if(x == 0 || y==0)
            return -1;
        int r=0, a, b;
        //a = (x > y) ? y : x; // a is greater number
        a = (x > y) ? x : y; // a is greater number
        b = (x < y) ? x : y; // b is smaller number

        r = b;
        while(a % b != 0) //Error replace it with while(a % b != 0)
        {
            r = a % b;
            a = b;
            b = r;
        }
        return r;
    }

    static int lcm(int x, int y)
    {
```

```java
static int lcm(int x, int y)
{
    if(x == 0 || y==0)
        return 0;
    int a;
    a = (x > y) ? x : y; // a is greater number
    while(true)
    {
        if(a % x != 0 && a % y != 0)
            return a;
        ++a;
    }
}

public static void main(String[] args) {
    // TODO Auto-generated method stub
    Scanner input = new Scanner(System.in);
    System.out.println("Enter the two numbers: ");
    int x = input.nextInt();
    int y = input.nextInt();

    System.out.println("The GCD of two numbers is: " + gcd(x, y));
    System.out.println("The LCM of two numbers is: " + lcm(x, y));
    input.close();
}
```

```
Console × Problems Debug Shell
<terminated> GCD_LCM [Java Application] C:\Program Files\Java\jdk-22\bin\javaw.exe (20 Oct 2024, 1:15:22 pm – 1:15:27 pm) [pid: 19784]
Enter the two numbers:
18
27
The GCD of two numbers is: 9
The LCM of two numbers is: 28
```