**Computer Science 2**   **Lab # 01**



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**CS2 Section # 01**

**Due:** Problem A by the **end of the lab** and Problems B by the end of **Saturday** of the same week.

**TOPIC: Review of complete Java programs, standard I/O, If-Else**

**Problem B: Proper Fractions, Improper Fractions, and Mixed Fractions**

**Problem Description:**

Proper fractions, improper fractions, and mixed fractions are defined at <http://www.ltcconline.net/greenl/courses/187/b/impropermixed.htm>

Write a program that prompts the user to enter the numerator and denominator of a fraction number and determines whether it is a proper fraction and improper fraction. For an improper fraction number, display its mixed fraction in the form of **a + b / c** if **b % c** is not zero; otherwise, display only the integer.

Here are sample runs of the program:

Sample 1:

Enter a numerator: **16**

Enter a denominator: **3**

16 / 3 is an improper fraction and its mixed fraction is 5 + 1 / 3.

Sample 2:

Enter a numerator: **6**

Enter a denominator: **7**

6 / 7 is a proper fraction

Sample 3:

Enter a numerator: **6**

Enter a denominator: **2**

6 / 2 is an improper fraction and it can be reduced to 3

**Analysis:**

(Describe the problem including input and output in your own words. Type your answer in the following with **BLUE font color**)

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| **The user will input both a numerator and a denominator and if the numerator is larger than the denominator, it is an improper fraction and a mixed fraction, and if the denominator is larger than the numerator, it is a proper fraction.** |

**Design:**

(Describe the major steps for solving the problem. Type your answer in the following with **BLUE font color**)

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| 1. **A scanner input would have to be created to receive an input from the user and will take a numerator and denominator.** 2. **If/ else statement used to determine if the fraction is an improper fraction or a proper fraction.** 3. **Uses division and mod to convert an improper fraction.** |

**Coding:** (Copy and Paste Source Code here. Type your answer in the following with **BLUE font color**)

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| **import java.util.Scanner;**  **public class Fractions{**  **public static void main(String[] args){**  **Scanner input= new Scanner(System.in);**  **System.out.print("Enter a numerator: ");**  **int n= input.nextInt();**  **System.out.print("Enter a denominator: ");**  **int d= input.nextInt();**  **//calculations**  **int a = n/d;//System.out.println(n%d);//1**  **int b= n%d;//System.out.println(n/d);//5**  **int c= d;**  **if(n%d ==0){**  **int s= n/d;**  **System.out.println(n+" / "+ d+" is a improper and it can be reduced to "+ s);**  **}**  **else if(n>d){**  **System.out.println(n+" / "+ d+" is an improper fraction and its mixed fraction is "+ a +" + "+ b+ " / "+ d);**  **}**  **else {**  **System.out.println(n+" / "+ d+" is a proper fraction");**  **}**  **}**  **}** |

**Testing:** (Describe how you test this program. Type your answer in the following with **BLUE font color**)

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| **RUN three times, using …**  **Test 1:**  **Enter a numerator: 16**  **Enter a denominator: 3**  **16 / 3 is an improper fraction and its mixed fraction is 5 + 1 / 3.**  **Test 2:**  **Enter a numerator: 15**  **Enter a denominator: 29**  **15 / 29 is a proper fraction**  **Test 3:**  **Enter a numerator: 10**  **Enter a denominator: 5**  **10 / 2 is an improper fraction and it can be reduced to 5** |