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



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**CS2 Section # 03**

**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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| **I have to ask the user to input the separate parts of a fraction, a numerator and denominator. Then have to determine whether or not it is an improper fraction or not (num. greater than denom.) If b%c=0 , write it in a+b/c form** |

**Design:**

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

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| **1) ask user for input of numerator and denominator**  **2) use if – else statements to determine whether or not the fraction is an improper or proper fraction**  **3) if the fraction is improper, b%c=0 then display as a mixed fraction in a+b/c form** |

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

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| **import java.util.\*;**  **public class ImproperFractions {**  **public static void main(String args[]) {**  **// asking input from user**  **Scanner input = new Scanner(System.in);**  **System.out.println("Enter a numerator: ");**  **int numerator = input.nextInt();**  **System.out.println("Enter a denominator: ");**  **int denominator = input.nextInt();**  **// checking the condition using if loop**  **if (numerator < denominator) {**  **// displaying output**  **System.out.println(numerator + " / " + denominator + " is a proper fraction");**  **}else if( numerator % denominator == 0 ) {**  **// displaying output**  **System.out.print(numerator + " / " + denominator + " is an improper fraction ");**  **System.out.println("and it can be reduced to " + numerator/denominator);**  **}else {**  **// displaying output**  **System.out.print(numerator + " / " + denominator + " is an improper fraction ");**  **System.out.print("and its mixed fraction is " + numerator/denominator + " + " + numerator % denominator + " / " + denominator);**  **}**  **}**  **}** |

**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: 6**  **Enter a denominator: 7**  **6 / 7 is a proper fraction**  **Test 3:**  **Enter a numerator: 6**  **Enter a denominator: 2**  **6/2 is an improper fraction and it can be reduced to 3** |