# Business Programming MSCI:3020/9200

**Homework Assignment #1**

**Due:** Thursday, February 7th, 2019 @ 11:59 pm

**Problem 1: Student Loan Interest (3 points)**

We are going to expand on the interest.java program from discussion. Instead of modeling it after a car payment, you are going to set up a calculator program to calculate your student loan interest and necessary payments after graduation.

1. Student loan interest usually accumulates daily off of the principal balance. Let’s assume that you do not pay any of your student loan principal or interest off during your time in school.

**If the interest accrues (not compounds) daily, write a program that takes *principal, years (in school), interest rate* as the arguments and gives you a new capitalized interest rate after your time in school.**

Example input after compiling: java StudentLoan 15000 4 6.8

15000 – principal amount

4 – number of years in school

6.8 – yearly interest rate of your loan

Example output:

A:

You will have $19,080.00 in loans after you finish school.

Total interest at graduation = $4,080.00

(Hint: Don’t overthink a. You just need to calculate the daily interest accrued and then multiply by the number of days in your total years in school – take 1 year to be 365.25 days)

1. Now in the same Java program, add another command line input argument that represents an example monthly payment you would make to pay off your loans. Use *if* logic to see if this monthly payment would be possible. For example, if your interest accrued each month is more than your monthly payment, then you would be paying off your loan forever. Print whether it is possible with the monthly payment entered as well as the minimum monthly payment needed to not have your loan grow.

(Hint: your total loan amount is now your answer from (a) and not your principal balance.

Hint: for simplicity assume they are equal monthly payments and each month has 30 days.)

Example input after compiling: java StudentLoan 15000 4 6.8 100

100 – monthly payment

Example output:

A:

You will have $19,080.00 in loans after you finish school.

Total interest at graduation = $4,080.00

B:

This isn't possible with a monthly payment of $100.00. You'll be paying off loans forever!

Your monthly payment must be greater than $106.57 in order to eventually pay off your loans.

Example output:

A:

You will have $24,400.00 in loans after you finish school.

Total interest at graduation = $4,400.00

B:

Your monthly payment must be greater than $110.23 in order to eventually pay off your loans.

$300.00 is an acceptable monthly payment.

**Problem 2: Multiple or Factor (2 points)**

*Hint: Use the remainder operator and control IF logic.*

1. Write an application that takes two integers as arguments and determines if the first input is a multiple or factor of the second input. If it is the same number, it should say that it is a multiple and a factor of itself.

Sample 1 (Input and Output):

java Multiple\_Factor 16 4

16 is a multiple of 4

Sample 2 (Input and Output):

java Multiple\_Factor 4 16

4 is a factor of 16

Sample 3 (Input and Output):

java Multiple\_Factor 5 16

1. is not a multiple or factor of 16
2. In that same application, give an output that states whether each number is even or odd and gives the square of the number. *(No need to use Math.pow() here)*

Sample Output:

5 is a multiple of 5

5 is a factor of 5

5 is an odd number and its square is 25

5 is an odd number and its square is 25