General Instructions:

1. Follow the instructions and especially the naming standards.
2. In this assignment you will need to create only a single source file. When you are done, in order to submit, put them in a folder named {**YOURID}_{FIRSTNAME}_{LASTNAME}_AS1.zip**
3. **Note:** replace your info, like **123456_ALI_ALILI_AS1.zip** be careful with the order (id, first name, last name).
4. You will lose points for not following the naming standard.
5. Be as clear and neat as possible when you write codes. Use naming conventions and indentations properly.
6. **Neither plagiarism nor any type of cheating will be tolerated!**

Assignment 1

In this assignment you will get to solve two mathematical expressions using java.

The first one is the Newton's law of gravitation:

Formula 1: $F = G * \frac{m_1 * m_2}{r^2}$ where

G is the gravitational constant $G = 6.674 * 10^{-11} \frac{m^3}{kg*s^2}$,

F gravitational force between two bodies
m1 and **m2** are the masses of two bodies and
r is the distance between them.

The second one is the Taylor series for calculating sin(x)**:**

Formula 2: $sin(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \ldots = \sum_{i=0}^{\infty} (-1)^i \frac{x^{(2i+1)}}{(2i+1)!}$

Notes:

1. **Formula 1** requires 3 parameters to be evaluated (since G is the constant): m1, m2 and F (consider all are floating-point numbers)
2. **Formula 2** requires 2 parameters to be evaluated: x (a floating-point number) and n (integral number): (precision - the number of terms to be accumulated)
    a. i.e., if n = 4 then your program should calculate $sin(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!}$ only.

Please, do the following as instructed:

1. Write a java program (save it in the file **Assignment1.java**) that can take some input parameters from command line:
    a. Your execution should be as follows:
        i. **Assignment1** 1 100 250 500

ii. Here the first parameter **1** is the operation code (i.e., Formula 1) and the rest are the parameters ***m1***, ***m2*** and ***F*** respectively.
iii. Output: **5.777e-05**
iv. **Assignment1** 2 3.5 7
v. Here **2** is the operation code (i.e., Formula 2) and the rest are the parameters *x* and *n* respectively. **Note**: as you change the value of n, the output will change.
vi. Output: **-3.507e-01**

Doing so far you will get **[80 / 100]**.
If you want some more, please read ahead.

2. We never solely rely on the end user, so add some error checking or validation to your program. If a user enters some irrelevant or invalid numbers print out a proper error message so that the end user knows what s/he did wrong. **[20 / 100]**
    a. User must enter a valid number of parameters.
    b. User must enter positive values for **masses** or **force** in the first formula**.**
    c. User must enter positive value for **n** in the second formula.