

Forman Christian College, Lahore

(A Chartered University)

Assignment 1

Due: Monday 25/2/2013 at 5 pm

Program Description

Your friend is taking a math course and is having a hard time taking derivatives and integrals. You plan to help him out using a java program. Write a program called Calculus.java, which should have the following functionality:

- Ask for the username. Hint: use `scan.nextLine()`;
- Ask the user for three integers, a,b, and c. These integers represent the coefficients of our quadratic equation: $ax^2 + bx + c$.
- Print the equation entered by the user.
- Next print out the derivative for the equation. Hint: The derivative for the given equation is $2ax + b$. Your program should perform any necessary calculation based on the input. So if the user had entered a as 2 and b as 3, it should print out, $4x + 3$. See sample run below.
- Next print out the integral of the equation.

Hint: For the quadratic equation, $ax^2 + bx + c$, the integral is

$$\frac{ax^3}{3} + \frac{bx^2}{2} + cx$$

If you see incorrect results after dividing, use 3.0 instead of 3 and 2.0 instead of 2 in your code.

- Next ask the user for x. x could be any number not just an integer. So choose the appropriate variable type.
- Print out the value of the derivative and the integral at the point chosen by the user.
- Finally print out an ending message containing the name of the user and your name saying your friend owes you dinner for helping him out.

Sample run

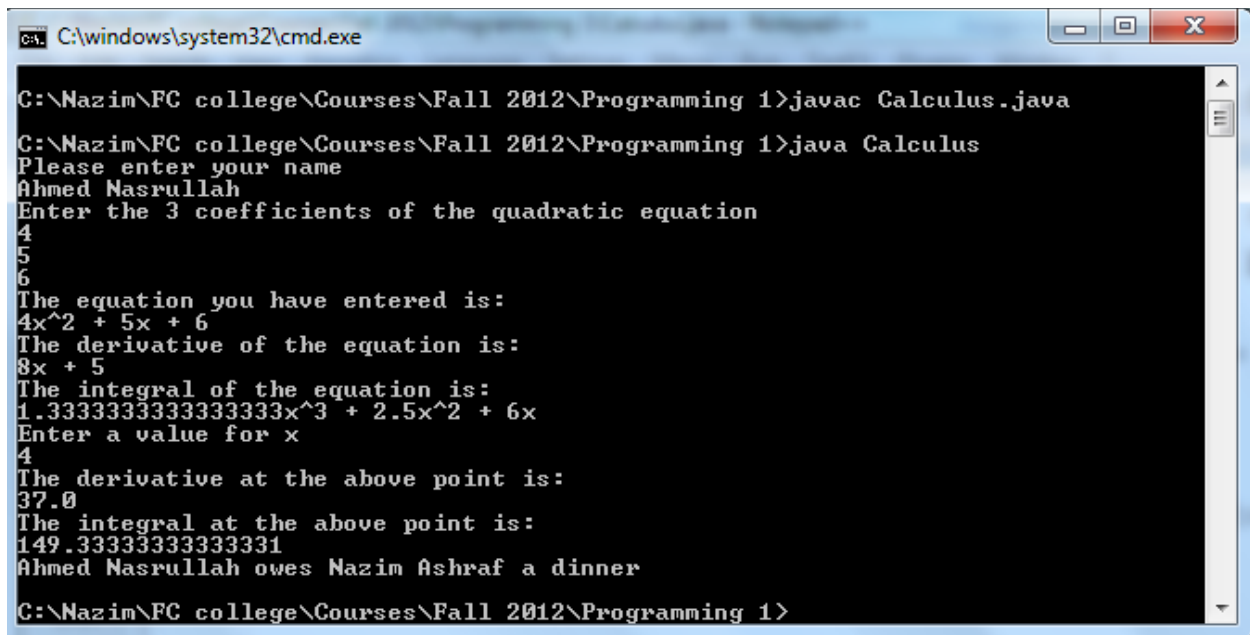
See below...

Submission instructions

You need to submit the following files:

- Calculus.java

- A screenshot of the console compiling and running the program with a sample run. To take a picture of the console window, you need to press PrtSc while pressing Alt. Paste this image file in Paint, and save the image file as screenshot.png. The screenshot should look something like this:



```

C:\windows\system32\cmd.exe

C:\Nazim\FC college\Courses\Fall 2012\Programming 1>javac Calculus.java
C:\Nazim\FC college\Courses\Fall 2012\Programming 1>java Calculus
Please enter your name
Ahmed Nasrullah
Enter the 3 coefficients of the quadratic equation
4
5
6
The equation you have entered is:
4x^2 + 5x + 6
The derivative of the equation is:
8x + 5
The integral of the equation is:
1.3333333333333333x^3 + 2.5x^2 + 6x
Enter a value for x
4
The derivative at the above point is:
37.0
The integral at the above point is:
149.33333333333333
Ahmed Nasrullah owes Nazim Ashraf a dinner
C:\Nazim\FC college\Courses\Fall 2012\Programming 1>

```

You need to email the two files(Calculus.java and screenshot.png) to TA.comp102@gmail.com with the subject as “COMP 102 - Assignment 1 - Roll number” and attach the required files.

Notes on Grading

- All variables should have informative names.
- Your input/output should match the examples.
- Every program must have comments. There should be header comments in your program including your name and a brief introduction of the program. You should have at least one comment besides that.
- Any plagiarism/ cheating would be strictly dealt with.
- Use correct indentation.
- 1 day late assignment would be penalized by a 10% grade deduction. 2 days late would be penalized by 25% grade deduction. Assignments submitted 2 days after the submission date would not be accepted.
- Failure to send Calculus.java would result in a zero for the assignment. Failure to send screenshot.png would result in 20% grade deduction.

Derived from http://www.cs.columbia.edu/~boyaci/courses/w3101_spring_09/W3101.html