

I. A) A Common Error

1a) Open **AP1ch03lab03a.java** and **AP1ch03lab03aTest.java**

b) Run **AP1ch03lab03aTest.java** and write the output:

grade average: \_\_\_\_\_

final exam: \_\_\_\_\_

final average: \_\_\_\_\_

2) Use a calculator to find the final average if the grade average is 80% of the final grade and the final exam is 20% of the final grade (4 times the average + the final all divided by 5) i.e.  $(4 \cdot \text{ave} + \text{final}) / 5$

a) What is the average according to the calculator? \_\_\_\_\_

3) Are the final averages in 1b) and 2a) the same? (yes/no) \_\_\_\_\_

B) Roundoff error (3.3 pp.104-105)

1a) Open **AP1ch03lab03b.java**

b) Run and write the output: x = \_\_\_\_\_ and 100 times x = \_\_\_\_\_

2a) Change the **x = 4.36;** to **x = 4.35;**

b) Run and write the output: x = \_\_\_\_\_ and 100 times x = \_\_\_\_\_

c) Is this the result we should have gotten? (yes/no) \_\_\_\_\_

**Summary:** The `getgrade()` method used to calculate the average in part A)#1b) is the same one listed in A)#2) above yet it has a result that is not correct. This error results in some calculations because of the computer converting and working in base 2 and then converting back again. In part B) the roundoff error occurs because 4.35 cannot be represented exactly as a binary number. When the floating point number is converted to an **int** the decimal part is dropped off resulting in a wrong result.

\*Note: To fix this use `Math.round()` before converting to an **int** then the decimal part is not dropped off. More about `Math.round()` in the next lab.

**Turn in this sheet to be graded!**