**COMP 1800 – Fall 2016**

**Classwork 5: Data Types and Expressions**

**(20 points)**

Number of People: Teams of up to 2. If you work with a teammate, only one submission is needed. Be sure to put both of your names on the paper. Feel free to ask Swaroop for help!

Due: Sept. 15, by the end of class

Submission: Turn in this assignment as a hard copy before the end of class; no electronic submission is necessary.

Grader: TA, Swaroop Goli ([ssgoli@memphis.edu](mailto:ssgoli@memphis.edu)). Questions about grading? Please contact him first!

For each of the following problems **(4 pts each)**, write a single Python expression that will calculate the answer for you. You don’t need to write the answer, just the expression you used to get it.

1. There is a theory that says it takes 10,000 hours of dedicated practice to master a particular skill (whether it’s programming, playing a musical instrument, or underwater bear wrestling). Convert this amount of time into seconds.
2. You come up with a new text encoding scheme (like ASCII or Unicode) that uses 24 bits of data to represent each character. Compute how many different characters this encoding scheme could support.
3. In class we discussed an example of using the formula . This assumes that the interest is compounded annually – in other words, interest is calculated and paid once per year. In real life, it’s more common to see interest compounded monthly. This changes the formula a little. It becomes  
   , where the variables have the same meanings as before:  
     
    *P*(*t*) amount of money in the account after *t* years  
    *P*0 initial principal (how much money you have at the beginning)  
    *r* annual interest rate  
    *t* number of years  
     
   Compute how much money you would have in an account that’s compounded monthly if you invest $25,000 today into the stock market and let it sit for 30 years. Assume that the market returns an average of 7% per year. (Based on historical data, this is a fairly realistic figure!)
4. You’re playing a computer game in which your character has two types of attacks: a fast basic attack that does 5 damage, and a slow strong attack that does 37 damage. You are fighting an opponent with 250 health. Compute the number of basic attacks that your opponent can withstand, assuming that you first use only strong attacks to bring down his health as far as possible without defeating him.
5. You’ve just finished a romantic Valentine’s Day dinner with your significant other. The two of you ordered a total of $52.84 worth of food. Compute the total cost of the meal (food + tax + tip), assuming that the tax rate is 9.25% (the Memphis rate), and you wish to tip 18% of the price after tax.