HW1: CS 110X C 2014

This homework **must be completed by each student individually**. When you complete this assignment, do not share your answers with any other student, not even your prospective programming partner.

|  |  |
| --- | --- |
| Q1 | Basic expressions |
|

|  |
| --- |
| [Skills](http://web.cs.wpi.edu/~heineman/html/teaching_/cs110x/c14/days/Skills.htm) |
| PS-2PS-10DT-1DT-2DT-3 |

|  |
| --- |
| LectureDependency |
| [day01](http://web.cs.wpi.edu/~heineman/html/teaching_/cs110x/c14/days/day01.html) |

 | Let’s get started with a question that you can answer after the first lecture. Given the following five mathematical expressions with a=4, b=11, and c=7, the equivalent Python expressions are shown below. You are asked to compute these values.

|  |  |  |  |
| --- | --- | --- | --- |
| # | Mathematical Expression | Equivalent Python Expression | Value |
| 1) | $$4ac$$ | 4\*4\*7 |  |
| 2) | $$b^{2}$$ | 11 \*\* 2 |  |
| 3) | $$\sqrt[a]{b}$$ | 11 \*\* (1.0/4) |  |
| 4) | $$\frac{a}{b}+ \frac{b}{c}$$ | 4.0/11 + 11.0/7 |  |
| 5) | $$\frac{-b+\sqrt{b^{2}-4ac}}{2a}$$ | (-11 + (11 \*\* 2 - 4\*4\*7)\*\*0.5)/(2.0\*4) |  |

Type these Python expressions in IDLE and report their value. Do the same for the following three expressions. Report the values directly in the HW1.py file.

|  |  |  |
| --- | --- | --- |
| # | Python Expression | Value |
| 6) | 8/5–5/8 |  |
| 7) | 3+4/5–6+7\*8 |  |
| 8) | 8/5.0–5.0/8 |  |

 |

|  |  |
| --- | --- |
| Q2 | Demonstrate ability to write a function |
|

|  |
| --- |
| [Skills](http://web.cs.wpi.edu/~heineman/html/teaching_/cs110x/c14/days/Skills.htm) |
| PF-1PS-1PS-2SM-2SM-3DT-1DT-2 |

|  |
| --- |
| LectureDependency |
| [day02](http://web.cs.wpi.edu/~heineman/html/teaching_/cs110x/c14/days/day02.html) |

 | Define a function in HW1.py called windChill. This function must **actually perform the following computation** defined by the National Weather Service, where T is the current temperature in Fahrenheit and V is wind velocity in miles per hour.Wind chill l = $35.74 + 0.6215\*T-35.75\*V^{0.16}+0.4275\*T\*V^{0.16}$

|  |
| --- |
| Sample Output |
| >>> windChill(-10,5)At -10F and 5mph winds it feels like -22.2555359542F |

The first function argument is Fahrenheit temperature. The second is wind velocity.For temperatures of 0°F and 5°F, experiment with **integer** wind velocities whose computed wind chill **comes the closest** to -22.25°F. **Report these wind velocities in the HW1.py file.** |

|  |  |
| --- | --- |
| Q3 | Debugging skills on display |
|

|  |
| --- |
| [Skills](http://web.cs.wpi.edu/~heineman/html/teaching_/cs110x/c14/days/Skills.htm) |
| DG-1DG-2DG-3PF-1PS-2IO-1SM-3 |

|  |
| --- |
| LectureDependency |
| [day02](http://web.cs.wpi.edu/~heineman/html/teaching_/cs110x/c14/days/day02.html) |

 | What is wrong with the following Python program?

|  |
| --- |
| COMMENT: Pythagorean examplemain(): side1 = 3 side2 = 4 long side = side1\*side1 + side2\*side1 \*\* 0.5 print ("hypotenuse is long side") |

There are six defects (some Syntax, Some Logic). Identify **four defects** and **explain how you would fix each one**. Then **write down what the output of the program should be if all defects are fixed**. Recall that you can run this module by selecting **Run 🡪 Run Module** in the IDLE editor. Once the Python shell appears, invoke the main method by typing main() at the >>> prompt. |

|  |  |
| --- | --- |
| Q4 | Capstone: Demonstrate ability to synthesize program from facts and formulae  |
|

|  |
| --- |
| [Skills](http://web.cs.wpi.edu/~heineman/html/teaching_/cs110x/c14/days/Skills.htm) |
| CS-5CS-9DT-1DT-2 |

|  |
| --- |
| LectureDependency |
| [day03](http://web.cs.wpi.edu/~heineman/html/teaching_/cs110x/c14/days/day03.html) |

 | The [NCAA passing efficiency formula](http://en.wikipedia.org/wiki/Passer_rating) evaluates the performance of passing in a college football game. Write a function *BCS2014rating()* that computes the passing efficiency for a quarterback after receiving information from the keyboard.Use your function to compute the QB rating for the winning and losing quarterbacks of [The BCS National Champsionship Game](http://en.wikipedia.org/wiki/2014_BCS_National_Championship_Game) held on January 6 2014. Enter these computed ratings into HW1.pyWinning QB rating = ANSWERLosing QB rating = ANSWER |

|  |
| --- |
| Sample Output |
| >>> BCS2014Rating()**Enter passing yards:** 2260**Enter touchdown passes:** 13**Enter passes thrown:** 322**Enter passes made:** 206**Enter number of interceptions:** 13Passer Rating of 128.180124224 |

Compare your program with sample output from existing [web sites](http://www.teamrankings.com/college-football/matchup/blue-devils-tigers-week-2-2013/rosters). |
| *[Ungraded] Based on your results, do you believe this formula is effective in identifying who the winning quarterback of a game was?* |

# Homework TurnIn Specification

Every Python module you write must include comments that declare the name of the assignment and the author. For example,

|  |
| --- |
| # HW1. # Author: George Heineman… |

For this individual homework, only your name goes in the file. For future paired assignments, both names of the students must be entered into the file.

You will submit this assignment using [***turnin***](http://web.cs.wpi.edu/~kfisler/turnin.html). If you are unable to log into turnin, please contact the instructor. You should have received a turnin password by email. If you have not, contact your professor.

Instructions are available on the class website. For this particular assignment, you **must** submit a single HW1.py file that conforms to the [template](http://web.cs.wpi.edu/~heineman/html/teaching_/cs110x/c14/Homeworks/HW1.py) that has been made available. A [detailed point-by-point rubric is available](http://web.cs.wpi.edu/~heineman/html/teaching_/cs110x/c14/Homeworks/HW1_rubric.xlsx).

# Revisions

1. Question 1 Part 5 was missing the inner square root. This has been fixed.