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Optional: name of "homework buddy" (leaving this blank signifies "I worked alone")

# 1

# h01

CS8 M18

## h01: Perkovic Ch1 (Introduction to CS), 2.1, 2.2 (Expr, Vars, Assignment, Strings), 2.3 (Lists, Tuples)

ready?	assigned	due	points
true	Tue 08/07 09:30AM	Tue 08/14 09:30AM	280

You may collaborate on this homework with AT MOST one person, an optional "homework buddy".

MAY ONLY BE TURNED IN IN THE LECTURE/LAB LISTED ABOVE AS THE DUE DATE.

There is NO MAKEUP for missed assignments, and you may not submit work in advance, or on behalf of another person.

In place of that, we drop the lowest score (if you have a zero, that is the lowest score.)

### READING ASSIGNMENT

Please read Chapter 1 in Perkovic. Then complete these problems.

- (10 pts) Please fill in the information at the top of this homework sheet, including your name and umail address. If the other two items apply, please fill them in as well. Please do this every single time you submit homework for this class. It is important to fill in both name and umail every time, since handwriting is sometimes difficult to decipher. Having both helps us ensure you get credit for your work.

Also: JUST write your name at the top of all sheets and turn in all sheets UNCONNECTED.

DO NOT staple, paper clip, spit-fold-and-tear, or do ANYTHING that would make it difficult to automatically feed your paper through a scanner.

- Section 1.1 describes Computer Science in general. It includes a passage that distinguishes between models, algorithms and programs. I'm going to ask two questions about the relationships among these concepts. In your answer, don't just copy down an exact quote from the textbook; explain in your own words. If you don't think you understand the relationship, be honest about that, and write down what you are confused about, or your best guess at what the author is trying to say.
  - (5 pts) What is the relationship between a *model* and an *algorithm*?

- (5 pts) What is the relationship between an *algorithm* and a *program*?

- (10 pts) Section 1.2 describes Computer Systems in general. According to our author, why did computer scientists create programming languages such as Python, C, C++, Java, etc.?

4. Continuing with questions from Section 1.2:

a. (10 pts) The author makes a distinction between the "core set" of features in a programming language, and those that are put into "software libraries". What are two examples of features that end up in libraries rather than in the core language?

b. (10 pts) What is the advantage of putting those features into libraries rather than into the core?

c. (10 pts) APIs (Application Programming Interfaces) are important in programming—our author gives a nice clear explanation of what an API is. What is that explanation?

5. Section 1.3 describes the Python programming language.

a. (10 pts) What is the interactive shell used for?

b. (10 pts) What does a Python program consist of?

6. Section 1.4 contains a description of a sample problem that the author uses to illustrate "computational thinking". The author notes that in applying computational thinking to a problem, one of the steps we take is to decide which details of the problem are important, and which are not.

a. (10 pts) Give two examples of details about the problem statement that, according to the author's discussion, are not relevant, and should be ignored.

b. (10 pts) Give two examples of details that are definitely relevant, and that we need to pay attention to in coming up with a solution.

**2**  
**h01**  
**CS8 M18**

**READING ASSIGNMENT** Please read Perkovic 2.1, 2.2 (Expr, Vars, Assignment, Strings). Then complete these problems.

7. Section 2.1 describes how several operators and built in functions in Python work. What would be the result of entering the following at the Python interactive shell prompt?

(Note: You are encouraged to check your answers at the Python prompt before turning in your work, but try this on paper first, just by reading the text and trying to predict what will happen. Then try typing in the results at the Python prompt. Change your answers if they were mistaken, but even more important, try to figure out why you were incorrect.)

Be very precise. Note that `True` is not the same in Python as `true`; upper vs. lower case matters. You will not get full credit for answers that are not precisely correct.

Points	Expression	Result	Points	Expression	Result
(4 pts)	<code>2 + 3 * 5</code>		(4 pts)	<code>4 &lt; 3</code>	
(4 pts)	<code>19 % 3</code>		(4 pts)	<code>1 + 2 == 3</code>	
(4 pts)	<code>5 ** 2</code>		(4 pts)	<code>True and False</code>	
(4 pts)	<code>7 // 2</code>		(4 pts)	<code>True or False</code>	
(4 pts)	<code>9 // 2</code>		(4 pts)	<code>5 != 10//2</code>	

3  
h01  
CS8 M18

8. (5 pts) As described in section 2.1, a Python assignment statement contains the assignment operator, an expression and a variable, but not in that order.

What is the correct order for these three parts, reading from left to right?

9. (5 pts) Section 2.1 contains a list of thirty-three *reserved words* in Python that may not be used as the name of a variable. You don't need to memorize this list, but you do need to know where to find it, either in the book, or online. So, to be sure you can find it, list all of the Python reserved words that start with the letter **c** or **f**.

10. Section 2.2 describes strings in Python, including the concepts of “dictionary order” (also called “lexicographic order”), concatenation of strings, multiplication of strings times an integer, the `in` operator, the `not in` operation, the `len` function, and string indexing. Review that material.

Then, assuming the following assignment statements have been entered at the Python prompt:

```
school = "UCSB"
course = "CS8"
qtr = "M17"
```

Indicate the value of each of these expressions:

	Expression	Result		Expression	Result
(4 pts)	<code>school * 2</code>		(4 pts)	<code>school &gt; course</code>	
(4 pts)	<code>qtr[1:3]</code>		(4 pts)	<code>qtr &lt; school</code>	
(4 pts)	<code>course[0:2]</code>		(4 pts)	<code>len(qtr) &gt; 4</code>	
(4 pts)	<code>'D' in school</code>		(4 pts)	<code>school[-1]</code>	
(4 pts)	<code>'E' not in school</code>		(4 pts)	<code>school[0]</code>	

**READING ASSIGNMENT** Please read Perkovic 2.3 (Lists, Tuples). Then complete these problems.

11. Section 2.3 describes lists and tuples in Python. Assuming the following assignment statements have been entered at the Python prompt:

```
schools = ("UCSB", "Stanford", "UCLA", "UCSD", "Cal Tech")
schedules = [ ["CMPSC 8", "MATH 3A"], ["CMPSC 8", "PSTAT 5A"], ["MATH 3B"] ]
units = [8, 8, 4]
```

What would be the result of entering the following at the Python interactive shell prompt?

(Note: You are encouraged to check your answers at the Python prompt before turning in your work, but try this on paper first, just by reading the text and trying to predict what will happen. Then try typing in the results at the Python prompt. Change your answers if they were mistaken, but even more important, try to figure out why you were incorrect.)

Be very precise. Note that `True` is not the same in Python as `true`; upper vs. lower case matters. You will not get full credit for answers that are not precisely correct. And note that `"UCSB"` and `["UCSB"]` are not the same in Python—one is a string, and the other is a list of length one containing a single string.

Points	Expression	Result	Points	Expression	Result
(4 pts)	<code>len(schedules)</code>		(4 pts)	<code>sum(units)</code>	
(4 pts)	<code>len(units)</code>		(4 pts)	<code>"CMPSC 8" in schedules[0]</code>	
(4 pts)	<code>len(schedules[1])</code>		(4 pts)	<code>"UCSD" in schools</code>	
(4 pts)	<code>len(schools[-1])</code>		(4 pts)	<code>"U" in schools[1]</code>	
(4 pts)	<code>min(units)</code>		(4 pts)	<code>"MATH 3A" in schedules</code>	

5

h01  
CS8 M18

# 6

## h01

### CS8 M18

12. (5 pts) As described in section 2.3, lists and tuples are similar, but there are two big differences. One is that lists are written with square brackets [ ] while tuples are written with parentheses ( ). What is the other big difference between lists and tuples?

13. (5 pts) Write a line of Python code that assigns the variable `mySchool` to have a value that is a tuple of length 1, containing the single string "UCSB".

14. Assume that the following sequence of statements has been entered at the Python prompt. Note that subsequent statements may change the value of the variables (e.g. `colors` is altered by the call to the `append` method)

```
colors = ["red", "red", "green"]
colors.append("blue")
colors.reverse()
```

Points	Expression	Result	Points	Expression	Result
(4 pts)	<code>len(colors)</code>		(4 pts)	<code>colors[-1][-1]</code>	
(4 pts)	<code>colors[0]</code>		(4 pts)	<code>colors[2][0]</code>	
(4 pts)	<code>colors.count("red")</code>		(4 pts)	<code>"blue" not in colors</code>	
(4 pts)	<code>colors.count("blue")</code>		(4 pts)	<code>colors.count(colors[-1])</code>	
(4 pts)	<code>len(colors[1])</code>		(4 pts)	<code>"e" in colors[0]</code>	