Finger Exercises due Mar 31, 2021 16:30 PDT

Exercises 1

4 points possible (graded)

**ESTIMATED TIME TO COMPLETE: 4 minutes**  
**Note that you will have to answer all questions before you can click the Check button.**

1. What is the difference between an Algorithm and a Program?

An algorithm is a conceptual idea, a program is a concrete instantiation of an algorithm.

An algorithm is limited to mathematical operation, a program can specify all kinds of operations.

An algorithm makes a slow program run fast.

An algorithm deals with computer hardware, a program deals with computer software.

1. True or False? A computational mode of thinking means that everything can be viewed as a math problem involving numbers and formulas.

True

False

1. True or False? Computer Science is the study of how to build efficient machines that run programs.

True

False

https://www.internationalstudent.com/study-computer-science/what-is-computer-science/

1. The two things every computer can do are:

Perform calculations

Convert electricity to numbers

Display results to a screen

Remember the results

Finger Exercises due Mar 31, 2021 16:30 PDT

Exercises 2

3 points possible (graded)

**ESTIMATED TIME TO COMPLETE: 3 minutes**  
**Note that you will have to answer all questions before you can click the Check button.**

True or False?

1. Declarative knowledge refers to statements of fact.

True

False

1. Imperative knowledge refers to 'how to' methods.

True

False

1. A recipe for deducing the square root involves guessing a starting value for y. Without another recipe to be told how to pick a starting number, the computer cannot generate one on its own.

True

False

Finger Exercises due Mar 31, 2021 16:30 PDT

Exercises 3

5 points possible (graded)

**ESTIMATED TIME TO COMPLETE: 5 minutes**  
**Note that you will have to answer all questions before you can click the Check button.**

1. True or False? A stored program computer is designed to compute precisely one computation, such as a square root, or the trajectory of a missile.

True

False

1. True or False? A fixed program computer is designed to run any computation, by interpreting a sequence of program instructions that are read into it.

True

False

1. A program counter

counts the number of primitive operations executed by the program.

counts the number of primitive operations comprising a complex operation.

points the computer to the next instruction to execute in the program.

remembers how many times a program has been executed.

1. What does it mean when we say that "the computer walks through the sequence executing some computation"?

The computer tests each instruction to ensure it will not harm the circuitry.

The computer executes the instructions in strict, linear sequence, just like walking in a straight line.

The computer executes the instructions mostly in a linear sequence, except sometimes it jumps to a different place in the sequence.

The computer slowly executes instructions so that we can follow its progress, rather than running a program at full speed.

1. True or False? In order to compute everything that is computable, every computer must be able to handle the sixteen most primitive operations.

True

False

Finger Exercises due Mar 31, 2021 16:30 PDT

Exercises 4

3 points possible (graded)

**ESTIMATED TIME TO COMPLETE: 2 minutes**  
**Note that you will have to answer all questions before you can click the Check button.**

Choose the term described by each of the following definitions.

Definitions:

1. Determines whether a string is legal



1. Determines whether a string has meaning



1. Assigns a meaning to a legal sentence



Finger Exercises due Mar 31, 2021 16:30 PDT

Exercise 5

5 points possible (graded)

**ESTIMATED TIME TO COMPLETE: 3 minutes**  
**Note that you will have to answer all questions before you can click the Check button.**

For each of the following expressions, indicate the type of the expression. While you could simply type these expressions into your shell, we encourage you to answer them directly since this will help reinforce your understanding of basic Python expressions.

[Note: The Python 'None' keyword](https://courses.edx.org/xblock/block-v1:MITx+6.00.1x+1T2021+type@vertical+block@1463ebb8ee2a47ad9b38108f1acc5e15?show_title=0&show_bookmark_button=0&recheck_access=1&view=student_view&format=Finger%20Exercises)

* 3.14



* -34



* True



* None



* 3.0



Finger Exercises due Mar 31, 2021 16:30 PDT

Exercise 6

8/10 points (graded)

**ESTIMATED TIME TO COMPLETE: 5 minutes**  
**Note that you will have to answer all questions before you can click the Check button.**

For each of the following expressions, indicate the value returned, or if the evaluation would lead to an error, write the word 'error' (note this is a word, not a string, no quotes). While you could simply type these expressions into an IDE, we encourage you to answer them directly since this will help reinforce your understanding of basic Python expressions.

For decimal answers, give the full result, or four decimal places of accuracy (whichever is shortest).

[Floating point errors](https://courses.edx.org/xblock/block-v1:MITx+6.00.1x+1T2021+type@vertical+block@2e5d05f90261413aabf38966ecee8798?show_title=0&show_bookmark_button=0&recheck_access=1&view=student_view&format=Finger%20Exercises)

* 6 + 12 -3



* 2 \* 3.0



* - - 4



* 10/3



* 10.0/3.0



* (2 + 3) \* 4



* 2 + 3 \* 4



* 2\*\*3 + 1



* 2.1 \*\* 2.0



* 2.2 \* 3.0



Finger Exercises due Mar 31, 2021 16:30 PDT

Exercise 7

6/6 points (graded)

**ESTIMATED TIME TO COMPLETE: 3 minutes**  
**Note that you will have to answer all questions before you can click the Check button.**

Below is a transcript of a session with the Python shell. For each expression being evaluated, provide the type and the value the expression returns. If evaluating an expression would cause an error, select 'NoneType' and write the word 'error' (note this is a word, not a string, no quotes) in the box. While you could simply type these expressions into your IDE, we encourage you to answer them directly since this will help reinforce your understanding of basic Python expressions.

Assume that the expressions are evaluated in the order shown - that is, each problem part is evaluated directly after the previous problem part(s).

>>> a = 3

>>> a + 2.0





>>> a = a + 1.0

>>> a





>>> a = 3

>>> b





Finger Exercises due Mar 31, 2021 16:30 PDT

Exercise 8

12/12 points (graded)

**ESTIMATED TIME TO COMPLETE: 6 minutes**  
**Note that you will have to answer all questions before you can click the Check button.**

For each of the following expressions, indicate the value returned, or if the evaluation would lead to an error, write the word 'error' (note this is a word, not a string, no quotes). While you could simply type these expressions into your IDE, we encourage you to answer them directly since this will help reinforce your understanding of basic Python expressions.

[Hint: Python boolean types](https://courses.edx.org/xblock/block-v1:MITx+6.00.1x+1T2021+type@vertical+block@e9eab35c19df4b3a8f67c0f7c6bdbb87?show_title=0&show_bookmark_button=0&recheck_access=1&view=student_view&format=Finger%20Exercises)

[Hint: Priority order of Boolean operations](https://courses.edx.org/xblock/block-v1:MITx+6.00.1x+1T2021+type@vertical+block@e9eab35c19df4b3a8f67c0f7c6bdbb87?show_title=0&show_bookmark_button=0&recheck_access=1&view=student_view&format=Finger%20Exercises)

* 3 > 4



* 4.0 > 3.999



* 4 > 4



* 4 > + 4



Why dose 4 > + 4 not give an error? Are we allowed to combine greater than or less than with another operator?

Using + or - next to a variable or literal denotes unary operator that applies to only one variable/literal. Because 4 is a integer literal and positive, the unary + doesn't have a side effect because 4 is already a positive number. So it ends up with the expression: 4 > 4

* 2 + 2 == 4



* True or False



* False or False



* not False



* 3.0 - 1.0 != 5.0 - 3.0



* 3 > 4 or (2 < 3 and 9 > 10)



* 4 > 5 or 3 < 4 and 9 > 8



* not(4 > 3 and 100 > 6)



Finger Exercises due Mar 31, 2021 16:30 PDT

Exercise 9

4/4 points (graded)

**ESTIMATED TIME TO COMPLETE: 3 minutes**  
**Note that you will have to answer all questions before you can click the Check button.**

Below is a transcript of a session with the Python shell. For each expression being evaluated, provide the type and the value that the **last expression in the transcript returns**. If evaluating an expression would cause an error, select 'NoneType' and write the word 'error' (note this is a word, not a string, no quotes) in the box. While you could simply type these expressions into your IDE, we encourage you to answer them directly since this will help reinforce your understanding of basic Python expressions.

Assume that the expressions are evaluated in the order shown - that is, each problem part is evaluated directly after the previous problem part(s).

>>> a = 3

>>> a == 5.0

>>> a





>>> b = 10

>>> c = b > 9

>>> c





Finger Exercises due Mar 31, 2021 16:30 PDT

Exercise 10

16/16 points (graded)

**ESTIMATED TIME TO COMPLETE: 5 minutes**  
**Note that you will have to answer all questions before you can click the Check button.**

For each of the following expressions, indicate the type of the expression and the value returned, or, if the evaluation would lead to an error, choose the type 'NoneType' and write the word 'error' (note this is a word, not a string, no quotes) as the value returned.

While you could simply type these expressions into your IDE, we encourage you to answer them directly since this will help reinforce your understanding of basic Python expressions.

* 3 + 5.0





* 5/2





* 5/2 == 5/2.0





* 5/2.0





* round(2.6)





* int(2.6)





* 2.0 + 5.0





* 5\*2 == 5.0 \* 2.0



