Assignment on Programming Languages for CS50L

Total points 8/10

Starting in 2021, all assignments in CS50L are out of 10 points. A score of 7 points or better (70%) is required to be considered to have "passed" an assignment in this course. Please do not resubmit an assignment if you have already obtained a passing score. You don't receive a final grade at the end of the course, so it will have no bearing on your certificate, and it will only slow down our graders!

Unlike CS50x, assignments in this course are graded on a set schedule, and depending on when you submitted, it may take up to three weeks for your work to be graded. Do be patient! Project scores and assignment status on cs50.me/cs50l (e.g. "Your submission has been received...") will likely change over time and are not final until the scores have been released.

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What is your GitHub username?

You only need to tell us if you are concerned about checking your progress in the course and/or you want a free CS50 Certificate after you satisfy all of the requirements of the course. If you do not already have a GitHub account, you can sign up for one at https://github.com/join. You can then use this account to log in to cs50.me/cs50l to track your progress in the course (your progress will only show up after you have received at least one score release email from CS50 Bot, so do be patient!). Don't worry about seeing a 'No Submissions' message on submit.cs50.io, if you find that. The course collects submissions using Google Forms, and only the gradebook on cs50.me/cs50l is important! If you do decide to provide us with a GitHub username, BE CERTAIN IT IS CORRECT. If you provide the wrong username, you will not be able to see your scores.

https://github.com/maz786

This course is graded by human graders, and has a ZERO TOLERANCE plagiarism and collaboration policy. If *any* of your answers are copied and pasted from, or obviously based on (a) an online source or (b) another student's work in the course, in *any* of the course's ten assignments, you will be reported to edX and removed from the course immediately. There is no opportunity for appeal. There are no warnings or second chances. *

It is far better, we assure you, to leave an answer blank rather than risk it. This may be an online course, but it is offered by Harvard, and we're going to hold you to that standard.

◉ I understand this policy and agree to its terms; I hereby affirm that I will not plagiarize any answers or collaborate with any other students in this course .

✓ What is a "register"? In what context do humans (occasionally) encounter references to them? 1/1

A register is a physical part of a computer's processor that serves to store data and instructions for later usage or processing. The CPU uses registers, which are extremely rapid storage spaces, to store data that it is currently working on or needs to access quickly.

Any storage area used to store data within a computer can be referred to as a register in general. In this sense, references to registers may come up in system design, computer programming, or computer architecture.

In the context of record-keeping or archival work, the word "register" can also refer to a formal record or list of things or events, such as a register of births or a register of historical documents.

✓ In your own words, what's a compiler? 1/1

A compiler is a programme that converts source code written in a high-level programming language into computer executable machine code. A programmer creates the source code using a language like C++, Java, or Python. A low-level, binary version of the programme that can be directly executed by the computer's processor is the machine code that the compiler generates.

A programme must be assembled in a number of steps. The compiler first scans the source code and looks for syntactic mistakes. The compiler will communicate any errors it finds to the programmer and halt compilation if necessary. If the source code doesn't include any errors, the compiler will convert it to machine code and create an executable file that can be used to run the programme.

As they enable programmers to create code in a high-level language that is simpler to read and comprehend while still creating machine code that can function effectively on the target platform, compilers are a crucial component of the software development process.

✓ What is an advantage that is afforded by the fact that Python uses "bytecode"? 1/1

Python's use of bytecode has the benefit of enabling faster code execution by the interpreter. The Python interpreter first compiles the source code into bytecode before running the application. The interpreter then runs this bytecode, reading and carrying out each instruction one at a time.

The bytecode can be executed more quickly than it would if the interpreter had to compile the source code each time the programme was run since it has previously been compiled from the source code. This can significantly alter how well-performing big or complicated systems operate.

Python's use of bytecode has the added benefit of making it simpler to run applications on various systems. Without the need to recompile the source code, the bytecode can be run on any system that has a Python interpreter installed because it is platform-independent. As a result, it is simpler to deploy Python programmes in a variety of settings, which can speed up the software development process.

✓ What is a Boolean expression? Provide an example (in English or pseudocode) of one. 1/1

A statement that can only be true or false is called a boolean expression. Boolean algebra takes its name from George Boole, who created the logic framework that serves as its foundation in the 19th century.

Boolean expressions are frequently used in programming to regulate a program's flow in conditional statements like if statements and while loops.

Here is an example of an English Boolean expression:

"It is warmer than freezing."

If the temperature is above freezing, this Boolean expression would be true, and if it is at or below freezing, it would be false.

Here is an example of a pseudocoded Boolean expression:

x > 5

If the value of x is more than 5 and less than or equal to 5, then this Boolean expression would be true.

Watch

Take a closer look at the implications of (not understanding) floating-point imprecision by way of this video.

✗ Explain, in no more than three sentences, how overflow led to the explosion of an Ariane 5 rocket. 0/1

You might find that http://www.nytimes.com/1996/12/01/magazine/little-bug-big-bang.html and http://www-users.math.umn.edu/~arnold/disasters/ariane5rep.html offer a bit more detail. Make sure your answer covers overflow sufficiently well to convince us of your understanding.

Rocket's debut launch on June 4, 1996 ended in disaster when it deviated from path & exploded 37 secs after takeoff. Investigation revealed software flaw in guidance system caused malfunction. Conversion of rocket's position from 64-bit float to 16-bit int had buffer overflow, leading to inaccurate result & explosion.

✗ Explain, in no more than three sentences, what floating-point imprecision is and what can cause it to occur. 0/1

Inaccurate representation of some decimal numbers in the binary system of a computer is referred to as floating-point imprecision. When applying mathematical operations to these numbers, especially when they are extremely large or extremely small, this can result in inaccuracies. The hardware restrictions of the computer and the manner that numbers are expressed and kept in memory can both contribute to floating-point imprecision.

Python

For these two exercises we'll use a site called replit.com, which provides a lightweight online IDE for writing simple programs. We recommend you log in using your GitHub account at replit.com before beginning (this will make it a lot easier to find and rename your "repl"s if you need to go back), but it is also okay to create so-called "repl"s anonymously.

To begin, visit https://replit.com/@dlloyd09/CS50Pseudorandom. There you'll find a file written by Doug that contains a program which, quite simply, generates a pseudorandom integer between 1 and 10, inclusive, assigns it to a variable, and prints it. Doug has also taken care to annotate his file with comments. To understand how things work in more detail, you might find Python's official documentation, https://docs.python.org/3/library/random.html#functions-for-integers, or Stack Overflow, https://stackoverflow.com/questions/3996904/generate-random-integers-between-0-and-9, of particular help!

To run the program, you need only click "Run ▸" along the top. If you want to try to edit the code--which you should definitely do--click "Fork" at the top, and a unique copy of this "repl" will be "forked" in your own account and you can tinker with it to your heart's content. Make changes, play around with it, change the parameters, make it do other stuff. Tinkering is great practice, especially for the next two exercises.

For this first one, you may want to do some additional research on some of the following Python language constructs, some of which may perhaps prove useful: (1) if, (2) else, (3) input, and (4) the int() function.

✓ Visit https://replit.com/@dlloyd09/CS50LawGuess. After forking that repl, in main.py, implement a program that picks a pseudorandom integer between 1 and 10, inclusive, and asks the user to guess that number, giving them only a single guess. Your program should then print some message, informing the user whether or not their guess was correct. 2/2

You are not required to do any input-based error handling, such as if a user provides a value like "-1" or "28", but if your program crashes when you run or test it, that's a bug you need to fix. Be certain you've played with your game by saving it and testing it (as by clicking "Run ▸" along the top) repeatedly! Only after you've done so, to submit your work, copy the URL of your repl (from the URL bar) and paste that link here. Do NOT select the "Post" option. Do NOT attempt to "Invite" us and share your "join" link--one that contains /join/ in the URL--this will result in a zero for the question if you do, because it is very likely to break, and therefore be inaccessible to the staff, if you share it with anyone else.

https://replit.com/@Maz7861/CS50LawGuess#main.py ✗

For this next one, you may want to do some additional research on some of the following Python language constructs, some of which may perhaps prove useful: (1) for, (2) while, (3) elif, (4) break, (5) range.

✓ Visit https://replit.com/@dlloyd09/CS50LawGame. After forking that repl, in main.py, implement a program that picks a pseudorandom integer between 1 and 25, inclusive, and gives the user up to 5 chances to guess that selected number, each time printing a message that informs the user as to whether their guess was (a) too low, (b) too high, or (c) correct. If the user guesses correctly at any point, the program should end immediately. If the user fails to guess correctly within 5 attempts, your program should print what the correct answer was before ending. 2/2

You are not required to do any input-based error handling, such as if a user provides a value like "-1" or "28", but if your program crashes when you run or test it, that's a bug you need to fix. Be certain you've played with your game by saving it and testing it (as by clicking "Run ▸" along the top) repeatedly! Only after you've done so, to submit your work, copy the URL of your repl (from the URL bar) and paste that link here. Do NOT select the "Post" option. Do NOT attempt to "Invite" us and share your "join" link--one that contains /join/ in the URL--this will result in a zero for the question if you do, because it is very likely to break, and therefore be inaccessible to the staff, if you share it with anyone else.

https://replit.com/@Maz7861/CS50LawGame#main.py ✗

Debrief

About how many MINUTES would you say you spent on this assignment? *

Just to set expectations for future students.

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