



Task: Thinking Like a Programmer - Pseudo Code I

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Introduction

Welcome to the Pseudo Code Task!

This task will introduce the concept of pseudo code. Although, pseudo code is not a formal programming language, it will ease your transition into the world of programming. Pseudo code makes creating programs easier, because as you may have guessed, programs can sometimes be complex and long, therefore, preparation is key. It is difficult to find errors without understanding the complete flow of a program. Thus, this is the reason why you will begin your venture into programming with pseudo code.

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The best way to get help is to login to www.hyperiondev.com/support to start a chat with your mentor. You can also schedule a call or get support via email.



Your mentor is happy to offer you support that is tailored to your individual career or education needs. Do not hesitate to ask a question or for additional support!



A note from the Hyperion Team...

Chances are, if you're taking this course, you're brand new to the Python programming language. You may even be new to programming all together. Either way, you've come to the right place!

The key to becoming a competent programmer is utilising your resources to their full potential. You may stumble upon a piece of code that you cannot wrap your head around or overcome, therefore, knowing what platforms to go to for help is important!

Hyperion knows what you need, and this is why we have implemented a [forum](#) for students of our courses to assist each other (but, of course, there are other avenues you can explore for help. One of the most frequently used by programmers all around the world is [Stack Overflow](#)).

Also, the Hyperion Hub is a great place to find more detailed articles on concepts that you may want to do further research on! Think of the Hub as an accompanying textbook for your MicroDegree, except without the high price tag. After the introduction we've given you here, you may want to check out the 'Java', 'Python' and 'C#' tags on the Hub to find articles ranging from 'Why Python is a great language for first time programmers' to '10 common mistakes made by Java programmers'.

The Hub is updated frequently, so be sure to check back in future for new articles or subscribe to Hub updates through our [Facebook page](#).

-The Hyperion Team

Introduction to Pseudocode

What is pseudo code? And why do you need to know this? Well, being a programmer means that you will often have to visualise a problem and know how to implement the steps to solve that particular conundrum. This is where pseudo code comes in.

Pseudo code is a detailed yet informal description of what a computer program or algorithm must do. It is intended for human reading rather than machine reading and is therefore easier for people to understand than conventional programming language code. It also does not obey any specific syntax rules, unlike conventional programming languages, and therefore can be understood by any programmer, irrespective of

programming language. As a programmer, pseudocode will help you better understand how to implement an algorithm, especially if it is unfamiliar to you. You can then translate your pseudo code into your chosen programming language.

Pseudo code is often used in computer science textbooks and scientific publications in the description of algorithms so that all programmers can understand them, irrespective of their programming languages. It is also used by programmers in the planning of computer program development to initially sketch out their code before writing it in its actual language.

What is an algorithm?

Now, what exactly is an algorithm? Well, Newton's method is an example of an algorithm: it is a mechanical process of solving a category of problems. It is not easy to define an algorithm. It might help to start with something that is not an algorithm. When you learned to multiply single-digit numbers, you probably memorised the multiplication table. In effect, you memorised 100 specific solutions. That kind of knowledge is not algorithmic. But if you were "lazy," you probably cheated by learning a few tricks. For example, to find the product of n and 9, you can write $n - 1$ as the first digit and $10 - n$ as the second digit. This trick is a general solution for multiplying any single-digit number by 9. That's an algorithm! Similarly, the techniques you learned for addition with carrying, subtraction with borrowing, and long division are all algorithms.

One of the characteristics of algorithms is that they do not require any intelligence to carry out. They are mechanical processes in which each step follows from the last according to a simple set of rules. In other words, an algorithm is like a recipe. It is a step by step method for solving a problem.



A note from Dimitri...

Sorry to interrupt, but did you know that [Ada Lovelace](#) (who was an English mathematician and writer) is regarded as the first ever computer programmer. Her notes on an early mechanical, general-purpose computer (the Analytical Engine) is recognised as the first algorithm (pseudocode) to be carried out by a machine.



Ada Lovelace

Also did you know The word 'algorithm' comes from the Medieval Latin word algorism and the Greek word "arithmos" (ἀριθμός). The word 'algorism' (and therefore, the derived word 'algorithm') comes from Al-Khwārizmī (Persian: خوارزمی, c.780–850), a Persian mathematician, astronomer, geographer, and scholar. English adopted the French term, but it wasn't until the late 19th century that "algorithm" took on the meaning that it has in modern English.

In English, it was first used about 1230 and then by Chaucer in 1391. Another early use of the word is from 1240, in a manual titled Carmen de Algorismo composed by Alexandre de Villedieu.

It begins thus:

Haec algorismus ars praesens dicitur, in qua / Talibus Indorum fruimur bis quinque figuris.

which translates as:

Algorism is the art by which at present we use those Indian figures, which number two times five.

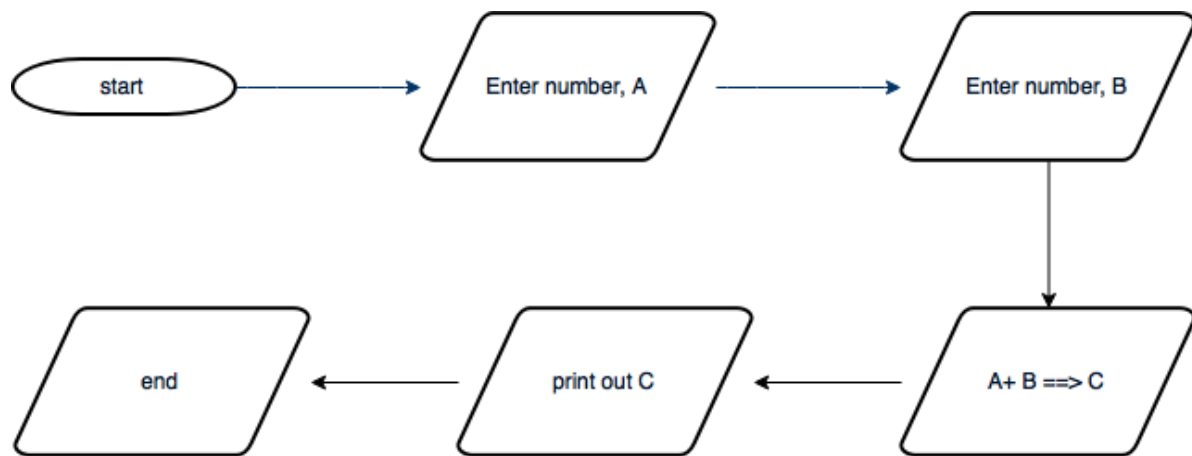
The poem summarises the art of calculating with the new style of Indian dice, or Talibus Indorum, or Hindu numerals or al-adad al-Hindi.

- **Dimitri Kalamoudacos, Marketing Wizard**

Pseudocode Syntax

There is no specific convention for writing pseudocode, as a program in pseudo code cannot be executed. In other words, pseudo code itself is not a programming language, rather is a model of all programming languages which one uses to make eventual coding a little simpler. Pseudo code resembles programming syntax, however, pseudo code cannot be compiled without errors.

Flowcharts can be thought of as a graphical implementation of pseudo code. This is because it is more visually appealing and probably more readable than a “text-based” version of pseudo code. For example, for an algorithm prompting a user to enter two integers consecutively, and then sums the two inputs and prints out the result, would look something like this:



Instructions

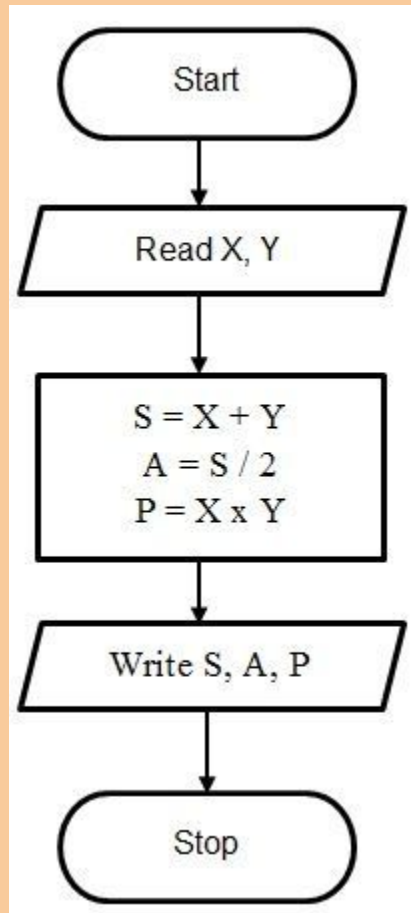
First read **example.py**, open it using Notepad (Right click the file and select 'Edit').

- **example.py** should help you understand some simple pseudo code. Every task will have example code to help you get started. Make sure you read all of the example file and try your best to understand.
- This will take some time at first as it is slightly different to other languages, but persevere! Your mentor is here to assist you along the way.
- Feel free to write your own example code before doing this task to become more comfortable with some of the basic components.

Compulsory Task

Follow these steps:

- Create a new text file called **pseudo.txt** inside this folder.
- Inside **pseudo.txt**, write pseudocode for the following scenarios:
 - An algorithm that asks a user to infinitely enter a positive number until the user enters a zero value, and then determines and outputs the largest of the inputted numbers.
 - An algorithm that reads in an arbitrary number of integers and then returns their arithmetic average.
 - An algorithm that reads a grocery list and prints out the products (in alphabetical order) that are still left to buy.
 - An algorithm for the flowchart below:



Things to look out for:

1. Make sure that you have installed and setup all programs correctly. You have setup **Dropbox** correctly if you are reading this, but **Python** or **Notepad++** may not be installed correctly.
2. If you are not using Windows, please ask your mentor for alternative instructions.

Give your thoughts..



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