CS110 - Computational Thinking I
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Intro to Programming

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Recap for Programming Exam I

- Code Comments
- Code Indentation
- Meaningful names for variables
- Submissions

Recap for Programming Exam I

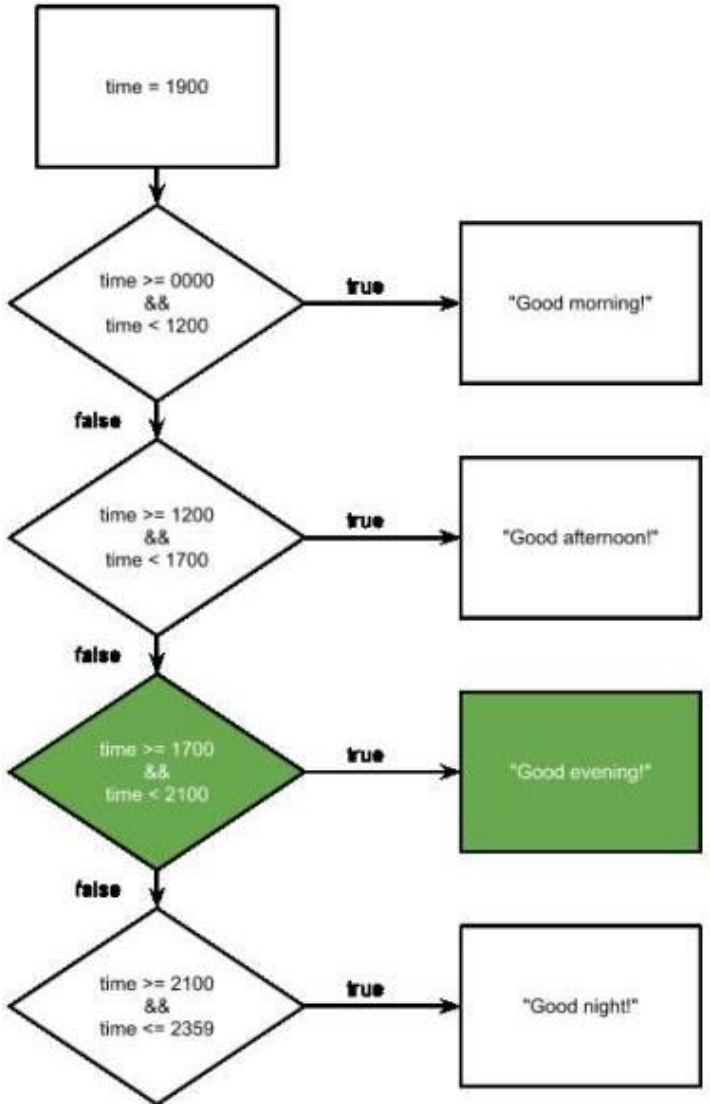
- Write a program to take “gender” as input from user. If the user is male, give the message: Good Morning Sir. If the user is female, give the message: Good Morning Ma’am.

- Write a program to take input color of road traffic signal from the user & show the message according to this table:
  - RED: Vehicle must stop
  - YELLOW: Vehicles should get ready to move
  - GREEN Vehicles can move now

- Write a program that takes user input day name. If the day is Monday, Tuesday, Wednesday, Thursday or Friday, then show “It’s a week day”. If the day is Saturday then show “It’s weekend”. If the day is Sunday then show “Yay! It’s a holiday”.

Recap for Programming Exam I

- Write a program that takes time as input from user in 24 hours clock format like: 1900 = 7pm. Implement the following case using if, else & else if statements



Recap for Programming Exam I

- Write a program to calculate the product of the odd integers from 1 to N. The product of the odd integers from 1 to 7 is 105.

Plan your code before you write it.

Functions

- Syntax
- Parameter passing
- Return value
- Parameter scope

Exercises

- Write a function ‘printTable’ that prints table of 4.
- Call this function to print table of 4 ten times.

- Modify the function function so that now it takes a number ‘n’ as parameter and prints its table.

- Call this function to print tables of 4,8,17 and 19.

Exercises

- Write a function isDivisible(x,y) that returns True if x is divisible by y and False otherwise.
- Write another function isLeapYear(y) that uses isDivisible to determine if y is a leap year o not.
- Write a program that uses isLeapYear() and prints all leap years between 2000 and 2100.

Exercise

- Write a function max(a,b) that returns the maximum of two numbers.
- Write another function max(a,b,c,) that uses max(a,b) to determine the max of two numbers.
- Write yet another function max(a,b,c,d,e,f,) that uses max(a,b,c) to determine the max of six numbers.

Exercise

- Given a text,
  - Write a function ‘getLineCount’ that returns number of lines in the text.
  - Write a function ‘getWordCount’ that returns number of words in the text.
  - Write a function ‘getSentenceCount’ that returns number of sentences in the text.
  - Write a function getVowelCount’ that returns number of vowels in the text.
  - Write a function getPuncCount’ that returns number of punctuations (, ; : ‘ “ ( )) in the text.

  You can take the following text as sample.

  > Over six years ago, in December 1989, I was looking for a "hobby" programming project that would keep me occupied during the week around Christmas. My office would be closed, but I had a home computer, and not much else on my hands. I decided to write an interpreter for the new scripting language I had been thinking about lately: a descendant of ABC that would appeal to Unix or C hackers. I chose Python as a working title for the project, being in a slightly irreverent mood (and a big fan of *Monty Python's Flying Circus*).
  >
  > By Guido van Rossum, the creator of Python.

- Write a program that takes a string and tells you whether it is a palindrome or not.

Function Exercises

- Write a function that takes a list of marks as parameter and **prints** average marks.
- Write a function that takes a list of marks as parameter and **returns** average marks.
- Write a function ‘contains’ that takes two strings, s1 and s2, as parameters and returns true is s1 contains s2 and false otherwise.
- Write a function ‘factorial’ that takes a number as parameter and returns its factorial.

Strings

- Strings
- Length of a string
- Indexing
- Slicing
- Iterating over strings
- Related functions

String - Exercise

- Write a function ‘getVowelCount’ that takes a sentence as parameter and returns number of vowels in it.

- Write a functions that takes a string ‘S’ and a single character ‘ch’ and returns number of occurrences of ‘ch’ in ‘S’.

Exercise

- Write a function to successively chop a part of Hello World!. The function repeatedly prints Hello World! but on each line the leftmost character is chopped off.
- For example,

```
>>> ello(5)
Hello World!
ello World!
llo World!
lo World!
o World!
>>> ello(1)
Hello World!
```

Lists

- Creating a list
- Indexing/Slicing
- Iterating a list
- Adding/Updating/Deleting elements in a list
- Split Function

Exercises

- Write a program that
  - creates a list of the following colors:
    - violet, indigo, blue, green, yellow, orange, red
  - iterates through the list to print each of its element
  - removes 3rd and 5th elements of the list
  - inserts a new color ‘white’ in the beginning and ‘black’ at the end of the list
  - removes ‘green’ color if it exists in the list, otherwise removes last element of the list
  - adds ‘orange’ color if it doesn’t already exist in the list
  - creates another list that contains first 5 elements of this list.

- Write a program that takes your marks (out of 100) in five subjects as input and prints your percentage.

Exercises

- Write a function ‘findMax’ that takes a list of numbers as parameter and finds their maximum.
  - findMin, findSum, findProduct
  - findMinIndex

Exercise

- Write a program that takes a sentence as input and prints each word of the sentence.

- Write a function that takes a sentence as parameter and returns number of words in that sentence.

File I/O

- Open
- Read
- Write
- Seek
- Close

Exercise

- Write a program that takes student id, name, discipline, GPA and hobbies as input and save them on a file ‘Data.txt’.
- Write a program that reads the file created above and prints the details on console.

Exercise

- You have saved different mathematical expression on a file ‘problems.txt’. A sample file can be like:

```
3+4
(3*4) -10
(4*5)- (6*13)
(4*5) + (5*7)/3
```

- Write a program that reads this file, evaluates these expressions (using ‘eval’ function) and prints them on console.
- Modify your program so that it now saves results on another file ‘result.txt’.

Exercise

- Write a program that reads from a text file and prints the following:
  - No. of lines
  - No. of words
  - No. of sentences
  - No. of vowels
  - No. of articles
  - No. of punctuations

Sample text on the file:

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