Lab 10 – CSE 101 (Fall 2019)

Objectives

The primary objectives of this lab assignment are:

- To get experience working with Huffman trees and the Huffman encoding
- To get practice converting between different encodings
- To get more Python programming practice

1. Huffman Tutorial Project (1 point)

Download lab10.py. Go through the steps T71 to T91 in Chapter 8 of the Conery Textbook, adding that code to the file.

After each step, be sure to print the results and try to understand what is happening.

2. Converting Strings to Hexadecimal (2 points)

In the lab10 file, implement the `print_hex` function that will print the ASCII codes in a string using hexadecimal notation:

```
>>> print_hex("Hello")

48 65 6C 6C 6F
```

Write your own code to convert each character to hexadecimal – do not use the hex() function. To do this, you can follow the same algorithm we used for converting a decimal number to binary by dividing number by 2 and looking at the remainder, except you need to divide by 16 since it is going to a base 16 number, instead of base 2.

You can use the ord() function to get the decimal value of a character. For example, ord("H") returns 72.

You will also want to use the provided `decimal_to_hex_string_dict`, which will allow you to map a decimal number between 0-15 to the hexadecimal string value.

It may be helpful to review the Chapter 8 slides and check out the `data_rep.py` sample code for Chapter 8.

3. More coding practice (2 points)

When you are applying for programming jobs, sometimes companies conduct online tests to determine your programming skills as part of the candidate screening process. There are several platforms for testing programming skills online, such as Codility and HackerRank. You can get the feel of some of the problems at the following page:

https://app.codility.com/programmers/lessons/

During this lab session you will solve the following problem from the Codility platform:

MaxProfit problem (Save your solution as `maxprofit.py`):

https://app.codility.com/programmers/lessons/9-maximum_slice_problem/max_profit/

If you'd like, you can solve other problems during your winter holidays!!

3. Submission

Submit the following programs on blackboard:

1) Completed `lab10.py` program
2) `maxprofit.py` program