COMP10001 Foundations of Computing
Semester 1, 2019

Tutorial Questions: Week 11

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Discussion

1. Revise "recursion". What is it and what makes it useful? How is a recursive function written?
2. What are the differences and similarities between recursion and iteration?
3. Recursive functions can use multiple recursive calls. How would a function with a single recursive call execute differently compared to one with multiple calls?

   Now try Exercise 1

4. What is a "URL"? What are the components of one?
5. What is "HTML"? What is is used for?
6. Revise the HTML tags you've learned about. How do we use them to format our document?
7. What is an HTML "entity"? Why are they needed?
8. What is the difference between a static and dynamic HTML page?

   Now try Exercises 2-3

Exercises

1. Convert the following iterative function into a recursive function:

```
def base_change(n, base):
    retval = 0
    n = str(n)[::-1]
    for i in range(len(n)):
        retval += base**i * int(n[i])
    return retval
```

2. Fill in the blanks of the HTML code on the following page so that it produces the output on the right when opened in a browser. You may use each of the options provided more than once.
3. **(Technology question)** Try visiting your favourite website and viewing the HTML source. How many tags can you recognise? Try editing the source to change the appearance of the webpage (this change will only occur locally on your computer). With knowledge of HTML, you can do a lot more on the web!

```
<                html>
<      >
  <      >
    <       >The Title</      >
  </      >
  <      >
    <      >
      <      >
        <      >
          <      ><      >bold</      ></      >
          <      ><      >underline</      ></      >
          <      ><      >italic</      ></      >
        </      >
      </      >
      <      ><          ='' >a link</      ></      >
      <      >
      <           ='smiley.gif' alt='smiley'/>
      </      >
      <      >      entities      </      >
    </      >
  </      >
</      >
```

1.
   - **bold**
   - underline
   - *italic*
2. a link
3. 
4. <entities>

i	li	>	b	head
ol	img src	ul	a href	u
html	<	title	!DOCTYPE	body

Problems

1. Write a recursive function which takes an integer `n` and calculates the n^{th} fibonacci number. The 0^{th} fibonacci number is 0, the 1^{st} fibonacci number is 1 and all following fibonacci numbers are defined as the sum of the preceding two fibonacci numbers.

2. Write a function which takes a URL as a string and reads it, splitting it into its components (scheme, hostname...) and returning them in a tuple.

3. Write a function which takes a list of lists containing cell values and optionally two lists specifying row and column headings, and formats the cell values into a HTML table, returning the HTML text as a string.