ECS 15: Introduction to Computers  
Example Final Exam Questions

Notes:
1) The final exam is open book, open notes. No electronic aides. You can bring print outs of the python lab solutions, lecture notes, etc.
2) You have 2 hours, no more.
3) Please write your name at the top right of each page you turn in!
4) Please, check your work! If possible, show your work when multiple steps are involved.

Part I
(these questions are multiple choices; in each case, find the most plausible answer)

1) An example of an output device is
   a. The keyboard,
   b. The mouse,
   c. The power cord,
   d. The monitor.

2) A device driver is:
   a. The person who delivers hardware devices to a computer store,
   b. The connector that allows you to attach the device to a computer,
   c. A computer program that allows the operating system to communicate with the device,
   d. The power supply for the device

3) What is a computer network?
   a. A group of computers that share the same power supply
   b. A computer that can be used by different users simultaneously
   c. Two or more computers connected together that can share data and programs
   d. Any sets of computers manufactured by the same company

4) In Python, if you write: \( A = '5' + '5' \)
   The value of A is:
   a. 10
   b. 55
   c. ‘55’
   d. ‘10’
5) Which of the following are executed by the BIOS (check all that applies):
   a. Memory test
   b. Load application software
   c. Print a test page on the printer
   d. Load the operating system

6) Which of the following is NOT an operating system?
   a. Linux
   b. Microsoft Vista
   c. Microsoft Word
   d. Mac Os X

7) Which of the following is NOT an internet protocol?
   a. SMTP
   b. FTP
   c. HTML
   d. HTTP

8) If a 5 minute song is sampled at 44 kHz, and each sample is stored as two 8 bit numbers (stereo), it will need that much space:
   \[(44,000 \text{ sample/sec})(2\text{bytes/sample})(60\text{sec/min})(5\text{min})=26,400,000 \text{ bytes}\]
   (and there are 1,049,000 bytes in a Megabyte)
   a. 211.2 Mbytes
   b. 26.4 Mbytes
   c. 2.64 Mbytes
   d. 13.2 Mbytes

9) What is a NIC?
   a. Network Interface Card
   b. Network Interference Control
   c. No Internet Connection
   d. New Infrared Controller

10) Which binary number comes right after the binary number 101001?
    a. 101002
    b. 101011
    c. 101010
    d. 101100

11) Which of the following is NOT true about digital recording:
    a. It can be reproduced without loss
    b. It can be shared on the internet
    c. It can be processed (for example it can be compressed)
    d. It is identical to its analog counterpart
12) In Python, if you write the instruction:

\[ A = (10/3) \mod 4 + 1 = (3) \mod 4 + 1 = 3+1 = 4 \]

You will get:

a. A=4  
b. A=3  
c. A=1  
d. A=5

13) How many bits is a kilobyte? (1 kilobyte = 1024 bytes, and 1 byte = 8 bits)

a. 1000  
b. 1024  
c. 8192  
d. 8000

14) After running this Python command, what is the value of A, assuming the input was 6.8?

\[ A = \text{raw\_input}("Enter the value of the variable A -> ") \]

raw\_input always returns a scalar str

a. 6.8  
b. 6  
c. "6.8"  
d. 7

15) If your computer has the IP address 128.96.10.123, and the subnet mask is set to 255.255.0.0, your computer will connect directly to all computers whose IP address starts with

a. 128  
b. 128.96  
c. 128.96.10  
d. 128.96.10.12
Part II

1) For each category on the left in the table below, provide three examples on the right.

<table>
<thead>
<tr>
<th>Category</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet protocols</td>
<td>HTTP</td>
</tr>
<tr>
<td></td>
<td>SMTP</td>
</tr>
<tr>
<td></td>
<td>FTP</td>
</tr>
<tr>
<td>Operating systems</td>
<td>Linux</td>
</tr>
<tr>
<td></td>
<td>Windows Vista</td>
</tr>
<tr>
<td></td>
<td>Mac OS X</td>
</tr>
<tr>
<td>Solution to the “last mile” problem for Internet</td>
<td>ADSL (Phone)</td>
</tr>
<tr>
<td></td>
<td>Cable Modem</td>
</tr>
<tr>
<td></td>
<td>Wireless</td>
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<tr>
<td>Application software</td>
<td>Word</td>
</tr>
<tr>
<td></td>
<td>Powerpoint</td>
</tr>
<tr>
<td></td>
<td>Safari</td>
</tr>
<tr>
<td></td>
<td>IDLE</td>
</tr>
<tr>
<td></td>
<td>Python (it is software that interprets code you write)</td>
</tr>
</tbody>
</table>
2) The table below contains valid Python expressions on the left. For each of these expressions, give the value of the variable A on the right. The order of operations matter! Python prioritizes so that it performs *, /, %, then +, - operations. Note, it honors grouping into parenthesis.

<table>
<thead>
<tr>
<th>Python expression</th>
<th>Value of A</th>
</tr>
</thead>
<tbody>
<tr>
<td>( A = \frac{2+3%4}{(5-2)} )</td>
<td>( A = \frac{2+3}{3} = \frac{5}{3} = 1 ) (recall 3%4=1, and integer division)</td>
</tr>
<tr>
<td>( L=[1,2,4,5,6] ) ( A=L[-1] )</td>
<td>( A = 6 )</td>
</tr>
<tr>
<td>( L=\text{‘a’} ) ( A=L*5 )</td>
<td>( A = \text{‘aaaaa’} )</td>
</tr>
<tr>
<td>( A = \frac{2+3/4}{\text{float}(5-1)} )</td>
<td>( A = \frac{2+0}{\text{float}(4)} = \frac{2}{\text{float}(4)} = 0.5 ) (3/4=0, float() makes it floating point division)</td>
</tr>
<tr>
<td>( L=[\text{“word”},\text{“text”},\text{“sentence”},\text{“a”}] ) ( L.sort() ) ( A=L[:::-1] )</td>
<td>( A = [\text{“word”}, \text{“text”}, \text{“sentence”}, \text{“a”}] ) ( L.sort() = [\text{“a”}, \text{“sentence”}, \text{“text”}, \text{“word”}], ) and [:::-1] reverses the order.</td>
</tr>
</tbody>
</table>

3) The Python module written below reads in an integer number \( N \) given by the user, and outputs all integer divisors of \( N \) between 1 and \( N \) (included). Unfortunately, as written, this program does not work. It contains 5 mistakes, either simple typos or conceptual. Please find all these mistakes:

```python
N=\text{raw\_input(“Enter the integer number -> “)} \text{ Error1: int() around raw\_input }
\text{ count } = 0
\text{ for factor in range(1,N) : } \text{ Error 2 missing colon, Error 3 range(1,N+1) to go from 1 to N.}
\text{ if } N/\text{factor} = 0 : \text{ Error 4 need logical operator “==” not “=”}
\quad \text{ count } = \text{ count } + 1 \text{ Error 5, need float(N)/float(factor), currently integer division}
\text{ print factor}
\text{ print “The total number of factors is “,count }
```
Part III.

1) Write a Python function named “exFunction” that:
- Reads in a sentence given by the user
- Scrambles this sentence, with each word replaced by its reverse
- Prints the scrambled sentence
- Returns the scrambled sentence

For example, the sentence: This is a test would be scrambled to: sihT si a tset

```python
def exFunction():
    s = raw_input("Please enter a sentence")
    words = s.split()  # Make the scalar str s into an array (of type str) stored in variable words
    for j in range(len(words)) :
        # loop through each element in the list
        words[j] = words[j][::-1]  # inverts the order of each word
    finalSentence = ' '.join(words)  # Make the array back into a scalar
    print finalSentence
    return finalSentence
```

For the actual final, review what we did in the labs:
1) string indexing and string methods, like split, join, sort, etc.
2) dealing with numbers: summing a list of numbers, encryption, making change.
2) Write a Python function named “simpleSum()” that:
- Reads in a string of numbers.
- Converts the string to a list of integer numbers.
- If the first number is odd, compute the sum of all the numbers.
- Otherwise, if the first number is even, compute the product of all the numbers.
- Returns the value that you computed above.

Example: if the string is ‘1 2 4 5’ it would return 12. If the string is ‘2 4 5 6’ it would return 240.

```python
def simpleSum():
    nums = raw_input('Enter a list of numbers with each number separated by a space:
    n')
    nums = nums.split()

    for j in range(len(nums)):
        nums[j] = int(nums[j])  #Finished converting to a list of ints

    if ((nums[0]%2) == 1):  # if the first element is odd
        answer = 0
        for j in nums[j]:
            answer += nums[j]
    else
        answer = 1
        for j in nums[j]:
            answer = answer*nums[j]

    return answer
```