CSC104 The How and Why of Computing  
Winter 2008  
Term Test 2  
Friday, March 28, 2008  
9:10 a.m. (50 minutes)

Solutions

Remember to put your student number on the bottom of each following page – in case your pages get separated.

**HINT**: Don’t get bogged down on questions that reward you with few marks – answer the questions that you can do easily for the most marks first. Then come back to questions that will take you more time.
**Question 1 [5 marks] Communications and the Web - Short answer:**

_Complete the following:_

**Communications**

a. What do the following acronyms stand for, and what do they mean:

LAN:

local area networks - (a local computer network for communication between computers;)

WAN:

Wide area networks - A network connecting computers within very large areas, such as states, countries, and the world.

b. Name and describe three network topology configurations? (Draw a small diagram if it helps.)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>ring - connected in a circle</td>
</tr>
<tr>
<td>2.</td>
<td>bus - connected by same communication line</td>
</tr>
<tr>
<td>3.</td>
<td>star - connected through machine in the centre</td>
</tr>
</tbody>
</table>

In the context of **communications**, what is a Bridge and what is a Router. What differentiates them?:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A Bridge is:</td>
<td>joins two equivalent networks</td>
</tr>
<tr>
<td>A Router is:</td>
<td>connect networks - not necessarily equivalent - to create an internet</td>
</tr>
</tbody>
</table>
The Internet

c. Domains.

What is a domain?

a network or relatively small internet - operated by a single organization - e.g., a company or a university,

Describe two means of identifying a domain:

ip address: the 32 bit address consists of 4 bytes separated by a dot.
There are 4 bytes - each byte represents a number is the address.
The domain name that is registered with the name server

d. Given the following URL:
http://www.cs.toronto.edu/~faye/104/tutorials.html
Describe what each part of this URL is:

   cs = subdomain

   toronto.edu = domain

   ~faye/104/ = path to file

   tutorials.html = file to be served

   http:// = hypertext transfer protocol

e. Give two examples of client-server software. Describe what each does.

   print server – prints documents on request for a client

   name server – on the web – maps the domain name to the ip address to direct requests to the correct domain location.
Question 2 [5 marks] Describe the output:

Given the following code:

def printSomething(x, y, z):
    a = range(x, y, z)
    for x in a:
        if x%5 == 0:
            print "Ant"
        elif (x + 2)%2 == 0:
            print "Dog"
        elif x%4 == 0:
            print "Cat"
        elif x%3 == 0:
            print "Bird"
        elif x == 1:
            print "Monkey"
        else:
            print "Camel"

printSomething(10,1,-1)
printSomething(1,10,2)

In the space below, show exactly what will be displayed (printed) when the above code is executed:

If they get everything except the even numbers – give 2.5
if correct give 5
if partly correct but mostly wrong – give 1

Ant
Bird
Dog
Camel
Dog
Ant
Dog
Bird
Dog
Monkey
Bird
Ant
Camel
Bird
Question 3 [5 marks] Correct the code:
Given the following code (note that line numbers are displayed for reference purposes only and should not be considered part of the code):

```python
# this function looks at all the words in a word list
# and returns the longest word.
def longestWord(wordList):
    longestWord = 0  # initialize longestWord to the first word
    for i in range(1, len(wordList)):
        if len(wordList[i]) > longestWord:
            longestWord = wordList[i]
    return longestWord

# here we call the function using a list that we create
myList = {"some", "day", "you", "will", "graduate", "and", "leave"}
print longestWord(myList)
```

There are at least five mistakes in the above code. First, You must identify five errors. In the above code, you must first tag the each code error with a circled error number. e.g.

Then in the space below, describe each error you have tagged, and the correct code.

1. Why it is wrong: 
   Correct code is: 
   ```python
   longestWord = wordList[0]
   ```

2. Why it is wrong: 
   Correct code is: 
   ```python
   if len(wordList[i]) > len(longestWord):
   ```

3. Why it is wrong: 
   Correct code is: 
   ```python
   myList = ["some", "day", "you", "will", "graduate", "and", "leave"]
   ```

4. Why it is wrong: 
   Correct code is: 
   ```python
   myList = ["some", "day", "you", "will", "graduate", "and", "leave"]
   ```

5. Why it is wrong: 
   Correct code is: 
   ```python
   print longestWord(myList)
   ```
<html><head><title>Surfing the Web</title></head><body><h1>Surfing the World-Wide Web</h1>
When you surf the web, you hope to catch that perfect wave! It might just look like this:
<img src="web_files/bigWaves.gif">

If you fall off your board, you may have to run a new web browser and start surfing all over again.

If you fall off your board, you may have to run a new web browser and start surfing all over again. 
</p></body></html>
Question 5 [9 marks] Write 3 functions in Python

[3 marks]
In the space below, write a Python function `printTriangle(n)` that accepts a number `n`, and prints a triangle as shown in the following table:
In other words, starting with one star, and printing a space after each star, print the rows as necessary to create the triangle. Print up to a maximum of `n` stars in the longest row of the triangle.

3 marks
if nested loop – and is close, give full marks
if partly right, give half marks
else – if they have no clue – give zero

```python
def printStars(n):
    for i in range(n):
        for j in range(i + 1):
            print '*',
        print
    for i in range(n-1,0,-1):
        for j in range(i):
            print '*',
        print
or using while

def printStars(n):
    i = 0
    while i < n:
        j = 0
        while j <= i:
            print '*',
            j = j + 1
        print
        i = i + 1
    i = i -1
    while i >= 0:
        j = 0
        while j < i:
            print '*',
            j = j + 1
        print
        i = i -1
```

[3 marks]
In the space below, write the python function `myPower(a,i)` that calculates `a` raised to the power of `i` and returns the result.

**hint:** to raise a number `x` to the power of another number `y` you must multiply `x` by itself `y` times.

e.g., \( a^2 \) (a to the power of 2) = \( a \times a \)
\( a^3 \) (a to the power of 3) = \( a \times a \times a \)
\( a^4 \) (a to the power of 4) = \( a \times a \times a \times a \)

Also, `a` to the power of 0 is 1. Assume that `i` is greater or equal to zero.

**Bonus mark:** 1 bonus mark if you use recursion correctly (though recursion is not required)

full marks plus bonus if correct recursion

recursion:
```python
def myPower(a,i):
    if i == 1:
        return a
return a * myPower(a, i-1)

full marks if correct – minus ½ each error, zero if no idea what to do.
def myPower(a,i):
    x = 0
    result = 1
    while x < i:
        result = result * a
        x = x + 1
    return result

[3 marks]
In the space below, write the python function smallestWord(word1, word2, word3) that accepts three words, and returns the shortest word of the three.

can use elif for this one as well. -1 for each logic error.

Full marks if correct
def smallestWord(word1, word2, word3):
    if len(word1) < len(word2) and len(word1) < len(word3):
        return word1
    if len(word2) < len(word3):
        return word2
    return word3