CS100: Introduction to Computer Science

Lecture 19: Review session 2

Review: Networking
- Networks
  - Linked computer systems
  - Share information and resources
- Network Classifications
  - LAN, MAN, WAN
  - Open vs. Closed
  - Ring, Bus or Stars
- Protocols
  - Token ring, CSMA/CD

Figure 4.2 Communication over a ring network
- Token: a unique bit pattern.
- A machine can transmit its own message when holding the token, otherwise forward messages.
- Forward the token to next machine when it receives its own message.

Figure 4.3 Communication over a bus network
- Each message is broadcast to all the machines on the bus.
- Each machine monitors all the messages but only keep those addressed to itself.
- A machine can send a message if the bus is silent, at the same time it keeps monitor the bus.
- If it detects a collision, wait for a random period and transmit again.

Review: Combining Networks
- Repeater
- Bridge
- Switch
- Router

Review: Internet, WWW, HTML
- Internet
  - Domain
  - Gateway
  - IP Address
  - Domain Name and Host names
- WWW
  - Hypertext
  - Web page
  - Web site
Review: Internet, WWW, HTML

- How to access a web page
  - Browser
  - Web server
  - HTTP
  - URL
- HTML & XML
  - HTML: appearance, structure
  - XML: semantics/meaning, nontextual materials

Review: Images

- Image in HTML
  - Background of your web page
  - Insert images
  - Make a hyperlink of an image
- Image representations & compression
  - GIF and JPEG
  - Pixels, image size, file size, image resolution

Review: Editing images with Photoshop

- Crop the image
- Resize the image
- Save files as GIF or JPEG
- Create images using Photoshop elements
- Change the background of a picture
  - [http://www.mtholyoke.edu/~xli](http://www.mtholyoke.edu/~xli)
- Deal with imperfections in images

Review: Machine language & high level programming languages

- Machine language vs. high level programming languages
- Compiler vs. interpreter
- Perl

Review: Variables

- Scalar variables
  - Numbers
  - Strings
- Arrays
  - What is an array?
  - How to access array elements?

Simple Perl Commands:

- print
  - Prints list of arguments that it is passed.
- <STDIN>
  - STDIN is the input stream associated with standard input. Standard input by default comes from your keyboard.
  - $name = <STDIN>; This statement reads from standard input into a scalar variable named name.
- chop
  - The chop function is used to indiscriminately remove the last character from a variable.
  - chop($name); This statement removes the last character in the variable
  - champ
  - removes ‘newline’ (\n) from the end of a scalar variable.
Simple Perl Commands:

- **if, else**
  - The if statement is used on a condition to change the flow of your program.
- **while**
  - The while statement is used to iterate through some code time and time again.
  - The for statement is also used to iterate through some code time and time again. Different from the while loop the number of iterations is known.

Simple Perl Commands:

- **sub**
  - Define a Subroutine/Function
  - sub subname {
    - statement1;
    - statement2;
    - }
  - My
  - Create local variables usually used in subroutines.
    - return
      - Return a value or a list of values from a subroutine.
        - return $a;
        - return ($a, $b);
        - return $a + $b;

Exercise 1: What is the output of the following code.

```perl
$sum = 0;
for (1; $i <= 10; $i++)
  $sum += $i;
print "The sum is $sum \n";
```

Exercise 2: What is the output of the following code.

```perl
$a[0] = 8;
$a[1] = 12;
$a[2] = 7;
print "The value is $a[2] \n";
$x = 2;
print "The value is $a[$x] \n";
```

Exercise 3: What is the output of the following code.

```perl
$a = -91.5;
$b = 21;
$c = &absolute_Value($a);
$d = &absolute_Value($a+$b);
print "The value of c is $c in\n";
print "The value of d is $d in\n";
sub absolute_Value {
  my ($tmp_abs);
  if ($_[0] >= 0)
    $tmp_abs = $_[0];
  else
    $tmp_abs = $_[0] ** (-1);
  return $tmp_abs;
}
```

Exercise 4: Write a program to calculate the absolute value of variable $a (Assign -9 to $a, and then store the absolute value in $b.)

```perl
$a = -9;
if ($a >= 0)
  ($b = $a);
else
  ($b = $a * (-1));
```
Exercise 5:
Write a subroutine that returns the absolute value of a number

```perl
sub absolute_Value {
    my ($tmp_abs);
    if ($_[0] >= 0)
    {
        $tmp_abs = $_[0];
    }
    else
    {
        $tmp_abs = $_[0] * (-1);
    }
    return $tmp_abs;
}
```

Announcements:

- Second In-class Exam: Monday April 23rd