CS383 Assignment 6

Instructions:

- *Submit all your answers in hard copies.*
- *Please submit source codes for question 2, 4, 6, 7 and 8 to alex_wang@126.com.*
- *This assignment is released on 12/09/2011, and due 12/14/2011.*
- *Please remember to include your name and student ID on all copies.*

1. Compare the standard C, Ada, and Perl's string libraries. Ignore regular expression in Perl.

2. Write the eight-queen program in Perl and Smalltalk (download Squeak from http://www.squeak.org/), print out the final result.

3. What is the output of the following Perl program? And explain why. Write another program to show why $_ is a global variable.

```
1.  use strict;
2.  for($_ = 0; $_ < 3; $_ ++)
3.  {
4.      &countToks();
5.      print $_, "\n";
6.  }
7.  exit;
8.  sub countToks{
9.      $_ = 6;
10.     print "tok = ", $_, "\n";}
```

4. (a) Filling the following table about Perl regular expression:

Metacharacters		Repetition	
char	Meaning	Repetitions	Meaning
^		a*	
$		a+	
.		a?	
*		a{m}	
+		a{m,}	
?		a{m,n}	
|		repetition?	
()		N/A	
[]			
{}			
\			

(b) Implement a new grep tool in Perl which does the following: it takes as command line inputs a file path and a list of strings, and it prints all the *words* (one per line) in the file which contains at least the one of the input strings as a substring, and at the end prints the total number of words in the input file. For example, you can invoke the tool like:
D:\> mygrep d:\temp\my_file ee cs is

Note that the tool should be insensitive to the cases of the input strings.

5. Give an example of a feature from Smalltalk and Python that promotes each of the following object-oriented design principles: code reuse, type safety, abstraction, and encapsulation. Give another example that violates each of these principles. You should write down a snippet of code to show your example.

6. Exercise 13.6 on book, page 359.

7. Modify the *Backtrack* class's *attempt* method (in page 345) so that it generates all solutions. Test your modification on eight queen problem?

8. Implement the remaining operators for the Python polynomial class and Python fraction class in the text book.

9. The class *Set* is an important abstract class in Java. Its implementation includes *HashSet* and *HashMap* (*SortedSet)*. Do some research to answer the following questions:
   a) What is the difference between a *HashSet* and a *HashMap*? Would the former be a candidate for implementation of the *Concordance* class instead of the latter? Why or why not?
   b) What comparable classes exist in the C++ Standard Library for the Java *HashSet* and *HashMap*? What are the major differences in their design? Give examples of their usage .