Homework #3
Due Th. 3/30

Please prepare a report including the source code, captures of output and send it along with related source files as a zip file to my blackboard. The zip file should be named by your family name. Please print the report and bring the hard copy by the due date to the class. The selective grading might be used for homeworks of this course.

1. Write a test program that stores 5 million integers in a linked list and test the time to traverse the list using an iterator vs. using the get(index) method.

2. Create two priority queues, {"George","Jim","John","Blake","Kevin","Michael"} and {"George","Katie","Kevin","Michelle","Ryan"}, and find their union, difference, and intersection.

3. Write a program that prompts the user to enter a text file name and displays the number of vowels and consonants in the file. Use a set to store the vowels 'A', 'E', 'I', 'O', and 'U'.

4. Write a program that repeatedly prompts the user to enter a capital for a state. Upon receiving the user input, the program reports whether the answer is correct. Assume that 50 states and their capitals are stored in a map structure as shown below. The program prompts the user to answer all states capitals and displays the total correct count. The users answer is not case-sensitive. You should use map to store pairs of each state and its capital. Your program should prompt the user to enter a state and should display the capital for the state.

```
Alabama          Montgomery
Alaska           Juneau
Arizona          Phoenix
...              ...
...              ...
```

5. Please refer to the book (Chapter 22), and find the time complexity of the following programs:

   • Find Greater Common Divisor (GCD) using Euclidean Method.
   • Find prime number using Sieve of Eratosthenes.