Introduction to Systems Programming (Systems I)

Homework #3 (Part A)

Due: Tuesday September 20 2016 before 11:59 PM

Email-based help Cutoff: 5:00 PM on Mon, September 19 2016

Maximum Points: 15

Submission Instructions

This part of the homework assignment must be turned-in electronically via Canvas. Ensure you name this document `MUid_homework3_PartA.docx`, where *MUid* is your Miami University unique ID. Complete the method shown for each problem. For each method, you can develop and test them in `NetBeans` and just copy-paste your solutions into this document.

Once you have completed answering the questions save this document as a PDF file (don't just rename the document; that is not the correct way to save as PDF) and upload it to Canvas

General Note: Upload each file associated with homework (or lab exercises) individually to Canvas. Do not upload archive file formats such as zip/tar/gz/7zip/rar etc.

Objective

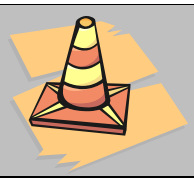
The objective of this homework is to:

- Understand working with `std::vector`.
- Practice answering exam style questions

Required reading

Prior to answering the questions in this homework briefly review the following chapters from the E-book titled "C++ How to Program" (all students have free access to the electronic book):

- Chapter 7.10 (`std::vector`)
- Chapter 14.1 – 14.6 (File I/O)



Although the Safari E-books are available to all students there are only a limited number of concurrent licenses to access the books. Consequently, do not procrastinate working on this homework or you may not be able to access the E-books due to other users using them.

1. What is quoted text and how do you read quoted text in C++? Explain with a suitable example (other than the one shown in Chapter 14) [**1 points**]

   A quoted text is text surrounded by quotation marks. You would read a quoted text with the quoted() stream manipulator.
   Example:
   If the information in a text file strictly says : "January"
   inputFile >> quoted(month);

2. What is a file position pointer (similar concept in Java and other programming languages)? What is a method that can be used to determine the file position? What is the method can be used to change the file position? [**1 points**]

   A file position pointer is the byte number of the next byte to be read or written in the file. The tellg() and tellp() methods get the file pointer position. The seekg() and seekp() methods change the file pointer to the position of the identified byte number.

3. Assume you have a method called `processLines(std::istream& is, std::ostream& os)` that process line-by-line. Complete the `main` method below to call `processLines` method to process the 3 lines: `"Line #1"`, `"Second Line"`, and `"Last line"`. The output should be written to standard console output stream. (Hint: Use a `std::istringstream`) [**3 points,** In exam you would have 5–7 minutes to write the 3 line solution]

```
// Prototype declaration
void processLines(std::istream& is, std::ostream& os);

int main() {
    processLine(std::istringstream, std::cout);



}
```

4. Complete the following method that returns a vector with only even values in the `src` vector. If the `src` vector has values {2, -4, 7, 9, 3, 8} this method should return a vector with values {2, -4, 8}. [**3 points**, In exam you will have about 7 minutes to write the solution]

```
using IntVec = std::vector<int>;

IntVec evens(const IntVec& src) {
        IntVec newVec;
        for (int i = 0; i < src.size(); i++) {
             if (src[i] % 2 == 0) {
                  newVec.push_back(src[i]);
             }
        }
        return newVec;









}
```

5. Complete the following method that returns a vector that contains a reverse of the words. For example if `src` is {"one", "two", "three"} the method should return a vector with strings {"three", "two", "one"} [**3 points**]

```
using StrVec = std::vector<std::string>;

StrVec reverse(const StrVec& src) {
     StrVec newVec;
     for (int i = src.size() - 1; i >= 0; i--) {
          newVec.push_back(src[i]);
     }
     return newVec;









}
```

6. Complete the following method that returns a vector with the first `n` prime numbers. For example, if `n == 7`, this method should return a vector with values {1, 2, 3, 5, 7, 11, 13}. [**4 points**, In exam you will have about 10 minutes to write the solution]

```
using IntVec = std::vector<int>;
IntVec getPrimes(int n) {
     IntVec primes;
     int num = 1;
     while (primes.size() < n) {
          bool is_prime = true;
          for (int i = 2; i <= num/2; i++) {
               if (num % i == 0) {
                    is_prime = false;
                    break;
               }
          }
          if (is_prime) {
               primes.push_back(num);
          }
          num++;
     }
     return primes;




}
```