Programming Assignment 1

Computer Programming for Engineers (DASF003-41)

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Introduction

- **Deadline : 2022.10.13**

- **You have two days for late submission (~2022.15)**
  - **25%** deduction per day

- **Submit both source code and Makefile**
  - You will not get a point if your makefile do not build an executable program

Problem 1 (20pt)

Description

1. Receive 10 numbers from users and store them into an array
2. If users enters more than 10 numbers, “Enter 10 numbers” error message should be displayed
3. Manipulate the array in a way that it stores all the odd number first (ascending order), and then even numbers (descending order)
4. Prints all the elements in the array.
5. The input will be given in one line (no need to consider multiple lines of inputs)
6. Only the numbers will be used for test input. No need to consider other types of values such as strings.
7. Same numbers can be used as input (e.x. 1 1 1 1 1 2 2 2 2 2)

Restriction

A. Input number must be between 0~9

B. Use range-based for loop when you are iterating the array

- -10 points if your program does not have at least one rang-based for loop. (Any location of the program)
- -2 points if you do not use range-based for loop with arr pointer in printArray function
- -2 points if you do not use ranged-based for loop with arr pointer in arrayModify function
- -5 points if you do not limit the range of input numbers (only 0-9 are acceptable)

Problem 1

Output Example

```
1 2 3 4 5 6 7 8 9 0
1 3 5 7 9 8 6 4 2 0

1 2
Enter 10 numbers

-1 10
Number must be between 0~9
```

Submission Files

- main.cc
- arrayModify.cc
- arrayModify.h
- Makefile
- -10 points if change the template code

Problem 2 (30pt)

Description

1. Arabians write letters right to left except numbers
2. Arabinglish is a fake language that writes English in Arabian style
3. Implement a translator that inputs English and outputs Arabinglish
4. **Input**: An English sentence that less than 100 characters
5. **Output**: Arabinglish sentence

Restriction

A. Use String class not C-String
   - -10 points if you use C-String

Problem 2

Output Example

```
There is 12 apples.
.selppa 12 si erehT

I am 100 years old!
!dlo sraey 100 ma I
```

Submission Files

- main.cc
- arabians.cc
- arabians.h
- display.cc
- display.h
- Makefile
- -10 points if change the template code

Problem 3 (10pt)

Description :

1. Develop a simple game program
2. The program generates random number from 0 to 99
   - No space is allowed (e.x. “1 2” leads to “Enter 0-99” error message)
3. User will guess this number by providing the guess through stdin
4. If user enters correct target number, program prints **“You Won”**
5. If user’s guess number is larger than the target number, program prints **“More Smaller”**
6. If user’s guess number is smaller than the target number, program prints **“More Larger”**
7. Game goes until the user finds right target number
8. If user enters input other than 0 to 99, program prints **“Enter 0 to 99”**
9. For random number generation, use rand() function
   - https://en.cppreference.com/w/cpp/numeric/random/rand

Problem 3

Output Example

```
a
Enter 0 to 99

-10
Enter 0 to 99

5
More Larger

50
More Smaller

35
You Won
```

Submission Files

- main.cc
- guess.cc
- guess.h
- Makefile
- -10 points if change the template code

Problem 4 (40pt)

Description

1. The file words.txt contains approximately 2500 words
2. Program reads each word from the file
3. Program outputs the words that has the most pairs of consecutive double letters
   - Numbers are not letters. Letter == [a-z, A-Z]
4. For example, the word “tooth” has one pair of double letters, and the word “committee” has three pairs of consecutive double letters.
5. Letters are not case sensitive.
   - “BAac” has one pair of double letters, which is “Aa"
6. "One pair of double letters” means the following:
   - “Baaac” has one pair of double letters, which is “aa”
   - “BaaaaS” has two pair of double letters, which is “aaaa”
7. If there is more than one word that has the most pairs of consecutive double letters, print them all
8. The input may contains whitespace such as “a b”

Problem 4

- **Submission Files**
  - main.cc
  - wordProcess.cc
  - wordPorceds.h
  - Makefile
  - -10 points if change the template code

Template Code

Regarding changing template code (-10pt)

- You should not modify/delete the given header files
- You should develop a program based on given functions
- You **can** include new libraries such as iostream
  - But you can only add C++ library not C (-5pt).
  - C libraries includes “string.h”
- You can change the return statement.
  - e.x. reverseString in arabians.cc file
  - You should change the return statement on line 7 so that it returns the correct string.

```
1  #include "arabians.h"
2
3  //implement this function
4  std::string cpe::reverseString(const std::string& target) {
5    //write your code here!
6
7    return "";
8  }
```

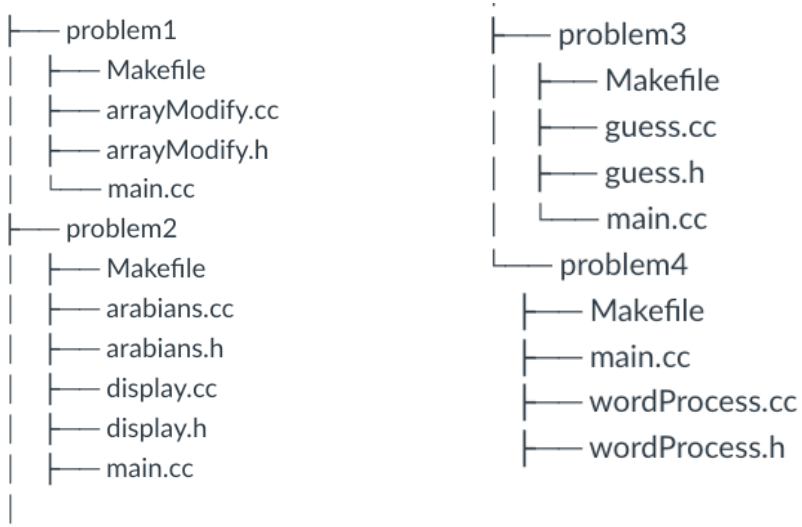
Program Termination

- **For problem 1,2,4**
  - Program should run once

- **For problem 3**
  - Program should run in an endless loop and only terminate if the user finds the right target number

Additional Information

- **You can use any editors**
  - But, you should submit both Makefile and the solutions (source code).
  - If we can't compile your program with the given Makefile, you will get 0 points.
- **You may get partial points for PA1**
  - Partial points will be judged by the TAs based on hidden test cases
- **Your submission files should looks like below**



Additional Material

Makefile

- Please reference the week 5's lecture note
- https://makefiletutorial.com

Install Linux (Ubuntu) on virtualbox

- We will test your programs in Linux (Ubuntu), but you can use any environment such as Mac, WSL, or VMWare
- Korean
  - https://mainia.tistory.com/2379
- English
  - https://www.wikihow.com/Install-Ubuntu-on-VirtualBox

Basic Linux command

- https://maker.pro/linux/tutorial/basic-linux-commands-for-beginners

Basic Vim Editor Usage (Non-essential)

- https://opensource.com/article/19/3/getting-started-vim

Prerequisites & PA Start Guild

- **Install Make and g++**
  - $ sudo apt-get install build-essential
  - $ sudo apt install g++
  - $ sudo apt-get install vim
- **Unzip tar file**
  - $ tar –xvf pa1.tar
- **Check the files in directory *pa1***
  - $ ls
- **Use Vim or any kind of editor**
  - $ cd problem1
  - $ vim Makefile

```
lbh@lbh-server:~$ tar -xvf pa1.tar
pa1/
pa1/problem3/
pa1/problem3/guess.cc
pa1/problem3/guess.h
pa1/problem3/Makefile
pa1/problem3/main.cc
pa1/problem1/
pa1/problem1/arrayModify.cc
pa1/problem1/arrayModify.h
pa1/problem1/Makefile
pa1/problem1/main.cc
pa1/problem4/
pa1/problem4/wordProcess.h
pa1/problem4/words.txt
pa1/problem4/wordProcess.cc
pa1/problem4/Makefile
pa1/problem4/main.cc
pa1/problem2/
pa1/problem2/display.cc
pa1/problem2/display.h
pa1/problem2/arabians.cc
pa1/problem2/Makefile
pa1/problem2/arabians.h
pa1/problem2/main.cc
lbh@lbh-server:~$ cd pa1
lbh@lbh-server:~/pa1$ ls
problem1  problem2  problem3  problem4
```

Submission Guide

- **Zip pa1 directory to tar file**
  - $ tar –cvf pa1-2021000000.tar pa1
  - Submit pa1-{your-student-id}.tar file at icampus