

AMERICAN UNIVERSITY OF SCIENCE & TECHNOLOGY
FACULTY OF ARTS AND SCIENCES
DEPARTMENT OF COMPUTER SCIENCE

CSI 205: COMPUTER PROGRAMMING I

Spring Term 2013-2014

FINAL PROJECT

Due Tuesday May 27, 2014

Problem A [Bingo]

Two persons are facing the screen. The first enters into memory a matrix representing a bingo card. The matrix is made of five columns and five rows, where each row contains five numbers and each column contains five values distributed as follows:

Column1 contains numbers between 1 and 15 included.

Column2 contains numbers between 16 and 30 included.

Column3 contains numbers between 31 and 45 included.

Column4 contains numbers between 46 and 60 included.

Column5 contains numbers between 61 and 75 included.

Example of a bingo card:

B	I	N	G	O
2	16	32	47	61
5	19	35	50	65
7	20	36	51	66
10	27	39	58	70
13	29	45	59	74

The second person uses the keyboard to enter five different numbers where each fills in the appropriate range of each column.

Write a program using a menu to do the following:

- 1- Write a function to fill in the bingo matrix of the 1st player.
- 2- Write a function to fill in the five numbers of the 2nd player.
- 3- Write a function to detect if the 1st player has a row or a diagonal touched by the chosen numbers of the 2nd player. A message is printed to indicate if there is a winner or not, as well as the content of the matrix with 'X' instead of the guessed numbers.
- 4- Repeat the program if both players want to play again.

Problem B [Hangman]

In this problem you have to create a computer game that will amuse you and help little children learn English. It is the Hangman game!

The idea behind the game is that the computer will choose a random word among a set of words and then display the number of letters in that word as dashes (ex: "apple" will be displayed as `_ _ _ _ _`). Your program then should ask the user to guess a letter; if the letter exists in the word it should display a message (like "Good guess! There exists one/two... letter "p" in the secret word") and then needs to display it (ex: if the word is "apple" and the user enters the letter "p", the word will be displayed as `_ p p _ _`). In case the user enters a letter that is not present in the word, your program needs to display a message (like "The letter "b" does not exist!") and then needs to start drawing the hangman. This should be repeated until the word is guessed or the hangman is drawn (warning messages should tell the user how many guesses he/she still has).

If the user guesses the word, your program should congratulate him/her and then ask if the user wishes to play again or exit. If the user couldn't guess the secret word (your program draws all of the hangman), then you need to tell the user that he/she has been hanged after drawing all the hangman and displaying the secret word, then it should ask to play again or exit.

You will need several functions in your program. And your work needs to be divided in phases. So one of you may need to write the dictionary of the words that your program knows and the function to randomly choose one of these words (or strings!) and return it to your program. Someone else may need to work on the function that draws the hangman (you can use your creativity to draw the hangman). The proposed function needs to take the number of mistakes that the user has made so far (an integer) and needs to draw the corresponding hanging progress (the function needs to output the hangman and will not return anything to main). The hanging process will need to take 10 steps (the maximum number of mistakes that the user can make in guessing the letters in the secret word). Example:

```

---
  |
  |
  O
  |
 / | \
  |
 /  \

```

To make your life easier and your program simpler, the words that your program will choose from the dictionary need to be only of 5 letters, not more and not less (ex: "apple", "letter", etc.).

Because you have a lot of projects and the finals are very close, so not much time for the project, the backbone of the project can be written very similar to the following source code. Be careful not to copy and paste it because it needs a lot of modifications. However try to understand it so you can make use of it IF you need!!!

```

/*
   This is a sample program that is missing a lot of functions
   and features that are required in your project. This is not
   sufficient for the project. However, if you understand it
   it will help you a lot.
*/

#include<iostream>
#include<cstring> // for string manipulation
using namespace std;

int main()
{
    char secretWord[]="apple"; // your program needs to choose
                               // a letter at random from a large
                               // array of strings!

    char *ptr = secretWord; // a pointer to the first element in
                            // the secret word.

    char letterGuess; // to input the guess.

    int mistakes = 0; // number of mistakes so far.

    int correctCharacter = 0; // to test if the character
                             // entered is correct or not.

    char guess[6]="-----"; // the guessed word so far.

    cout<<guess<<endl; // outputting the guessed word!

    // looping until the user guesses the secret word or makes 10 mistakes.
    do{

        ptr = secretWord; // initializing the pointer to the first
                           // element in the secretWord string at
                           // every guess.

        cout<<"Enter letter: "; // entering the guess
        cin>>letterGuess;

        // a loop to search for the letterGuess in the secretWord
        for(int i = 0; i < sizeof(secretWord); i++)
        {
            if(letterGuess == *ptr) // if the guessed letter is present
            {
                guess[i] = *ptr; // enter it into the guess array
                correctCharacter = 1; // i have found a correct letter
            }

            ++ptr; // move pointer to next character in the secret word
        }

        if(correctCharacter == 0) // if the guessed letter is not found
            mistakes++; // increase the mistakes by one

        correctCharacter = 0; //reset the correctCharacter flag

        system("cls"); // to clear the screen
        cout<<guess<<endl; // output the guessed word so far

    } while(mistakes < 10 && strcmp(secretWord, guess));

    cout<<"Press any key to exit."<<endl;
    system("pause");
    return 0;
}

```

Problem C [CSI 201 Help]

Write a C++ program to help the CSI 201 students in their studies. Your program should convert a number from decimal to binary, octal, and hexadecimal (and vice-versa). It should also convert a number into its two's complement notation, excess bit notation for integers, as well as floating-point notation for real numbers and fractions. Use the notations from the CSI 201 class (8-bit notation). Use functions and menus, and be creative.

Documentation

The Final Project Report must contain:

- 1) Program/problem definition (Exercise number and the given)
- 2) Well commented source code after each problem definition
- 3) Discussion about the program (explain the aim behind the program)
- 4) Discussion about the functions (explain the aim behind each function used in the program)
- 5) Percentage completed for each exercise
- 6) Program output
- 7) What are the errors that you encounter and you could not fix (if any)
- 8) A Soft copy of the report and the source code (.cpp and .exe files) on a CD/DVD
- 9) Note that, in the last page of the report you must insert a summary table as below:

Exercise #	Solved	Percentage Completed (%)	Grade (for instructor use)
A	Yes	100	
B	Yes	75	
C	No	0	
Documentation	Yes	100	

Formatting

Font Size: 12 for text 10 for code

Font Name: Times New Roman for text and Courier New for code

Line Spacing: 1.15

Alignment: Justify

Include Header and Footer

Footer: Page number in the middle

Header: Project name (left) – Topic (right, for e.g program #1)

The first page of the report must look like (Note this is scaled down)

**American University of Science & Technology
Faculty of Arts and Sciences
Department of Computer Science**

CSI 205 – Computer Programming I
Section B – T-TH 12:00 – 12:50

YOUR Name
YOUR ID

Final Project

Submitted to:
Mr. Joseph Fares

Submission Date (e.g.: Tuesday, May 27, 2014)
Beirut Campus

- END OF PROJECT -