Program 1: ASCII Flowers
Due: Friday 01/27

1 Introduction

On Blackboard, in the same folder where you found this document, there is some starter code called *main.cc*. For this assignment, you will add your own code to this file and then submit *main.cc* with your changes. Do not add any new files because they will not be used for grading.

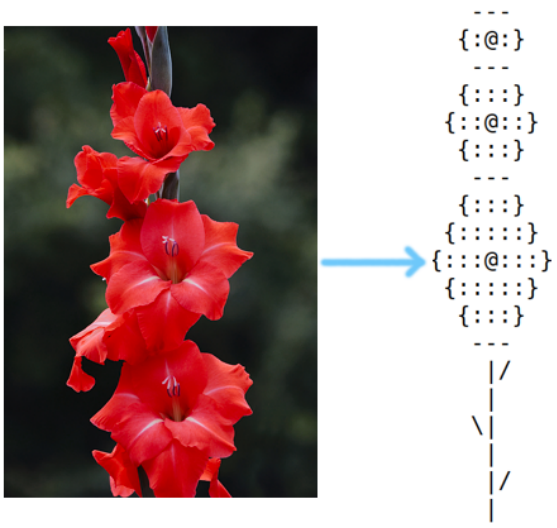

Figure 1: We are making ASCII art of *Gladiolus* flowers!

2 How to Submit Your Work

All your work will be done in a single file called *main.cc*, and you will submit this to **Gradescope** under the assignment called *Program 1*. We will have an autograder help us handle the large number of submissions, and to give you quick feedback on your score. Note that at the time of release, the autograder might not be ready.

3 Quick Task Overview

The program needs an implementation of *Option 2*, to print out the flower pattern. After *Option 2* is selected, you need to

1. Prompt the user to enter the number of *Sections*
2. Read in the integer from the user
3. Display the ASCII flower based on the input from the user.

For example, if the user gives 3 then you need to display a flower with 3 heads (each head getting progressively larger. The stem should be two vertical lines, for every head, with alternating offshoots. See the examples in Section 5.

4 Details About How the Program Works

You will be adding a new feature to the program in *main.cc*, that will display an ASCII flower. When the program starts, it starts by prompting the user with a message and informing them of all the menu options. You can see examples of this in Section 5. The menu options are as follows:

1. *Display the Hello Graphic*: you will have no work to do for this option. When selected, the program will ask for a frame character and this is used in the graphic. See the first example in Section 5 for seeing how this works. Looking at the code for this might be helpful for seeing how to implement the next option.

2. *Display the Flower*: **Program 1 is about implementing this option**. When selected, the program should ask for the number of sections in the flower, then display it.

3. *Exit the Program*: Do nothing and quit the program.

You can see the starter code in Section 6. Lines 18-23 are the prompt for the user. Lines 26-27 handle reading the menu choice of the user. Lines 36-73 display the Hello Graphic, if option 1 is selected. *Most importantly*, your code for printing the flower will start at line 78.

5 Examples of Output

```
Program 1: ASCII Flowers
Choose from the following options:
   1. Display the HELLO graphic
   2. Display The Flower
   3. Exit the program
Your choice -> 1
Enter your frame character: -

----------------------------------
----------------------------------
-- ** ** ***** **    **    ***** --
-- ** ** ***** **    **    ***** --
-- ** ** **    **    **    ** ** --
-- ***** ***** **    **    ** ** --
-- ***** ***** **    **    ** ** --
-- ** ** **    **    **    ** ** --
-- ** ** ***** ***** ***** ***** --
-- ** ** ***** ***** ***** ***** --
----------------------------------
----------------------------------
```

Here you can see what happens when you select option 1. The program prompts the user to give a character that will be used for the frame of the graphic, then reads in that character from *stdin*. Next, it displays the ASCII art.

```
Program 1: ASCII Flowers
Choose from the following options:
   1. Display the HELLO graphic
   2. Display The Flower
   3. Exit the program
Your choice -> 2
Enter number of sections: 1

 ---
{:@:}
 ---
  |/
  |
```

When you select option 2, the program will prompt for the *number of sections* for the flower. Here is an example of what you should print when there is only one section. Below, you can see examples of when there are 2 and 3 sections respectively.

```
Program 1: ASCII Flowers
Choose from the following options:
   1. Display the HELLO graphic
   2. Display The Flower
   3. Exit the program
Your choice -> 2
Enter number of sections: 2

  ---
 {:@:}
  ---
 {:::}
{::@::}
 {:::}
  ---
   |/
   |
  \|
   |
```

```
Program 1: ASCII Flowers
Choose from the following options:
   1. Display the HELLO graphic
   2. Display The Flower
   3. Exit the program
Your choice -> 2
Enter number of sections: 3

   ---
  {:@:}
   ---
  {:::}
 {::@::}
  {:::}
   ---
  {:::}
 {:::::}
{:::@:::}
 {:::::}
  {:::}
   ---
    |/
    |
   \|
    |
    |/
    |
```

6 Starter Code

```cpp
/**-------------------------------------------
    Program 1: ASCII Flowers
    Prompt for the number of flower layers and display

    Course: CS 141, Fall 2023
    System: Linux_x86_64 and G++
    Author: George Maratos and David Hayes
 ------------------------------------------------**/

#include <iostream>
#include <iomanip>

using namespace std;

int main()
{
    // display the prompt to the user
    cout << "Program 1: ASCII Flowers\n"
         << "Choose from the following options:\n"
         << "   1. Display the HELLO graphic\n"
         << "   2. Display The Flower\n"
         << "   3. Exit the program\n"
         << "Your choice -> ";

    // read in the user's choice
    int menu_option;
    cin >> menu_option;

    // handle option to quit
    if (menu_option == 3) {
        exit(0);
    }

    // handle the HELLO graphic choice
    if (menu_option == 1) {
        char frame;
        cout << "Enter your frame character: ";
        cin >> frame;
        //top border
        cout << endl;
        for (int i=0; i<2; i++) {
            cout << setfill(frame) << setw(36) << ' ' << endl;
        }
        //message
        cout << setfill(frame) << setw(3) << right << " "
             << "** ** ***** **    **    *****"
             << setfill(frame) << setw(3) << left << " " << endl
             << setfill(frame) << setw(3) << right << " "
             << "** ** ***** **    **    *****"
             << setfill(frame) << setw(3) << left << " " << endl
             << setfill(frame) << setw(3) << right << " "
             << "** ** **    **    **    ** **"
```

```
53              << setfill(frame) << setw(3) << left << " " << endl
54              << setfill(frame) << setw(3) << right << " "
55              << "***** ***** **    **    ** **"
56              << setfill(frame) << setw(3) << left << " " << endl
57              << setfill(frame) << setw(3) << right << " "
58              << "***** ***** **    **    ** **"
59              << setfill(frame) << setw(3) << left << " " << endl
60              << setfill(frame) << setw(3) << right << " "
61              << "** ** **    **    **    ** **"
62              << setfill(frame) << setw(3) << left << " " << endl
63              << setfill(frame) << setw(3) << right << " "
64              << "** ** ***** ***** ***** *****"
65              << setfill(frame) << setw(3) << left << " " << endl
66              << setfill(frame) << setw(3) << right << " "
67              << "** ** ***** ***** ***** *****"
68              << setfill(frame) << setw(3) << left << " " << endl
69              << right;
70          //bottom border
71          for (int i=0; i<2; i++) {
72              cout << setfill(frame) << setw(36) << " " << endl;
73          }
74      }
75
76      // handle the floral pattern TODO for students
77      if (menu_option == 2) {
78          // add your solution here
79      }
80      return 0;
81  }
```