

Project 1

Name: _____ Time spent: _____ min

The goal of this project is to pull together elements from the class so far and use some library and 3rd party functions

Part 1 is to draw a simple plot to an external Windows terminal window

(this project will not run in the Eclipse console – see additional slide)

Inputs (from user):

mathematical function desired

support for: sin, cos (from math.h)

peak value for the function

note: functions will range from $-peak$ to $+peak$

of steps to take from $0 - 2\pi$

of levels to plot between $-peak$ to $+peak$

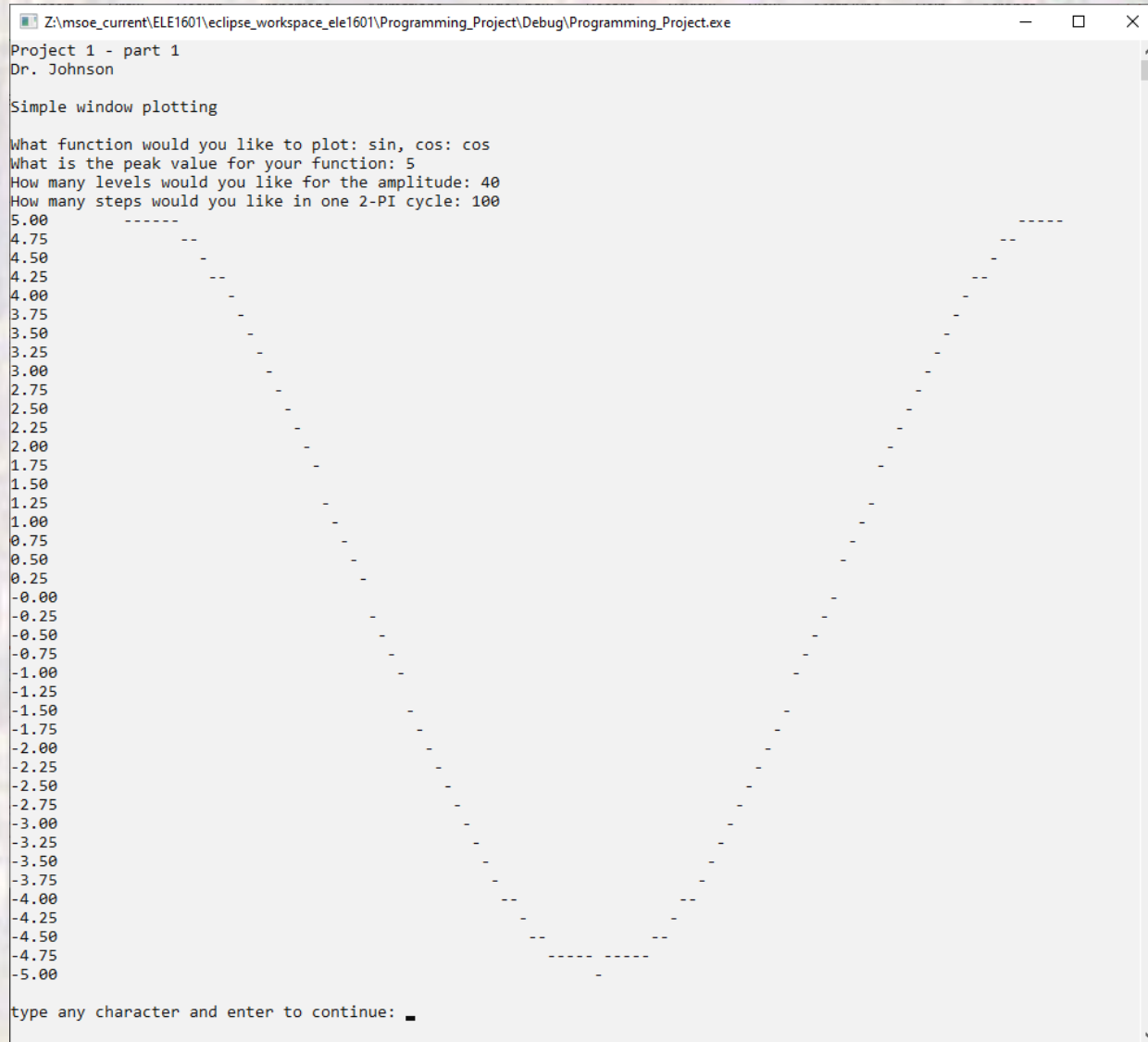
Output: Plot of the waveform in a Windows terminal window

note: a function to help with the plotting is provided

Deliverables: flow diagram, code, output for:
sin, peak = 3, 30 levels, 40 steps

```
Z:\msoe_current\ELE1601\eclipse_workspace_ele1601\Programming_Project\Debug\Programming_Project.exe
Dr. Johnson
Simple window plotting
What function would you like to plot: sin, cos: sin
What is the peak value for your function: 3
How many levels would you like for the amplitude: 30
How many steps would you like in one 2-PI cycle: 40
3.00      -----
2.80      -       -
2.60      -       -
2.40
2.20      -       -
2.00
1.80      -       -
1.60
1.40      -       -
1.20
1.00      -       -
0.80
0.60      -       -
0.40
0.20      -       -
-0.00     -
-0.20
-0.40      -       -
-0.60      -       -
-0.80      -       -
-1.00      -       -
-1.20      -       -
-1.40      -       -
-1.60      -       -
-1.80      -       -
-2.00      -       -
-2.20      -       -
-2.40      -       -
-2.60      -       -
-2.80      -       -
-3.00      -
type any character and enter to continue:
```

Deliverables: flow diagram, code, output for:
cos, peak = 5, 40 levels, 100 steps



Deliverables: flow diagram, code, output for:
sin, peak = 3, 30 levels, 40 steps

The screenshot shows a window titled "Z:\msoe_current\ELE1601\eclipse_workspace_ele1601\Programming_Project\Debug\Programming_Project.exe". The window content is as follows:

```
Dr. Johnson
Simple window plotting
What function would you like to plot: sin, cos: sin
What is the peak value for your function: 3
How many levels would you like for the amplitude: 30
How many steps would you like in one 2-PI cycle: 40
3.00      -----
2.80      -   -   -
2.60      -     -
2.40      -     -
2.20      -     -
2.00      -     -
1.80      -     -
1.60      -     -
1.40      -     -
1.20      -     -
1.00      -     -
0.80      -     -
0.60      -     -
0.40      -     -
0.20      -     -
-0.00     -     -
-0.20     -     -
-0.40     -     -
-0.60     -     -
-0.80     -     -
-1.00     -     -
-1.20     -     -
-1.40     -     -
-1.60     -     -
-1.80     -     -
-2.00     -     -
-2.20     -     -
-2.40     -     -
-2.60     -     -
-2.80     -     -
-3.00     -     -
```

Annotations with arrows point to the following elements:

- Intro**: Points to the window title and the first two lines of text.
- Data input**: Points to the four lines of user input.
- Data values**: Points to the vertical axis labels on the left of the plot.
- Plot**: Points to the sine wave graph.
- Continue**: Points to the "type any character and enter to continue:" prompt.

Additional text on the right side of the image says: "Think of this as 5 sections and manage each separately".

At the bottom right, there is a note: "Use a scanf to cause the program to wait for an input (throw away the char read in)".

Window printing function

```
#include <windows.h>
```

Use the following function to place the cursor in the desired location – simply add it to your program file

```
void set_cursor_position(int row, int col){  
    HANDLE hOut = GetStdHandle(STD_OUTPUT_HANDLE);  
    fflush(stdout);  
    COORD coord = { (SHORT)col, (SHORT)row };  
    SetConsoleCursorPosition(hOut, coord);  
    return;  
} // end set_cursor_position
```

Use `printf(...)` to print a single character or a text string to the new location

Running the program

This program must be run in a Windows terminal instead of the Eclipse console window:

After compilation – in windows go to the `project_directory/debug` folder and double click on the file: `project_name.exe`

A Windows terminal will open and your program will run

`project_directory` and `project_name` are what you used for your project

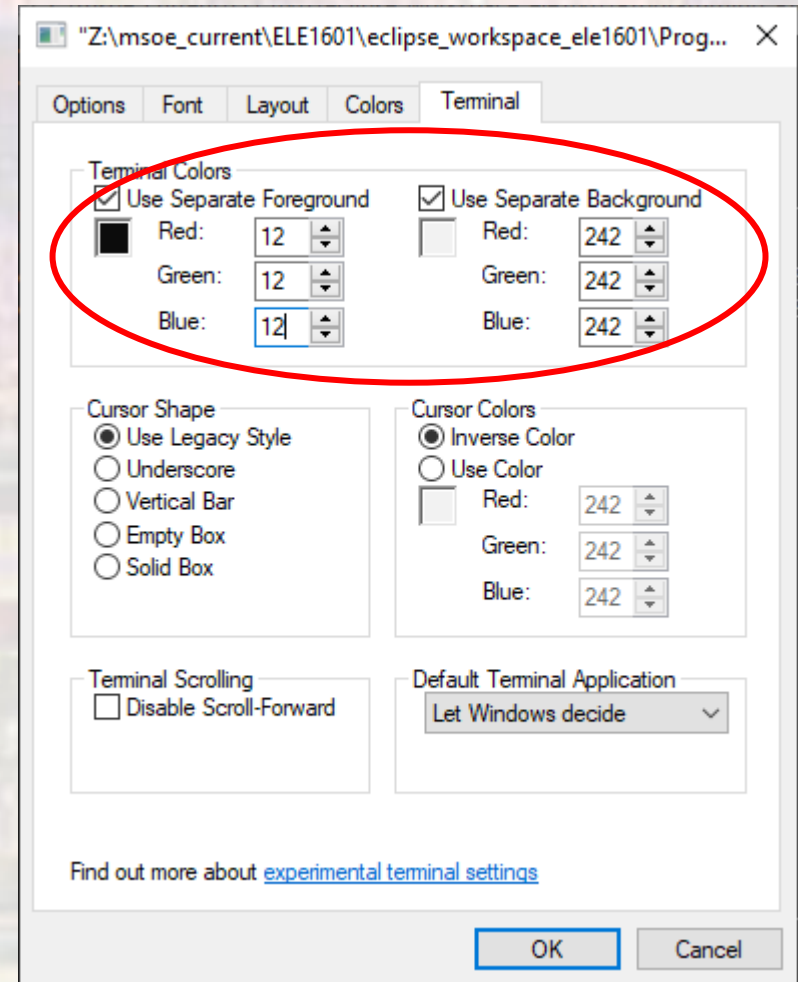
Change the Terminal Window Colors

rt-click on the window banner

select [properties](#)

select the [Terminal](#) tab

match the [Terminal Colors](#) here:



Development

Try getting the `set_cursor_position` function to place a character at various parts of the screen

a few characters in each section for example

Get the `scanf` / wait to work

last thing in a `while(1)`

Create a function to clear a section of the screen

make it re-usable by passing the upper left and lower right locations

Print just the values (function)

Add the `plot` (function)