

Week 2 - Basics of C

Daniel Alyoshin

CSCA48 - TUT002

Content Covered so Far

- ▶ Basic structure of a program in C
- ▶ Coding, compilation, and execution
- ▶ Variables and types
- ▶ Declaring a variable
- ▶ `printf()`, format specifiers, and variations of using `printf()`
- ▶ Loops – for loops and while loops with various types of counter variables/increments
- ▶ Conditionals, nested conditionals, logical vs. arithmetic operators
- ▶ Declaring and using simple functions

Your Task for Today

- ▶ Create a C program that graphically outputs the value of $\sin(x)$.
- ▶ Constraints: $x \in [0, 2\pi]$
- ▶ You will probably want to use the `sin()` function from the `math.h` library.
- ▶ You will probably want to use the `M_PI` constant from the same library.
- ▶ Work in groups of 2 or 3.
- ▶ Note: if you are on Linux compile with `-lm`

▶ > ./a.out

A scatter plot showing a collection of data points. The points are represented by asterisks (*). They are arranged in a roughly triangular pattern, with a higher density of points along the right side and a single outlier point located below the main cluster. The points are scattered across the plot area, with some points having a larger size than others, suggesting a third variable or a specific data type.

Crunchy Extensions

1. Modify the plot so that it prints the values of x on the left-side of the graph.
2. Modify the plot so it has a vertical line corresponding to $\sin(x) = 0$.
3. VERY CRUNCHY – modify the program so it prints the graph in the standard orientation.
i.e. x along the X axis, and $\sin(x)$ along the Y axis.

Potential Solution

```
# include <stdio.h>
# include <math.h>

int main(void)
{
    for(float i = 0; i < (2 * M_PI); i += (M_PI / 10))
    {
        for (float j = -10; j < (10 * sin(i)); j++)
        {
            printf(" ");
        }
        printf("*\n");
    }

    return 0;
}
```

Reminders

- ▶ Each student to submit their own .c file which can be the same as that submitted by members of their group.
- ▶ Ensure your file is named **exactly** as instructed on Quercus.
- ▶ You are **not** supposed to keep working on this, you will not be marked on correctness so as long as you submit work that shows you were engaged during this tutorial you will get full marks.