

Design4Practice (D4P) Program

To: Dr. Trevas
From: Aaron Curley
Due: 7/5/20
Re: Self-Learning

The skill I began to learn was programming using the C language. C is programming language created in the early 1970's at Bell Labs by scientist named Dennis Ritchie. I choose to learn C the C programming language because it is versatile, and the foundation of many programming languages.

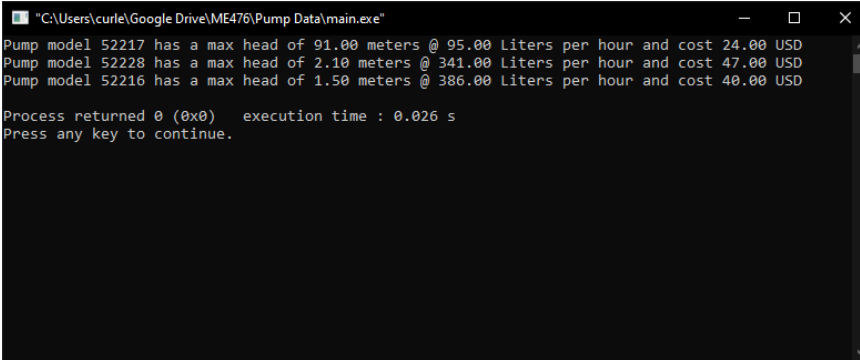
The compact size of C and its simplicity makes it versatile. Programs written in C require very little processing resources because the programs are small. C is also very similar to assembly language which means it compiles into binary quickly. These features are why C is widely used in embedded systems. Embedded systems perform a predefined specific task within a larger system. These systems are usually equipped with small amounts of computing resources to keep cost, power requirements, and size small. Embedded systems are used in many machines we use every day such as microwaves and washing machines. C is used when direct control over hardware is needed.

Knowing the C language will help me learn other programming languages that I might need in my career because it is the underlying basis of many programming languages used today. An example is python which is considered a high-level programming language and is used to build applications. Python and C share a lot of characteristics so knowing C will help me in learning and understanding python. Another advantage of C is that numerous programming languages today have a way to interface with C which is useful when learning a new programming language is impractical.

I applied my new coding skills to organize some pump data. The data will be used to select a pump for a hydroponic farming system. In the code on line 6 a structure named `pumpdata` is declared. Members of the structure are `maxhead`, `gph`, and `cost`. These are declared on lines 7 – 9 as floating point variables. Structure variables of the `pumpdata` type are declared on line 11, 17, and 22. Values are then assigned to the member variables on lines 12-14, 18-20, and 23-25. The data is displayed in the standard output using the `printf` statements on lines 28-30. Arranging the data in this way will make calculations easier because all the variables are in one place within the program.

```
1 #include <stdio.h>
2 #include <stdlib.h>
3
4 int main()
5 {
6     struct pumpdata {
7         float maxhead;
8         float gph;
9         float cost;
10    };
11    struct pumpdata model52217;
12    model52217.maxhead = 91; // m
13    model52217.gph = 95; // L/h
14    model52217.cost = 24; // USD
15
16
17    struct pumpdata mode52228;
18    mode52228.maxhead = 2.1; //m
19    mode52228.gph = 341; // L/h
20    mode52228.cost = 47; // USD
21
22    struct pumpdata mode52216;
23    mode52216.maxhead = 1.5; //m
24    mode52216.gph = 386; // L/h
25    mode52216.cost = 40; // USD
26
27
28    printf("Pump model 52217 has a max head of %.2f meters @ %.2f Liters per hour and cost %.2f USD\n", model52217.maxhead, model52217.gph, model52217.cost);
29    printf("Pump model 52228 has a max head of %.2f meters @ %.2f Liters per hour and cost %.2f USD\n", mode52228.maxhead, mode52228.gph, mode52228.cost);
30    printf("Pump model 52216 has a max head of %.2f meters @ %.2f Liters per hour and cost %.2f USD\n", mode52216.maxhead, mode52216.gph, mode52216.cost);
31
32
33    return 0;
34 }
35
```

Figure 1 Pump Data [2]



```
"C:\Users\curle\Google Drive\ME476\Pump Data\main.exe"
Pump model 52217 has a max head of 91.00 meters @ 95.00 Liters per hour and cost 24.00 USD
Pump model 52228 has a max head of 2.10 meters @ 341.00 Liters per hour and cost 47.00 USD
Pump model 52216 has a max head of 1.50 meters @ 386.00 Liters per hour and cost 40.00 USD

Process returned 0 (0x0)   execution time : 0.026 s
Press any key to continue.
```

Figure 2 printf statements displayed in standard output

In conclusion the C language will enable me to design electromechanical systems using micro controllers. Micro controllers are single integrated circuit chips that contain memory, a processor and input/output peripherals. This is a great skill to have because most machines today are controlled with micro controllers.

Works cited

- [1] Gookin, Dan. "Learning C." LinkedIn, 2017, www.linkedin.com/learning/me?u=57692001.
- [2] Mandravellos, Y., 2020. *Code::Blocks*. The Code::Blocks Team.