

Activity No. 6.1

Hands-on Activity 6.2: Hands-on Activity 6.1: Built-in Functions

Course Code: CPE007	Program: Computer Engineering
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Name(s): Tobias, Lawrence C.	Instructor: Engr. Jimlord M. Quejado

6. Output

1.

WHAT.cpp

```
1 #include <iostream>
2 using namespace std;
3
4 double volume(double s);
5 double volume(double s) {
6     return s * s * s;
7 }
8 int main() {
9     double side;
10    cout << "Enter the side length of the cube: ";
11    cin >> side;
12    double vol = volume(side);
13    cout << "The volume of the cube is: " << vol << endl;
14    return 0;
15 }
```

The terminal window shows the following output:

```
C:\Dev-Cpp\WHAT.exe      X + | v
Enter the side length of the cube: 13
The volume of the cube is: 2197
-----
Process exited after 2.735 seconds with return value 0
Press any key to continue . . . |
```

2.

WHAT.cpp DO YOU MEAN.cpp

```
1 #include <iostream>
2 #include <cmath>
3 using namespace std;
4
5 double hypotenuse(double a, double b);
6 double hypotenuse(double a, double b) {
7     return sqrt(a * a + b * b);
8 }
9
10 int main() {
11     double side1, side2;
12
13     side1 = 3.0;
14     side2 = 4.0;
15     cout << "Triangle 1: sides " << side1 << " and " << side2
16     << ", hypotenuse: " << hypotenuse(side1, side2) << endl;
17
18     side1 = 5.0;
19     side2 = 12.0;
20     cout << "Triangle 2: sides " << side1 << " and " << side2
21     << ", hypotenuse: " << hypotenuse(side1, side2) << endl;
22
23     side1 = 8.0;
24     side2 = 15.0;
25     cout << "Triangle 3: sides " << side1 << " and " << side2
26     << ", hypotenuse: " << hypotenuse(side1, side2) << endl;
27
28     return 0;
29 }
30
```

C:\Dev-Cpp\DO YOU MEAN.e X + -

```
Triangle 1: sides 3 and 4, hypotenuse: 5
Triangle 2: sides 5 and 12, hypotenuse: 13
Triangle 3: sides 8 and 15, hypotenuse: 17
```

```
-----
Process exited after 0.3152 seconds with return value 0
Press any key to continue . . .
```

3.

```
WHAT.cpp DO YOU MEAN.cpp BY THAT.cpp
```

```
1 #include <iostream>
2 #include <iomanip>
3 #include <cmath>
4 using namespace std;
5
6 int celsius(int f);
7 int fahrenheit(int c);
8
9 int celsius(int f) {
10     return round((f - 32) * 5.0 / 9.0);
11 }
12
13 int fahrenheit(int c) {
14     return round((c * 9.0 / 5.0) + 32);
15 }
16
17 int main() {
18     cout << "Celsius to Fahrenheit:" << endl;
19     cout << "C   F   C   F   C   F   C   F   C   F   C   F   C   F   C   F" << endl;
20     int count = 0;
21     for (int c = 0; c <= 100; c++) {
22         cout << setw(3) << c << setw(4) << fahrenheit(c) << " ";
23         count++;
24         if (count % 10 == 0) cout << endl;
25     }
26     cout << endl;
27
28     cout << "Fahrenheit to Celsius:" << endl;
29     cout << "F   C   F   C   F   C   F   C   F   C   F   C   F   C   F   C" << endl;
30     count = 0;
31     for (int f = 32; f <= 212; f++) {
32         cout << setw(3) << f << setw(4) << celsius(f) << " ";
33         count++;
34         if (count % 10 == 0) cout << endl;
35     }
36     cout << endl;
37
38 }
39
40 }
```

```
C:\Dev-Cpp\BY THAT.exe + - Celsius to Fahrenheit:  
C F C F C F C F C F C F C F C F C F C F C F  
0 32 1 34 2 36 3 37 4 39 5 41 6 43 7 45 8 46 9 48  
10 50 11 52 12 54 13 55 14 57 15 59 16 61 17 63 18 64 19 66  
20 68 21 70 22 72 23 73 24 75 25 77 26 79 27 81 28 82 29 84  
30 86 31 88 32 90 33 91 34 93 35 95 36 97 37 99 38 100 39 102  
40 104 41 106 42 108 43 109 44 111 45 113 46 115 47 117 48 118 49 120  
50 122 51 124 52 126 53 127 54 129 55 131 56 133 57 135 58 136 59 138  
60 140 61 142 62 144 63 145 64 147 65 149 66 151 67 153 68 154 69 156  
70 158 71 160 72 162 73 163 74 165 75 167 76 169 77 171 78 172 79 174  
80 176 81 178 82 180 83 181 84 183 85 185 86 187 87 189 88 190 89 192  
90 194 91 196 92 198 93 199 94 201 95 203 96 205 97 207 98 208 99 210  
100 212  
Fahrenheit to Celsius:  
F C F C F C F C F C F C F C F C F C F C F C  
32 0 33 1 34 2 35 3 36 4 37 5 38 6 39 7 40 8 41 9 42  
42 6 43 7 44 8 45 9 46 10 47 11 48 12 49 13 50 14 51 15 52  
52 11 53 12 54 13 55 14 56 15 57 16 58 17 59 18 60 19 61 20 62  
62 17 63 18 64 19 65 20 66 21 67 22 68 23 69 24 70 25 71 26 72  
72 22 73 23 74 24 75 25 76 26 77 27 78 28 79 29 80 30 81 31 82  
82 28 83 29 84 30 85 31 86 32 87 33 88 34 89 35 90 36 91 37 92  
92 33 93 34 94 35 95 36 96 37 97 38 98 39 99 40 100 41 101 42  
102 39 103 40 104 41 105 42 106 43 107 44 108 45 109 46 110 47 111 48  
112 44 113 45 114 46 115 47 116 48 117 49 118 50 119 51 120 52 121 53  
122 50 123 51 124 52 125 53 126 54 127 55 128 56 129 57 130 58 131 59  
132 56 133 57 134 58 135 59 136 60 137 61 138 62 139 63 140 64 141 65  
142 61 143 62 144 63 145 64 146 65 147 66 148 67 149 68 150 69 151 70  
152 67 153 68 154 69 155 70 156 71 157 72 158 73 159 74 160 75 161 76  
162 72 163 73 164 74 165 75 166 76 167 77 168 78 169 79 170 80 171 81  
172 78 173 79 174 80 175 81 176 82 177 83 178 84 179 85 180 86 181 87  
182 83 183 84 184 85 185 86 186 87 187 88 188 89 189 90 190 91 191 92  
192 89 193 90 194 91 195 92 196 93 197 94 198 95 199 96 200 97 201 98  
202 94 203 95 204 96 205 97 206 98 207 99 208 100 209 101 210 102 211 103  
212 104  
-----  
Process exited after 0.345 seconds with return value 0  
Press any key to continue . . . |
```

7. Supplementary Activity

Analysis:

1. For this program, I made a function called `volume(double s)` and I declared it at the top so the program knows it exists. This function returns $s * s * s$, which is the formula for the volume of a cube. In the main part, I declared a variable named `side` to store the value that the user will input. After the user types the side length, I called the `volume` function and stored its result in another variable named `vol`. Then the program displays the volume that was calculated. So basically, the program asks for the cube's side, calculates side^3 using the function I made, and shows the answer. When I tried it with the side length of 13, the output was: 13 The volume of the cube is: 2197.

2. For this program, I created a function called hypotenuse(double a, double b) and declared it at the top so the program knows it will be used. This function returns $\sqrt{a^2 + b^2}$, which follows the Pythagorean Theorem for finding the hypotenuse of a right triangle. In the main part of the program, I declared two variables named side1 and side2, and I assigned different values to them three times to represent three different triangles. For each pair of side lengths, I called the hypotenuse function to compute and show the length of the hypotenuse. So basically, I just changed the side values for each triangle and used the same function to calculate their hypotenuses. When the program ran, the output was: Triangle 1 with sides 3 and 4 had a hypotenuse of 5, Triangle 2 with sides 5 and 12 had a hypotenuse of 13, and Triangle 3 with sides 8 and 15 had a hypotenuse of 17.

3. For this program, I created two functions: celsius(int f) and fahrenheit(int c), and I declared them at the top so that the program knows they will be used. The celsius function converts a Fahrenheit value into Celsius using the conversion formula, and the Fahrenheit function converts a Celsius value into Fahrenheit. Both conversions use round to make sure the results are whole numbers. In the main part of the program, I used two loops to generate conversion tables. The first loop goes from 0 to 100 to convert Celsius values to Fahrenheit, and the second loop goes from 32 to 212 to convert Fahrenheit values to Celsius. I also used a counter to help format the output into neat columns. So in the end, the program prints two organized tables: one showing Celsius to Fahrenheit conversions and another showing Fahrenheit to Celsius conversions.

8. Conclusion

In this activity, I made programs that each had their own task. One part was about finding the volume of a cube, another part focused on solving the hypotenuse of a triangle, and the last part was about converting temperatures between Celsius and Fahrenheit. I made sure that each part worked correctly by checking if the answers matched the formulas. Sometimes I needed to look at the numbers again to make sure the calculation was right, but once everything worked, it was nice to see the correct results show up. Overall, this activity helped me organize my code better and understand how breaking a program into clear steps makes it easier to read, use, and understand.