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MTH 3300
Spring 2017
Professor Evan Fink
Homework 1

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1. Xcode nation
2. Coin Algorithm
   (a) Start with the coin of largest value, which does not exceed the price.
   (b) Take the coin and and check if it equals the price. If not, take the difference between the price and value of the coin, and this will be your new price.
   (c) Repeat step (a) and (b) until necessary.
3. Nearest Subway Entrance Algorithm
   (a) Iterate through each latitude and longitude, on the spreadsheet then apply the distance formula (for speed):

$$D = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

   on your calculator for each iteration, where

$$D = \text{the distance between your location and the nearest subway station}$$

$$x_2 = \text{latitude given}$$

$$x_1 = \text{iterated latitude}$$

$$y_2 = \text{longitude given}$$

$$y_1 = \text{iterated longitude}$$

   (b) While doing this, neatly make a list and keep track of the station name, latitude, longitude, and distance, respectively.
   (c) Determine the shortest distance calculated.
   (d) Determine which longitude and latitude it corresponds to, then which station those coordinates correspond to.
4. C++ Statements

```
1       int score = 17;
2       bool sure = false;
3       double length = 12.5;
4       char initial = 'f';
```

5. Worst Episode Ever

```
cout << "Worst." << endl << "Episode." << endl << "Ever." << endl;
```

6. Characters

   (a) Newline Character

   ```
   cout << \n << endl;
   ```

   (b) Tab Character

   ```
   cout << \t << endl;
   ```

   (c) Double Quotation Mark

   ```
   cout << \" << endl;
   ```

7. Formatting

```
#include <iostream>

using namespace std;

int main()
{
  int first, second;

  cout << "Enter two integers" << endl;

  cin >> first >> second;

  int sum = first + second;
  cout << "The sum is" << sum;

  return 0;
}
```

8. Evaluating Expressions

   (a) 20/7 = 2

   (b) 5 - 8/3*2 = 1

   (c) 3.0/4 + 2 = 2

   (d) 56%10 = 6

   (e) 56%10*2 = 12

   (f) 5.6%10*2 = ERROR, will not compile since the modulus operator only uses ints.

   (g) static_cast<double>(25)/2 = 12.5

   (h) static_cast<double>(25/2) = 12.0

9. Problem 1, Section 1

(a)

```
#include <iostream>
#include <stdlib.h>

using namespace std;

int main()
{
  int w, l, Area;
  w = 15;
  l = 5;

  Area = l*w;
  cout << "The area is" << "Area" //COMPILER ERROR: "Area"
     refers to a string, should be Area, the intialized
     variable of type int.

  system("pause");
  return 0;
}
```

(b)

```
#include <iostream>
#include <stdlib.h>

using namespace std;

int main()
{
  int w = 15, l = 5;

  Area = l*w; // COMPILER ERROR: The variable "Area" has
     not been initialized.
  cout << "The area is" << area; //COMPILER ERROR: variable
      "area" has not been initialized, should refer to
     variable "Area".

  system("pause");
  return 0;
}
```

(c)

```
#include <iostream>
#include <stdlib.h>

using namespace std;

int main()
{
  double w, l, Area;
  w = 15.5;
  l = 5;

```

```
12          l*w = Area; // COMPILER ERROR: "Area" should be on the
                LHS and "l*w" should be on the RHS.
13          cout << "The area is" Area; // COMPILER ERROR: There
                should be a "<<" before "Area"
14
15          system("pause");
16          return 0;
17        }
```

(d)

```
1         #include <iostream>
2         #include <stdlib.h>
3
4         using namespace std;
5
6         int main()
7         {
8           int w, l, Area; // should change "int" to "double" for
                greater accuracy, since w = 15.5
9           w = 15.5;
10          l = 5;
11          cout << The area is << w*l; // COMPILER ERROR: need
                quotation marks around "The area is"
12          system("pause");
13          return 0;
14        }
```

10. Problem 2, Section 1

```
1     int a,b,c;
2     a = 32;
3     b = 10;
4     c = a-b; // c = 32-10 = 22
5     b = c; // b = 22
6     a = a+b; // a = 32 + 22 = 54
7     -c; // this line doesn't do anything
8     a += 2;  // 54 + 2 = 56
```

a = 56
b = 22
c = 22