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<div align="center">Lab #3</div>

A2)

```cpp
#include <iostream>
#include <cmath>

using namespace std;

int main(int argc, char *argv[])
{
double v;
int x=0;
double t;
double k;
double y;
  cout << "Input Velocity: " << endl;
    cin >> v;
  cout << "Input Launch Angle: " << endl;
    cin >> t;
  cout << "Input Starting Height: " << endl;
    cin >> k;
  while ((x<=9) && (x>=0)) {
    y = k + x * tan(t) - (4.905 * pow(x,2))/(pow (v*cos(t),2));
    cout << "(" << x << "," << y << ")" << endl;
    x++;
  }
  return 0;
}
```

```cpp
#include <iostream>
#include <cmath>

using namespace std;

int main(int argc, char *argv[])
{
    {
        double v;
        int x=0;
        double t;
        double k;
        double y;
        cout << "Input Velocity: " << endl;
        cin >> v;
        cout << "Input Launch Angle: " << endl;
        cin >> t;
        cout << "Input Starting Height: " << endl;
        cin >> k;
        while ((x<=9) && (x>=0)) {
            y = k + x * tan(t) - (4.905 * pow(x,2))/(pow (v*cos(t),2));
            cout << "(" << x << "," << y << ")" << endl;
            x++;
        }
        return 0;
```

```
Input Velocity:
20
Input Launch Angle:
45
Input Starting Height:
7
(0,7)
(1,8.57534)
(2,10.0618)
(3,11.4594)
(4,12.7681)
(5,13.988)
(6,15.119)
(7,16.1611)
(8,17.1143)
(9,17.9787)
Program ended with exit code: 0
```

A4) We preferred using a for loop instead of a while loop since it is simpler and easier to understand.

```cpp
#include <iostream>
#include <cmath>

using namespace std;

int main(int argc, char *argv[])
{
    {
        double v;
        int x=0;
        double t;
        double k;
```

```
        double y;
        cout << "Input Velocity: " << endl;
        cin >> v;
        cout << "Input Launch Angle: " << endl;
        cin >> t;
        cout << "Input Starting Height: " << endl;
        cin >> k;
        for (int x=0; x < 10; x++) {
            y = k + x * tan(t) - (4.905 * pow(x,2))/(pow (v*cos(t),2));
            cout << "(" << x << "," << y << ")" << endl;
        }
        return 0;
    }}
```

```cpp
#include <cmath>

using namespace std;

int main(int argc, char *argv[])
{
    {
        double v;
        int x=0;                                              // Unused variable 'x'
        double t;
        double k;
        double y;
        cout << "Input Velocity: " << endl;
        cin >> v;
        cout << "Input Launch Angle: " << endl;
        cin >> t;
        cout << "Input Starting Height: " << endl;
        cin >> k;
        for (int x=0; x < 10; x++) {
            y = k + x * tan(t) - (4.905 * pow(x,2))/(pow (v*cos(t),2));
            cout << "(" << x << "," << y << ")" << endl;
        }
        return 0;
    }}
```

```
Input Velocity:
15
Input Launch Angle:
60
Input Starting Height:
10
(0,10)
(1,10.296)
(2,10.5439)
(3,10.7438)
(4,10.8956)
(5,10.9994)
(6,11.0551)
(7,11.0627)
(8,11.0222)
(9,10.9337)
Program ended with exit code: 0
```

A6)
#include <iostream>

```cpp
#include <cmath>

using namespace std;

int main(int argc, char *argv[])
{
    {
        double v;
        int x=0;
        double t;
        double k;
        double y;
        cout << "Input Velocity: " << endl;
        cin >> v;
        cout << "Input Launch Angle: " << endl;
        cin >> t;
        cout << "Input Starting Height: " << endl;
        cin >> k;
        {
            y = k + x * tan(t) - (4.905 * pow(x,2))/(pow (v*cos(t),2));
            while (y>=0) {
                cout << "(" << x << "," << y << ")" << endl;
                x++;
                y = k + x * tan(t) - (4.905 * pow(x,2))/(pow (v*cos(t),2));
            }
        }
        return 0;
    }}
```

```cpp
int main(int argc, char *argv[])
{
    {
        double v;
        int x=0;
        double t;
        double k;
        double y;
        cout << "Input Velocity: " << endl;
        cin >> v;
        cout << "Input Launch Angle: " << endl;
        cin >> t;
        cout << "Input Starting Height: " << endl;
        cin >> k;
        {
            y = k + x * tan(t) - (4.905 * pow(x,2))/(pow (v*cos(t),2));
            while (y>=0) {
                cout << "(" << x << "," << y << ")" << endl;
                x++;
                y = k + x * tan(t) - (4.905 * pow(x,2))/(pow (v*cos(t),2));
            }
        }
        return 0;
    }}
```

```
Input Launch Angle:
70
Input Starting Height:
10
(0,10)
(1,11.0997)
(2,11.9548)
(3,12.5653)
(4,12.9312)
(5,13.0525)
(6,12.9293)
(7,12.5615)
(8,11.9491)
(9,11.0921)
(10,9.99052)
(11,8.64438)
(12,7.05365)
(13,5.21834)
(14,3.13845)
(15,0.813974)
Program ended with exit code: 0
```

A8) This time we preferred using the while loop since the for loop was tricky and went against our intuition.   12

```cpp
#include <iostream>
#include <cmath>

using namespace std;

int main(int argc, char *argv[])
{
    {
        double v;
        int x=0;
        double t;
        double k;
```

```cpp
    double y;
    cout << "Input Velocity: " << endl;
    cin >> v;
    cout << "Input Launch Angle: " << endl;
    cin >> t;
    cout << "Input Starting Height: " << endl;
    cin >> k;
    {
        y = k + x * tan(t) - (4.905 * pow(x,2))/(pow (v*cos(t),2));
        for (int x=0; y>=0;) {
            cout << "(" << x << "," << y << ")" << endl;
            x++;
            y = k + x * tan(t) - (4.905 * pow(x,2))/(pow (v*cos(t),2));
        }
    }
    return 0;
}}
```

```cpp
int main(int argc, char *argv[])
{
    {
        double v;
        int x=0;
        double t;
        double k;
        double y;
        cout << "Input Velocity: " << endl;
        cin >> v;
        cout << "Input Launch Angle: " << endl;
        cin >> t;
        cout << "Input Starting Height: " << endl;
        cin >> k;
        {
            y = k + x * tan(t) - (4.905 * pow(x,2))/(pow (v*cos(t),2));
            for (int x=0; y>=0;) {
                cout << "(" << x << "," << y << ")" << endl;
                x++;
                y = k + x * tan(t) - (4.905 * pow(x,2))/(pow (v*cos(t),2));
            }
        }
        return 0;
    }}
```

```
Input Launch Angle:
70
Input Starting Height:
10
(0,10)
(1,11.0997)
(2,11.9548)
(3,12.5653)
(4,12.9312)
(5,13.0525)
(6,12.9293)
(7,12.5615)
(8,11.9491)
(9,11.0921)
(10,9.99052)
(11,8.64438)
(12,7.05365)
(13,5.21834)
(14,3.13845)
(15,0.813974)
Program ended with exit code: 0
```