

Building Data Structure

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- Several built-in data structures
 - Float (store floating point numbers)
 - Array (store list of numbers)
 - int (for integer values)
 - Queue
 - Stack

Defining our own data structure for different objects:-

- Triangle (No built-in data structure is available)

A **triangle** is represented by an array of three **points** and a **point** is represented by its **x** and **y** coordinates, **build-in** data structure **float** is used to represent the value of a coordinates.

Algorithm:

- Program uses 4 functions
- read_point() : use to read a point
- read_triangle() : to read a triangle
- area() : to compute area of triangle
- main() : reads a triangle and outputs its area

//C++ program for defining triangle data structure

```
#include <iostream>
#include<math.h>
using namespace std;
```

//structue to represent a point

```
struct point
{
    float x, y;
};
```

//triangle is an arry of three points

//structure used to a triangle

```
struct triangle
{
    point p[3];
```

```
};
```

```
//function to read a point
```

```
//takes input from user
```

```
void read_point(point &p)
{
    cin >> p.x >> p.y;
}
```

```
//function to read a triangle
```

```
void read_triangle(triangle &t)
{
    read_point(t.p[0]);
    read_point(t.p[1]);
    read_point(t.p[2]);
}
```

```
//returns the absolute value of area of triangle
```

```
float area(triangle t)
{
    return (0.5*abs(((t.p[1].x-t.p[0].x)*(t.p[2].y-t.p[0].y))-((t.p[2].x- t.p[0].x)*(t.p[1].y-
t.p[0].y))) );
}
```

```
int main(void)
```

```
{
    //data sturctur triangle is declared here
    triangle t;
    read_triangle(t);
    cout <<"The area of the triangle is " <<area(t) << endl;
}
```

Input: (1, 5) (9, 8) (7, 6) *// Input must be enter with space like this 1 5 9 8 7 6*

Output: The area of triangle is 5

References:

- Department of computer science- IIT Bombay
- www.youtube.com