Pair in C++

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In the realm of C++, the concept of "**pair**" proves to be useful when there is a relationship between two values that may belong to different data types.

Example:

To illustrate, imagine having two buckets, one filled with fruits and vegetables, and the other containing MRP prices per kilogram.

In order to establish a connection between these buckets for future utilization, the "pair" concept in C++ comes into play.

Code

```
/*
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*/

#include<iostream>
using namespace std;


int main()
{
	//SYNTAX:
	//pair <data_type1, data_type2> Pair_name (value1, value2) ;


	//-------------------------------------------------------
	//Create pair of same type
	pair<int,int> p;

	//Assign value of first and second element
	p.first		= 10;
	p.second	= 20;
	//print out that value
	cout<< "Pair value of p = "<<p.first<<" and "<<p.second<<endl;
	//-------------------------------------------------------

	//-------------------------------------------------------
	//Create pair of different type
	pair<char,int> p1;
	p1.first = 'A';
	p1.second = 1;
```
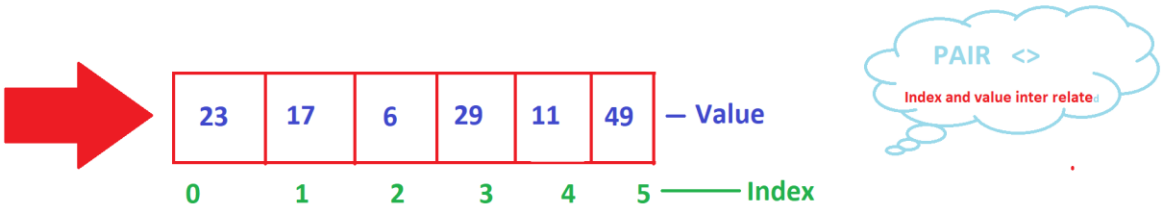
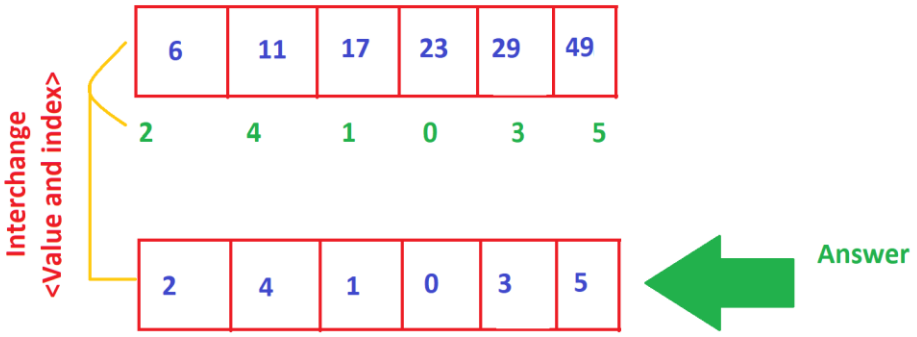

```
    cout<< "Pair value p1 = "<<p1.first<<" and "<<p1.second<<endl;
    //-------------------------------------------------------

    //-------------------------------------------------------
    //Assign value during declaration time
    pair<float,string> p3(3.14,"Pi");
    cout<< "Pair value p3 = "<<p3.first<<" and "<<p3.second<<endl;
    //-------------------------------------------------------


    return 0;
}
```

Application:





In above example we are going to sort the value and then interchange with Index number.

Code:

```
//Application of pair and vector
//Sorting Array as per value and then change the value with related indexes.
//Here array and it's value both are inter related,so during sorting as per value need to store related index also.
//HEre concept of pair and vector is very useful.


#include<iostream>
#include <bits/stdc++.h>   //Single library to ADD all std function and library
#include<vector>

using namespace std;

//------------------------------------------------------------------------------
//Our own function
bool compare_array_val(pair<int,int>p1,pair<int,int>p2)
{
	return(p1.first < p2.first);
}
//------------------------------------------------------------------------------


int main()
{
	//------------------------------------------------------------------------------
	//Fixed Array
	int array[] = {23,17,6,29,11,49};
	vector< pair<int,int> > v;    //Like 2D array but here every elemnt have significant value with it's pair element

	//Store value and index as a pair of vector
	for(int a = 0;a < (sizeof(array) / sizeof(array[0])); a++)
	{
		//make pair is inbuilt function
		v.push_back(make_pair(array[a],a));
		//We are storing first value and second index
	}
	cout << endl << "Before sorting : " << endl;
	vector< pair<int , int> > :: iterator it;
	for(it=v.begin();it != v.end(); it++)
	{
		cout << endl << "Element : " << it->first << " Index : " << it->second;
	}

	//------------------------------------------------------------------------------


	//------------------------------------------------------------------------------
```

```
//Sort as per value
sort(v.begin(),v.end(),compare_array_val);
//------------------------------------------------------------------------


//------------------------------------------------------------------------
//print array
//After sorting element and related index
vector < pair<int,int> > :: iterator itr;
cout<<endl<<"After sorting : "<<endl;
for(itr = v.begin();itr != v.end(); itr++)
{
        cout<< endl << "Element : " << itr->first << " at index : " << itr->second;
}
//------------------------------------------------------------------------

//------------------------------------------------------------------------
//Interchange with index
for(itr = v.begin();itr != v.end(); itr++)
{
        int temp = itr->first;
        itr->first = itr->second;
        itr->second = temp;
}
//------------------------------------------------------------------------


//------------------------------------------------------------------------
cout << endl << "After interchange :"<<endl;
for(itr = v.begin();itr != v.end(); itr++)
{
        cout<< endl << "Element : " << itr->first << " at index : " << itr->second;
}
//------------------------------------------------------------------------
```

```
Before sorting :

Element : 23 Index : 0
Element : 17 Index : 1
Element : 6 Index : 2
Element : 29 Index : 3
Element : 11 Index : 4
Element : 49 Index : 5
After sorting :

Element : 6 at index : 2
Element : 11 at index : 4
Element : 17 at index : 1
Element : 23 at index : 0
Element : 29 at index : 3
Element : 49 at index : 5
After interchange :

Element : 2 at index : 6
Element : 4 at index : 11
Element : 1 at index : 17
Element : 0 at index : 23
Element : 3 at index : 29
Element : 5 at index : 49
--------------------------------
```

```
return
0;
}
```