

Object Oriented Programming Lab

Lab Task 5

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C++ Code:

#include <iostream>

using namespace std;

class Person

{

string name;

int age;

float\* heights;

int size;

public:

Person(string n="Unknown", int a=0, float\* h=nullptr, int s=0);

Person(Person &p); // Shallow Copy Constructor

Person(const Person &p); // Deep Copy Constructor

~Person();

void getter();

void setter(string na, int ag, float\* he, int si);

};

// Default Constructor

Person::Person(string n, int a, float\* h, int s)

{

name = n;

age = a;

size = s;

heights = new float[size];

for (int i = 0; i < size; i++)

{

heights[i] = h[i];

}

}

// Shallow Copy Constructor

Person::Person(Person &p)

{

cout << "Shallow Copy Constructor Called" << endl;

name = p.name;

age = p.age;

heights = p.heights; // Shallow copy (shared memory)

size = p.size;

}

// Deep Copy Constructor

Person::Person(const Person &p)

{

cout << "Deep Copy Constructor Called" << endl;

name = p.name;

age = p.age;

size = p.size;

heights = new float[size];

for (int i = 0; i < size; i++)

{

heights[i] = p.heights[i];

}

}

// Destructor

Person::~Person()

{

if (heights)

{

delete[] heights;

heights = nullptr;

}

}

// Setter Function

void Person::setter(string na, int ag, float\* he, int si)

{

cout << "Enter your name: ";

cin >> na;

cout << "Enter your age: ";

cin >> ag;

cout << "Enter number of heights: ";

cin >> si;

if (heights) {

delete[] heights;

}

heights = new float[si];

for (int i = 0; i < si; i++)

{

cout << "Enter height " << i + 1 << ": ";

cin >> heights[i];

}

name = na;

age = ag;

size = si;

}

// Getter Function

void Person::getter()

{

cout << "Name: " << name << endl;

cout << "Age: " << age << endl;

cout << "Heights: ";

for (int i = 0; i < size; i++)

{

cout << heights[i] << " ";

}

cout << endl;

}

int main()

{

string n;

int a, s;

cout << "Enter your name: ";

cin >> n;

cout << "Enter your age: ";

cin >> a;

cout << "Enter the number of heights: ";

cin >> s;

float\* h = new float[s];

for (int i = 0; i < s; i++)

{

cout << "Enter height " << i + 1 << ": ";

cin >> h[i];

}

Person p1(n, a, h, s);

cout <<"\tDisplaying Person 1\n";

p1.getter();

Person p2 = p1; // Shallow Copy

p2.setter(n, a, h, s);

cout<<"\tDisplaying Person 1\n";

p1.getter();

Person p3(p1); // Deep Copy

p3.setter(n, a, h, s);

cout<<"\tDisplaying Person 1\n";

p1.getter();

delete[] h;

return 0;

}

Output:



