Kerala HSS CS Lab

C++ Programs Source Code and Output

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ARRAY1.CPP source

```cpp
/*
 * Q: Read N numbers into an array
 * and print those which are larger than
 * the average
 */

#include <iostream>

using namespace std;

int main() {

  //Defining variables
  int array[100]; //to store umbers entered by user
  int N;          //how many items will be entered
  int avg;        //to store average of numbers in array

  cout<<"How many numbers would you like: ";
  cin>>N;
  cout<<"Enter the numbers:"<<endl;

  //Reading into array[0], array[1],
  //array[2]....., array[N-1]
  for(int i=0; i<N; i++) {
    cin>>array[i];
  }

  avg=0;

  //Average = Sum of all numbers / Total number of items

  //Step 1: Sum of all numbers
  //avg = array[0] + .... + array[N-1]
  for(int i=0; i<N; i++) {
    avg+=array[i];
  }

  //Step 2: Divide by total number of items
  avg/=N;

  cout<<endl<<"The average is: "<<avg<<endl;
  cout<<endl;
  cout<<"The numbers greater than average are:"<<endl;

  //if array[0]>avg, print array[0] ... array[N-1]>avg, print array[N-1]
  for(int i=0; i<N; i++) {
    if(array[i]>avg) cout<<array[i]<<endl;
  }
  cout<<endl;

  //Tell the operating system that everything is OK (exit code 0)
  //More info in higher classes
  return 0;
}

```

ARRAY1.CPP output

```
How many numbers would you like: 10
Enter the numbers:
1
2
3
4
5
6
7
8
9
10

The average is: 5

The numbers greater than average are:
6
7
8
9
10


```

FACTORIAL.CPP source

```cpp
/*
 * Write a program to find the factorial
 * of a number using a user defined function
 * and recursion
 */

#include <iostream>
using namespace std;

/* this is the recursive factorial function
 * which repeatedly calls itself
 * until n is not greater than 1
 */
int factorial(int n) {
  if(n>1) return n*factorial(n-1);
  else return n;
}

int main() {

  int num;

  cout<<"Enter the number to find factorial:";
  cin>>num;

  int fact=factorial(num);

  cout<<num<<"! = "<<fact<<endl;

  //Tell OS everything’s OK
  return 0;
}
```

FACTORIAL.CPP output

```
Enter the number to find factorial:5
5! = 120

```

LINEAR-SEARCH1.CPP source

```cpp
/*
 * Program to read the admission numbers of N
 * students in a class and search given admission
 * no. from the list using linear search
 */

#include<iostream>
using namespace std;

int main() {

  int adm_nos[100];
  int N, to_search;

  cout<<"Enter the number of students:";
  cin>>N;

  cout<<"Enter admission numbers:"<<endl;

  //Read n numbers into array
  for(int i=0;i<N;i++) {
    cout<<"["<<i<<"]"<<":"; //Display [0]:, [1]:, ..[n-]:
    cin>>adm_nos[i];
  }

  cout<<endl;
  cout<<"Enter the admission no. to search:";
  cin>>to_search;

  bool found=false; //to test whether an item is found

  for(int i=0;i<N;i++) {
    if(adm_nos[i]==to_search) {
      cout<<"Found "<<to_search<<" at index "<<i<<endl;
      found=true; //set to true, so that error message is not shown
      break;
    }
  }

  if(!found) //show the error message if not found
    cout<<to_search<<" was not found"<<endl;

  return 0;
}
```

LINEAR-SEARCH1.CPP output

```
Enter the number of students:10
Enter admission numbers:
[0]:101
[1]:102
[2]:103
[3]:104
[4]:105
[5]:106
[6]:107
[7]:108
[8]:109
[9]:110

Enter the admission no. to search:108
Found 108 at index 7

```

POINTER1.CPP source

```cpp
/*
 * Program to create two pointers initialised with
 * two numbers and find their average.
 */

#include <iostream>
using namespace std;

int main() {
  int* m = new int(24);
  int* n = new int(32);

  int* avg = new int(0);
  cout<<"value of m:"<<*m<<endl;
  cout<<"value of n:"<<*n<<endl;

  *avg = (*m+*n)/2;
  cout<<"average:"<<*avg<<endl;

  return 0;

}


```

POINTER1.CPP output

```
value of m:24
value of n:32
average:28

```

STRING-LENGTH.CPP source

```cpp
/*
 * Program to find string length without
 * using strlen function
 */

#include <iostream>
using namespace std;

int main() {

  char str[100];
  int length = 0;

  cout<<"Enter the string: ";
  cin>>str;

  // Example string="Hello" = {’H’,’e’,’l’,’l’,’o’,’\0’}
  // length is initially zero
  // str[0] = ’H’ != ’\0’; so length+=1 and continue loop
  // ...
  // str[5] = ’\0’ == ’\0’ stop looping
  // print 5
  while(str[length]!=’\0’) {
   length++;
  }
  cout<<"The length of given string: "<<length<<endl;
  return 0;
}


```

STRING-LENGTH.CPP output

```
Enter the string: Hello
The length of given string: 5

```

STRUCT1.CPP source

```cpp

/*
 * Program to find the net salary of an employee
 * by defining a struct with the details:
 *  employee code,name,basic pay,DA,HRA,PF.
 */

#include <iostream>
using namespace std;

struct employee {
  int emp_code;
  char name[25];
  int basic_pay;
  int da;
  int hra;
  int pf;
  int net_salary;
};

int main() {
  employee emp;

  cout<<"Enter the details of the employee:"<<endl;
  cout<<"\tEmployee code:";
  cin>>emp.emp_code;
  cout<<"\tName:";
  cin>>emp.name;
  cout<<"\tBasic Pay:";
  cin>>emp.basic_pay;
  cout<<"\tDA:";
  cin>>emp.da;
  cout<<"\tHRA:";
  cin>>emp.hra;
  cout<<"\tPF:";
  cin>>emp.pf;

  emp.net_salary = (emp.basic_pay + emp.da + emp.hra) - emp.pf;

  cout<<"Net salary:"<<emp.net_salary<<endl;
  return 0;
}

```

STRUCT1.CPP output

```
Enter the details of the employee:
        Employee code:123
        Name:Hercules
        Basic Pay:10000
        DA:1000
        HRA:1000
        PF:600
Net salary:11400

```

SUM-OF-DIGITS.CPP source

```cpp

/* Program to input a number and find the sum of its digits */

#include<iostream>
using namespace std;

int main() {

  int number, sum_of_digits=0;

  cout<<"Enter a number:";
  cin>>number;

  // The content of the loop will be
  // executed as long as number > 0
  while(number>0) {
    //add the 1’s digit of the number to sum_of_digits
    //trick: division by 10 and take reminder gives 1’s digit
    sum_of_digits+=number%10;
    //divide number by 10 (ignore decimals. ie integer division)
    //so the 10’s place will become 1’s place
    //100’s place -> 10’s place and so on.
    number/=10;
  }

  cout<<"Sum of digits:"<<sum_of_digits<<endl;

  return 0;
}


```

SUM-OF-DIGITS.CPP output

```
Enter a number:1234
Sum of digits:10

```

SUM-OF-SQUARES.CPP source

```cpp
/*
 * Program to display the sum of squares of N natural numbers
 * without using equations
 */

#include <iostream>
using namespace std;

int main() {

  int n, sum_of_sqrs = 0;

  cout<<"Enter the number:";
  cin>>n;

  //the following code will be executed for all values of i
  //from 1 to n
  //ie, sum_of_sqrs+=1*1; sum_of_sqrs+=2*2; ... sum_of_sqrs+=n*n;
  for(int i=1;i<=n;i++) {
    sum_of_sqrs+=i*i;
  }

  cout<<"Sum of squares of "<<n<<" natural numbers:"<<sum_of_sqrs<<endl;

  return 0;

}
```

SUM-OF-SQUARES.CPP output

```
Enter the number:10
Sum of squares of 10 natural numbers:385

```

SWAP.CPP source

```
/*
 * Write a program to swap two variables with the help
 * of a user defined function
 */

#include <iostream>
using namespace std;

/*
 * swap is a function which accepts two variables
 * passed by reference
 */
void swap(int& var1, int& var2) {
  int temp = var1;
  var1 = var2;
  var2 = temp;
}

int main() {

  //define two variables
  int var1,var2;

  //read values from user
  cout<<"Enter the values of variables:"<<endl;
  cout<<"var1=";
  cin>>var1;
  cout<<"var2=";
  cin>>var2;

  //call the swap function
  swap(var1,var2);

  //output the new values
  cout<<"New values:"<<endl;
  cout<<"var1="<<var1<<endl;
  cout<<"var2="<<var2<<endl;

  //Tell OS that everything is ok
  return 0;

}


```

SWAP.CPP output

```
Enter the values of variables:
var1=10
var2=100
New values:
var1=100
var2=10

```

SWITCH-CASE1.CPP source

```cpp
/*
 * Program to input a group code and
 * output corresponding group name based
 * on the following:
 * |-----------------------------------|
 * | Code no. | Subject                |
 * |----------|------------------------|
 * |  5       | computer science       |
 * |  33      | computer application   |
 * |  39      | science                |
 * |  other   | invalid option         |
 * |-----------------------------------|
 */

#include<iostream>
using namespace std;

int main() {

  int group_code;
  cout<<"Enter the group code:";
  cin>>group_code;

  cout<<"Group name:";

  switch(group_code) {
    case 5:
      cout<<"Computer Science";
      break;
    case 33:
      cout<<"Computer Application";
      break;
    case 39:
      cout<<"Science";
      break;
    default:
      cout<<"Invalid Option";
  }
  cout<<endl;

  return 0;
}


```

SWITCH-CASE1.CPP output

```
Enter the group code:33
Group name:Computer Application

```