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MATRIC NUMBER : A20EC0046

SECTION : 08

1. Write a complete program that calculates the total and the average of marks for any number of subjects taken by a student. The marks are stored in a dynamically allocated array. Basically, the program will perform the following tasks:
2. Prompt the user to enter the number of subjects taken by the student.
3. Create an array with a dynamically allocated memory to hold the specified number of marks.
4. Prompt the user to enter the marks for each subject and store them in the allocated array.
5. Calculate total of the marks.
6. Calculate average of the marks.
7. Display the output (total marks and average).
8. Free the allocated memory and make the pointer point to null.

The output of the program would be as follows.

/\*

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\* MATRIC NUMBER : A20EC0046

\* SECTION       : 08

\* DESCRIPTIONS  : This program to calculates totals and averages of the marks

                  for any number of subject taken by student and stored in a

                  dynamically allocated array.

\*/

#include <iostream>

using namespace std;

int main(){

    int n;

    double \*mark;

    double total, average;

    // Get the number of subject taken by student

    cout << "Please enter number of subjects taken: ";

    cin >> n;

    //Dynamically allocated an array large enough to hold that many number of marks

    mark = new double[n];

    cout << "\nPlease enter the marks of each subject.\n\n";

    // Get the marks of each subject

    for(int i = 0; i < n; i++){

        cout << "Subject " << (i+1) << " :";

        cin >> mark[i];

        // Calculate the total marks

        total += mark[i];

    }

    // Calculate the average total marks per subject

    average = total/n;

    // Display the results

    cout << "\nTotal of Marks :   " << total << endl;

    cout << "\nAverage : " << average;

    // Free dynamically allocated memory

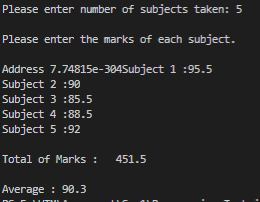
    delete [] mark;

    mark = 0;       // set mark point to null

    return 0;

}

Output :



1. Given the following code, what would be the content of each variable at the end of the program **segment**. The variable : **a, b, c, x, y, ax[6], ax[16]** and **\*ip.**

//Program 7.11

#include <iostream>

using namespace std;

int main (){

    int a = 3;

    int b = 8;

    int c = 2;

    int x = 5;

    int y = -5;

    int ax[20] = {2,3,1,7,12,35,-6,77,-8,9};

    int \*ip;

    int \*ix;

    ip = new int[5];

    for (a =0;a<5; a++)

        cout <<(\*ip + a );

    \*ip = \* ax;

    ix = ip + 10;

    a = \*ix;

    \*(++ix) = \*(ax + 6);

    b = \*ix;

    c = \*(ax + 6);

    x = \*ix \*= ax[4];

return 0;

}

Output :

a : 1634887535

b : -6

c : -6

x : -72

y : -5

ax[6] : -6

ax[16] : 0

\*ip : 2

1. What is the output of the following program:

//Program 7.12

#include <iostream>

using namespace std ;

int\* myfunction (int \*y) {

    int\* px = y ;

    int temp = 12;

    y[4] = y[0];

    y[0]= temp;

    for (int j=0;j<5;j++)

        cout <<y[j]<<" ";

        cout <<endl;

        return px;

}

int main (){

    int\* pi, \*x;

    int a[]= {3,4,5,6,7};

    x=a;

    pi = myfunction (x);

    cout << "\*pi = " << \*pi << endl;

    for (int j=0;j<5;j++)

        cout <<a[j]<<" ";

    return 0;

}

Output :

12 4 5 6 3

\*pi = 12

12 4 5 6 3

1. Type in program 7.5. Run the program.

// Program 7.5

#include<iostream>

using namespace std;

int main(){

    int \*iptr;

    iptr = new int;

    \*iptr=50;

    cout<<"The address of iptr: "<<iptr<<endl;

    cout<<"The value of \*iptr: "<<\*iptr<<endl;

    delete iptr;

    return 0;

}

* 1. Identify the output of the program.



* 1. Draw the memory layout for the program.

|  |  |  |
| --- | --- | --- |
| Memory Address | Identifier | Contents |
| 0xf81350 | Iptr | 50 |

1. Type in **Program 7.6.** Run the program. Determine the output and explain in details the steps involved until the program is terminated.

//Program 7.6

//Using the new and delete operators for Dynamic Memory

//Allocation

#include <iostream>

using namespace std;

int main(){

    int i, num;

    int \* id;

    cout <<"Enter number of student:";

    cin >> num;

    id = new int[num];

    for (i=0; i<num; i++){

        cout << "Enter student ID: ";

        cin >> id[i];

    }

    for (i=0; i<num; i++){

        cout << "id for student number " << (i+1) << ": ";

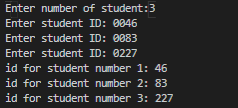
        cout << id[i] << endl;

    }

    delete [] id;

    return 0;

}

Output :

Explanation :

|  |  |
| --- | --- |
| int i, num;      int \* id; | Variable declaration |
| cout <<"Enter number of student:";      cin >> num; | Ask user to enter the number of student |
| id = new int[num]; | Declaration of pointer |
| for (i=0; i<num; i++){          cout << "Enter student ID: ";          cin >> id[i];      } | Repeated statement to ask user to enter student ID according to the number of students entered. |
| for (i=0; i<num; i++){          cout << "id for student number " << (i+1) << ": ";          cout << id[i] << endl;      } | Displayy all the students ID entered by user |
| delete [] id; | Clear the allocated array |