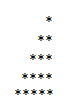
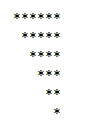
Version History

|  |  |  |  |
| --- | --- | --- | --- |
| **Ver. Number** | **Last Updated** | **By** | **Changes** |
| 1.0 | 16-Jan-14 | Bilal Shahzad |  |
| 1.1 | 30-Jan-14 | Bilal Shahzad | Questions for ‘functions’ practice are added |
| 1.2 | 11-Feb-14 | Bilal Shahzad | Questions for ‘Classes’ practice are added |

Time is not a constraint. You need to try as many you can. Take your time as much a program needs. When you will start a program, mostly you will not have any idea how to solve a program. You need to think and think. But don’t think that you can’t do it.

1. Declare at least one variable for one type (int, long, float, double, decimal, bool, char, string). Assign some initial value to it and then display the result on screen.
2. Write a program which will add two numbers; subtract two numbers, multiple two numbers, perform division on two numbers and also use remainder operator (%) on two numbers.
3. Write a code that switches the values of two variables A and B and prints the result on the screen. How many variables do you need?
4. Write a code that switches the values of two variables A and B and prints the result on the screen. You should not use any other variable than A & B.
5. Write a program which will take Celsius value from user and will display Fahrenheit value after conversion. Check formula on internet for conversion of Celsius to Fahrenheit.
6. Write a program which will take three numbers from user and will display the biggest number from three.
7. Write a program which will take three numbers from user and will display the smallest number from three.
8. Write a program which will read two numbers from user and an operator from (+,-,\*,/,%) and will print the result accordingly on the screen.
9. [Loops]Write a program which will print 1 to 100 numbers on the screen.
10. [Loops] Write a program which will take a number from user and will print its table on the screen till 10. (E.g. 5\*1=5)
11. [Loops] Write a program which will take two number from user (e.g. 2 & 5) and will print sum of numbers in this range (e.g. Output: 14)
12. [Loops] Write a program which will display count of numbers which are divisible by 3, divisible by 5, divisible by 3 & 5. Range of numbers to check is 1 to 100.
13. [Loops] Write a program which will print Fibonacci series. It starts with 0 & 1. Every next number is got by adding last two numbers. For example, 0, 1,1,2,3,5,8,13,21 and so on. You need to print first 20 numbers in this series.
14. [Loops] Write a program that takes a number from user and computes the factorial of an integer n.
15. [Loops] Write a program which will take two numbers from user and then ask to enter an operator (e.g. +, -, \*, /, %). Program will compute the result and will display it. Program will ask the user if he wants to continue, enter (Y). If user enters y or Y, program will ask again for numbers and operators, otherwise program will exit.
16. [Loops] Write a program which will take a number from user and will print sum of its digits. For example input = 123455, output=20
17. [Loops] Write a program which will take a number from user and will print its reverse number. For ease, you can suppose number of 4 digits long only. For example input =1234, output =4321.
18. [Loops] Write Programs to print following output (using loops)
    1. 
    2. 
    3. 
    4. 
    5. 
    6. 
19. [Miscellaneous] Write a program to solve following problem

**Problem Statement: Virtual Restaurant**

You are required to write a program for **BILLING SYSTEM** of a virtual restaurant. The basic idea is that by entering the meal price, your billing system will calculate the Sales Tax, Total amount and Complement offer upon that meal. The program will process the billing of undetermined number for customers. At the end, program will show sum of total amount of all the customers.

**Detailed Description:**

Billing System should work as under:

* You are required to take meal price as input from user.
* After getting this input, program will calculate the sales tax on it as given below:

|  |  |
| --- | --- |
| **Meal Price** | **Sales Tax applicable** |
| Less than or equal to 1000 | No sales Tax on it. |
| Greater than 1000 and less than or equal to 2000 | 1% of meal price. |
| Greater than 2000 | 2% of meal price. |

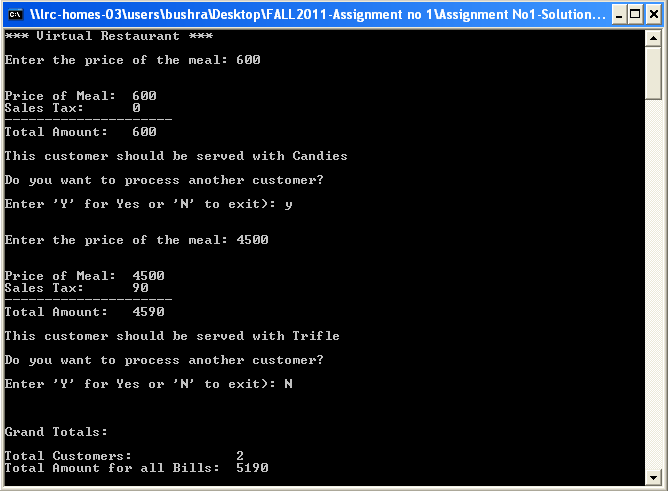
* After calculating the sales tax, program will calculate and display the total amount of the meal according to given formula:

Total Amount = Meal\_Price + Sales\_Tax

* Now, program will prompt to serve the complement sweet dish to customer on the basis of total amount as given below:
* After displaying the information of one customer, the program should ask the user if he/she again wants to process the bill of another customer. The user will be given two options. If user selects “Y or y”, the program will start the processing of another customer. If user selects “N or n”, the billing system exits.
* Before exiting from billing system, this program should display the total number of customers it processed, and sum of total amount of all the customers.

|  |  |
| --- | --- |
| **Total Amount** | **Sweet Dishes** |
| Less than 1000 | Candies |
| Greater than or equal to 1000 and less than 2000 | Sweet Bread |
| Greater than or equal to 2000 and less than 3000 | Pudding |
| Greater than or equal to 3000 and less than 4000 | Cake |
| Other amounts | Trifle |

**Sample Output:**



1. [Miscellaneous] Write a program to solve following problem.

**Problem Statement: Rent A CAR**

You are required to write a program for **RENT A CAR SYSTEM**. The basic idea is that user will provide customer information, Car Model, and number of days. Upon this information your program will calculate the Amount for the Car. Rent Amount will be calculated on the Basis of Type of Model he / she is going to take on Rent and of Days on Rent. There are Types of Models available “**2009”, “2010” and “2011”.** For **Model 2009 Minimum Rent per day is Rs. 5000/- for Model “2010” Amount is Rs. 8000/- and for “2011” Amount is Rs. 10,000/- Per Day.**

**Detailed Description:**

1. The program should display

Please provide customer Name:

Please provide Car Model.

Enter ‘A’ for Model 2009.

Enter ‘B’ for Model 2010.

Enter ‘C’ for Model 2011.

Then your program should take these inputs,

1. Depending upon the choices that user has entered, your program will further display the prompt

1. If user has entered Car Model, then your program should prompt the user to enter the Car Number and No. of Days for which car is required.

-----------------------------------------------------------------

Model Name:

Number of Days:

-----------------------------------------------------------------

1. After getting all this information, now write a function which will calculate rental/charged amount on the basis of this information.

To calculate rental/charged amount we will use this formula:

**Rental Amount = charged amount \* number of days**

Charged amount will be different for different Car Models as described above.

After calculating Rent Amount for Car display it on the screen.

**Sample Output**

**Please provide customer Name: Ahsan**

**Please provide Car Model Description.**

**Enter ‘A’ for Model 2009.**

**Enter ‘B’ for Model 2010.**

**Enter ‘C’ for Model 2011**

**Please provide following information:**

**Car No. : LWQ234**

**Number of day’s: 3**

**Final output should be like this**:

-----------------------------------------------------------------

Customer Name: Ahsan

Car Model : 2009

Car No. : LWQ234

Number of days: 03

Your Rental Amount is: 15000

-----------------------------------------------------------------

1. [Arrays] Consider an array X (type float) of length n. Write code that prints the array Y, which is X in reverse order.

Sample Input: 1 12 3 1 4 5

Sample Output: 5 4 1 3 12 1

1. [Arrays] Consider an array X of length n randomly initialized. Write a program that returns the position and value of the minimum.

Sample Input: 5 1 12 0 -3 100 12

Sample Output: Min is= -3 at 4

1. [Arrays] Consider an array X of length n. Take n numbers from user. Then take a number from user and search in the array and display the index of the array, If found else -1.

Sample Input: 5 1 12 0 -3 100 12

Number to search: -3

Sample Output: Number is found at index = 4

1. [Arrays] Write a program which will take 10 numbers from users and find Sum, Average, Max and Min of these numbers.

Sample Input: 10, 2, 5, 3, 1, 5, 2, 9, 11, 5

Sample Output:

Sum is: 53

Average: 5.3

Max: 11

Min: 1

1. [Arrays] Write a program which take 10 numbers from user and will sort those numbers and print the sorted array.

Sample Input: 6, 1, 100, 2, 0, 9, -3, 5, 10, 4.

Sample Output: -3, 0, 1, 2, 4, 5, 6, 9, 10, 100

1. [Arrays] Write a program which will take two arrays and store sum of these arrays in 3rd array and then print the result array.

Sample Input:

First array: 1 2 3 1 4 1 5

Second array: 3 5 12 3 5 9 2

Sample Output: Result is= 4 7 15 4 9 10 7

1. [Arrays] Write a program, which counts the number of time an integer between 0 and 9 has been entered by the user. The program will ask the user to enter a number between 0 and 9, exit when a negative number is entered (values outside of the range will be discarded). Upon exit, it will print the number of 0, 1... Entered.

Sample Input:

Enter number: 5

Enter number: 2

Enter number: 2

Enter number: 1

Enter number: -1

Sample output:

You have entered

0 for 0 times

1 for 1 times

2 for 2 times

3 for 0 times

…..

9 for 0 times

1. [Arrays] Write a program to solve following problem.

Player Batting History

Program will take match stats for a player for n number of matches. You need to take following inputs for every match

Sample input:

Please Enter Player Name: Bilal Shahzad

Press enter to add data for matches:

Please enter data for Match 1:

Match score: 68

Balls faced: 20

Fours: 5

Sixes: 1

Catches: 0

Please enter data for Match 2:

Match score: 120

Balls faced: 77

Fours: 10

Sixes: 3

Catches: 1

Sample Output: (Table format is not necessary; you can show data in your own format)

Name: Bilal Shahzad

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Math | Runs | HS | Ave | BF | SR | 100 | 50 | 4s | 6s | Ct |
| 2 | 188 | 120 | 94 | 97 | 193.81 | 1 | 1 | 15 | 4 | 1 |

1. [Multi-dimensional Arrays] Write a function to solve following problem

**Problem Statement: Sorting two matrices**

You are required to write a program which takes two 3x3 matrix A and B containing 09 elements each and sort all these 18 elements in descending order and put it in one dimensional array and then display it.

Follow the following steps to code this program

* 1. Take two two-dimensional arrays as A[3][3]and B[3][3] and one-dimensional array C[] to keep the result.
  2. Prompt the user to enter the elements of first matrix
  3. Prompt the user to enter the elements of second matrix
  4. Now take first element of first matrix and check in both matrix weather it is greatest or any other number is the greatest and put the greatest number at the first index of the one dimensional array. Follow this procedure for other elements and at the end one dimensional array would be in descending order
  5. Display this one-Dimensional sorted array on the screen

**Following is the sample program structure**

2 3 5 2 8 7

**A=** 6 5 9 **B=** 0 1 1

1 0 2 4 7 9

**Output should be like this**

Please enter the Elements of First Matrix:

Please enter the Elements of second Matrix:

**Sorted Values from Both the Matrices are**:

--------------------------------------------------------------

9 9 8 7 7 6 5 5 4 3 2 2 2 1 1 1 0 0

-------------------------------------------------------

1. [Multi-dimensional Arrays] Write a program which will take 2 arrays of order 3\*3 from user. Program will perform basic matrices operations (which you studied in linear algebra subject). It will perform following operations
   1. Addition
   2. Subtraction
   3. Multiplication
   4. Determinant Calculation
   5. Inverse Calculation
2. [Functions] Write a function which will take two parameters (a number for table to print and number till table should print). It should output the table.

E.g. CreateTab(5,4);

5 \* 1 = 5

5 \* 2 = 10

5 \* 3 = 15

5 \* 4 = 20

1. [Functions] Write a function which will take two parameters (a character and a number to print that character that many times).

e.g. PrintLine(‘\*’, 20); //This will print 20 stars in a line

1. [Functions] Write a function which will take two parameters (a base, a power) and returns the result.

e.g. MyPower(2,5); //it will give 32 which is 2^5

1. [Functions] Write a function will take a number and returns its factorial. E.g. FindFactorial(5); //It will return 120
2. [Functions] Write a function which will take any three numbers and will return maximum from those three.

e.g. FindMax(3,15,9); it will return 15 as output

1. [Functions] Write a function which will take any three numbers and will return minium from those three.

e.g. FindMin(3,15,9); it will return 3 as output

1. [Functions] Write a function which will take a number and returns its English representation. The max number user can enter is 99999.

E.g. GetNumberTrans(10); //it will return ‘Ten’

GetNumberTrans(101);//it will return ‘One hundred and one’

1. [Functions] Write a function which will take two parameters (an array of int and another number). If provided number is found in array, return found index otherwise return -1.

e.g. FindIndex(arr,5); // arr=1,2,5,3,10,9 number=5, output=2

1. [Functions] Write a function which will take two arrays and return another array which will be sum of provided two arrays.
2. [Functions] Write a function which will take an array and returns sum of all values in that array.
3. E.g. FindSum(arr); //arr=1,5,3,9 output=18
4. [Functions] Write a function which will take an array and returns maximum number from that array.

e.g. FindMax(arr);//arr=1,5,3,9,10 output=10

1. [Functions] Write a function which will take an array and returns minum number from that array.

e.g. FindMax(arr);//arr=1,5,3,9,10 output=1

1. [Functions] Write a function which will take an array and returns that array in sorted order (ascending and descending).

e.g. Input arr=5,1,3,5,2,9,0, output arr = 0,1,2,3,5,5,9

1. [Functions]Write a function to calculate if a number is a prime or not. Return 1 if it is prime and 0 if it is not a prime.
2. [Functions] Write a function to determine the number of prime numbers below n.
3. [Functions] Write a function which will take two parameters from user and will find HCF (Highest Common factor) of these two numbers.
4. [Functions] Write a function which will take two parameters from user and will find HCF (Highest Common factor) of these two numbers.
5. [Functions] Write a function which will take one array as input and will print frequency of each element in the array.

E.g. Input Array: 15,0,5,20,5,1,0,2,5,15

Output: 0 has occurred 2 times

1 has occurred 1 times

2 has occurred 1 ties

5 has occurred 3 times

15 has occurred 2 times

20 has occurred 1 time

1. [Strings in C++] Write a program that prompts the user for a string, and prints its reverse.
2. [Strings in C++] Write a program that prompts the user for a sentence, and prints each word on its own line.
3. [Strings in C++] Using the integer representation of a character, write a function that replaces all the lower case characters in a string by upper case characters.
4. [Strings in C++] Write a program that tests if a user-supplied sentence is a palindrome. The program should not be case sensitive.
5. [Strings in C++] Given a string as input, write a function that counts the numbers, the lower case, upper case and special characters.
6. [OOP] Create a class named ‘Employee’. This class should have following members
   1. EmployeeID (integer type and public)
   2. EmployeeName (String type and public)
   3. One default constructor
   4. One parameterize constructor (which will take two parameters to set class data members)
   5. One function ‘Show()’ which will show message ‘Employee ID: 1, Employee Name: ABC’ where 1 and ‘ABC’ are dummy data here.
7. [OOP] Create a class named ‘MyCalculator’. This class should provide functions
   1. Sum(int ,int)
   2. Subtract(int ,int);
   3. FindMod(int num,int divsor)
   4. FindDiv(int num,int divisor)
   5. FindPower(int base,int power)
8. [OOP] Create a class Customer which will have following members
   1. CustomerID (int)
   2. CustomerName (String)
   3. TotalBill (float)
   4. AddItem(int quantity, pricePerItem);
      1. This function will calculate amount and add it to ‘TotalBill’ variable. User can call this function many times and ‘TotalBill’ should be updated with every call
   5. RemoveItem(int quantity, pricePerItem)
      1. This function will calculate amount and remove it from ‘TotalBill’ variable. ‘TotalBill’ should not go in negative. User can call this function many times and ‘TotalBill’ should be updated with every call
   6. GetTotalBill()
      1. This function will return the value of ‘TotalBill’ variable to user
9. [OOP] Create a class PMatch which will have following members
   1. MatchID (int)
   2. BatScores (short)
   3. BallsFaced(short)
   4. Fours
   5. Sixes
   6. Catches (shot)
10. [OOP] Create a class Player which will have following members
    1. Player Name (String)
    2. MatchesList (Match[ ]);
    3. AddMatch(Match obj)
       1. This function will add object of Match in local array (i.e. MatchesList)
    4. ShowAverage()
       1. Compute Average using ‘MatchesList’ array and show it to user
    5. ShowFoursCount()
       1. Counts Fours using ‘MatchesList’ array and show it to user
    6. ShowSixesCount()
       1. Counts Sixes using ‘MatchesList’ array and show it to user
    7. ShowCatchesCount()
       1. Counts Catches using ‘MatchesList’ array and show it to user
    8. ShowTotalScores()
    9. ShowStrikeRate()
    10. ShowScoreCard()
        1. Show result in score card format as shown previously in ‘Arrays’ practice question

**More exercises:**

1. <http://en.wikibooks.org/wiki/C_Programming/Beginning_exercises>
2. <http://newb6.u-strasbg.fr/~siebert/pages/teaching/INFO-L2/Exercise_C_L2STUE.pdf>
3. <http://www.cs.cf.ac.uk/Dave/C/node4.html>
4. <http://knking.com/books/c2/answers/>
5. <http://knking.com/books/c2/cprogs2.zip>
6. <http://fileadmin.cs.lth.se/cs/Education/EDA031/labs/cpplabs.pdf>
7. <https://go-left.com/blog/programming/100-little-programming-exercises/>