

# ALIGARH MUSLIM UNIVERSITY

## DEPARTMENT OF COMPUTER SCIENCE

### MASTERS OF COMPUTER APPLICATIONS



#### CSD-10P1 : LABORATORY COURSE

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# WEEK 1

# WEEK 1

**#1 Open a new document and type the given letter.**

**i) Save the document as “Letter.doc.”**

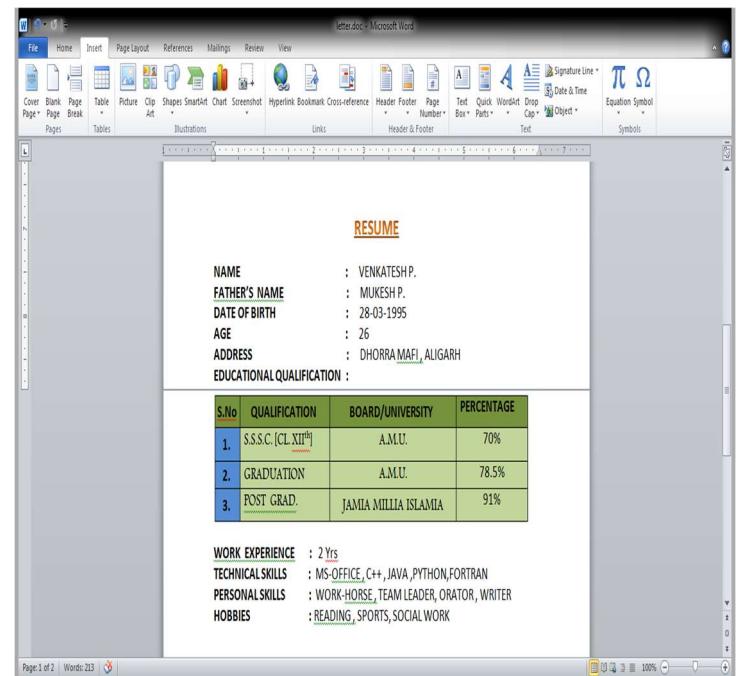
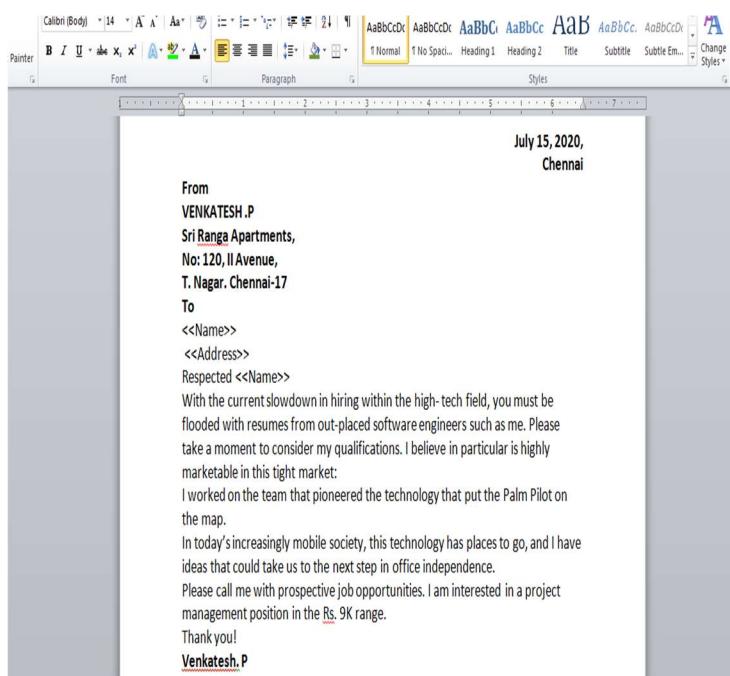
**ii) Send the document to 3 recipients using Mail merge. (Use 3 different addresses)**

**iii) Define a Macro ‘Decorate’ which makes the text bold, Red in color and italic, font size 16. Assign a shortcut key Alt + Z to this macro.**

**STEPS:**

**For (i):**

- Open a word file and type down the entire letter along with the resume. Save the file as letter.doc



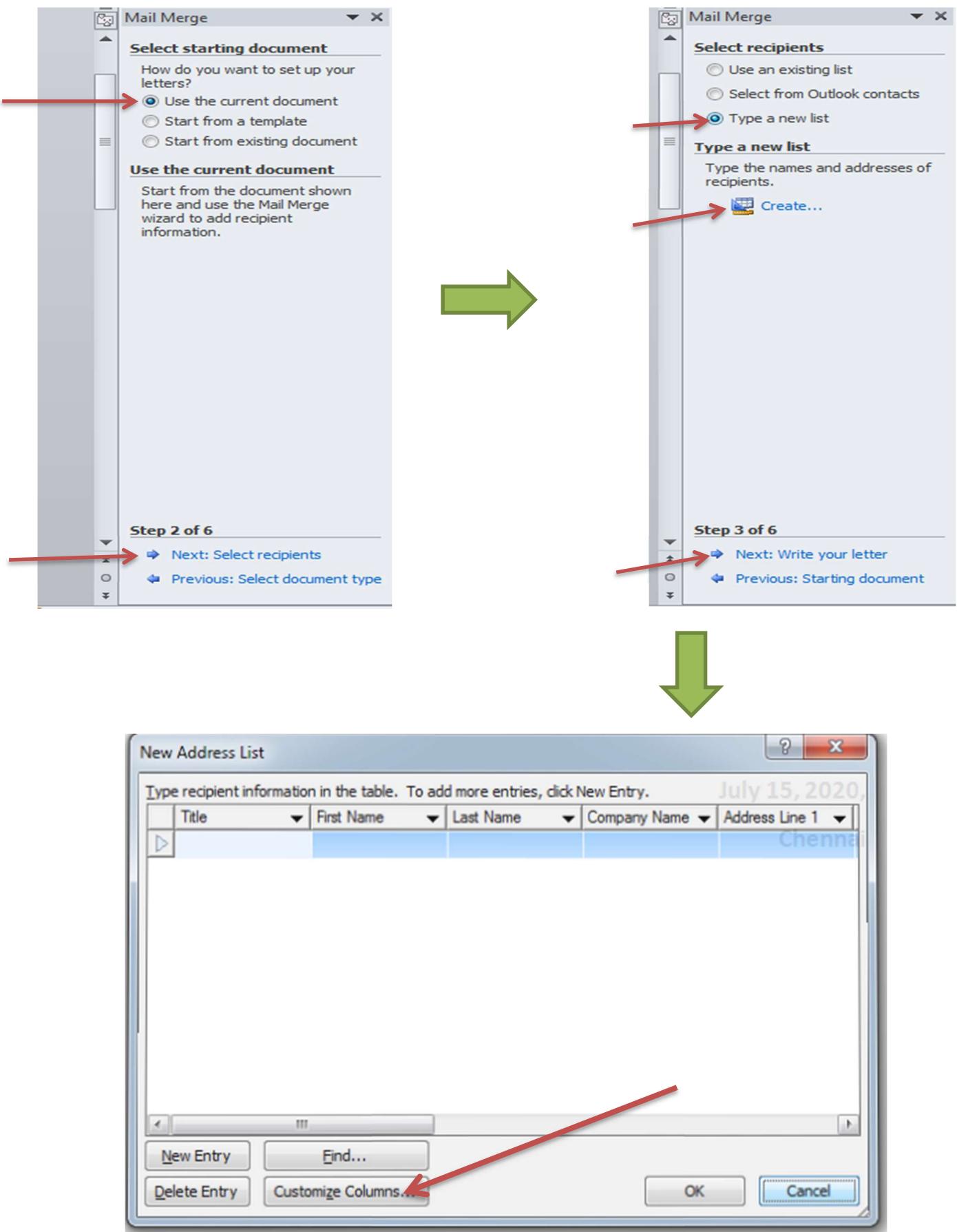
**For (ii)**

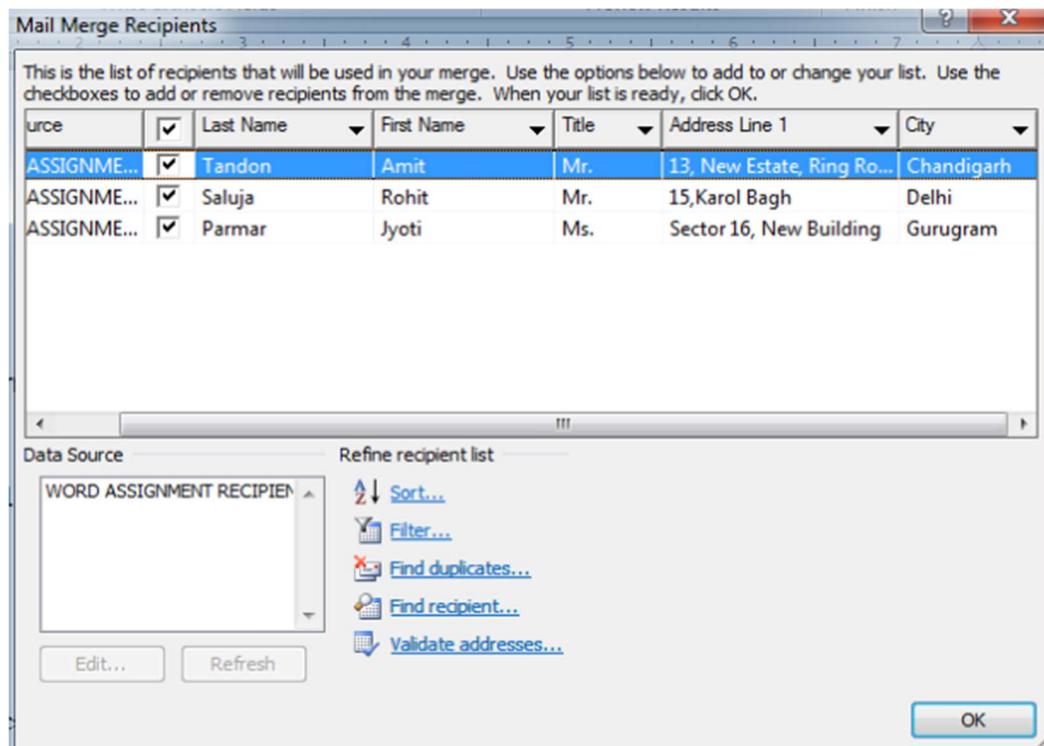
**FOR MAIL MERGE:**

- Go the mailings tab and click on the **Start Mail Merge** drop down button. From there, select **Step by Step Mail Merge Wizard**.
- The mail merge wizard appears on the right side of the screen. Since we're working on letters, chose **letters** and click on **Next :Starting Document** at the bottom .
- Next we have to select the document form where we wish to start. In our case we chose **the current document**. Proceeding further, click on **Next: Select Recipients** at bottom.

- Now we have to select the recipients. For this, select Type new list. Then click on Create. An address list window appears, click on customize columns.
- Type the fields that u want to insert in your letter. After clicking on OK type the names and other information of the recipients which are provided in the question. Then click on Next:Write your letter at the bottom.
- Now on the letter which has been written already, select the fields that you want to insert by placing the cursor at the required place.
- You can see that the fields you inserted would appear like «AddressBlock», «Title», «First\_Name» and so on. Now click on Next:Preview your letters at the bottom.
- Here , all the letters can be individually previewed. This is how mail merge is done.

The screenshot shows the Microsoft Word ribbon with the 'Mailings' tab selected. In the 'Create' section of the ribbon, the 'Start Mail Merge' button is highlighted. A dropdown menu is open, showing options: Letters, E-mail Messages, Envelopes..., Labels..., Directory, Normal Word Document, and Step by Step Mail Merge Wizard... A red arrow points from the 'Letters' option in the dropdown to the 'Letters' option in the 'Select document type' section of the Mail Merge task pane. The task pane also shows the 'Letters' radio button is selected. The main document area contains a letter addressed to 'VENKATESH .P' at 'Sri Ranga Apartments, No: 120, II Avenue, T. Nagar. Chennai-17'. The 'From' field is also populated with the same information. The right side of the screen shows the 'Step 1 of 6' step in the Mail Merge process, with a link to 'Next: Starting document'.





This is the final result. The letters can be printed from here.

**From**

**VENKATESH .P**

**Sri Ranga Apartments,**

**No: 120, II Avenue,**

**T. Nagar. Chennai-17**

**To**

**Mr. Amit Tandon**

**13, New Estate, Ring Road**

**Chandigarh**

**Dear Mr. Tandon,**

With the current slowdown in hiring within the high- tech field, you must be flooded with resumes from out-placed software engineers such as me. Please take a moment to consider my qualifications. I believe in particular is highly marketable in this tight market:

I worked on the team that pioneered the technology that put the Palm Pilot on the map.

In today's increasingly mobile society, this technology has places to go, and I have ideas that could take us to the next step in office independence.

Please call me with prospective job opportunities. I am interested in a project management position in the Rs. 9K range.

Thank you!

**Mail Merge**

Preview your letters

One of the merged letters is previewed here. To preview another letter, click one of the following:

<< Recipient: 1 >>

Find a recipient...

Make changes

You can also change your recipient list:

Edit recipient list...

Exclude this recipient

When you have finished previewing your letters, click Next. Then you can print the merged letters or edit individual letters to add personal comments.

Step 5 of 6

Next: Complete the merge

Previous: Write your letter

**From**

**VENKATESH .P**

**Sri Ranga Apartments,**

**No: 120, II Avenue,**

**T. Nagar. Chennai-17**

**To**

**Mr. Rohit Saluja**

**15,Karol Bagh**

**Delhi**

**Dear Mr. Saluja,**

With the current slowdown in hiring within the high- tech field, you must be flooded with resumes from out-placed software engineers such as me. Please take a moment to consider my qualifications. I believe in particular is highly marketable in this tight market:

I worked on the team that pioneered the technology that put the Palm Pilot on the map.

In today's increasingly mobile society, this technology has places to go, and I have ideas that could take us to the next step in office independence.

Please call me with prospective job opportunities. I am interested in a project management position in the Rs. 9K range.

Thank you!

**Mail Merge**

Preview your letters

One of the merged letters is previewed here. To preview another letter, click one of the following:

<< Recipient: 2 >>

Find a recipient...

Make changes

You can also change your recipient list:

Edit recipient list...

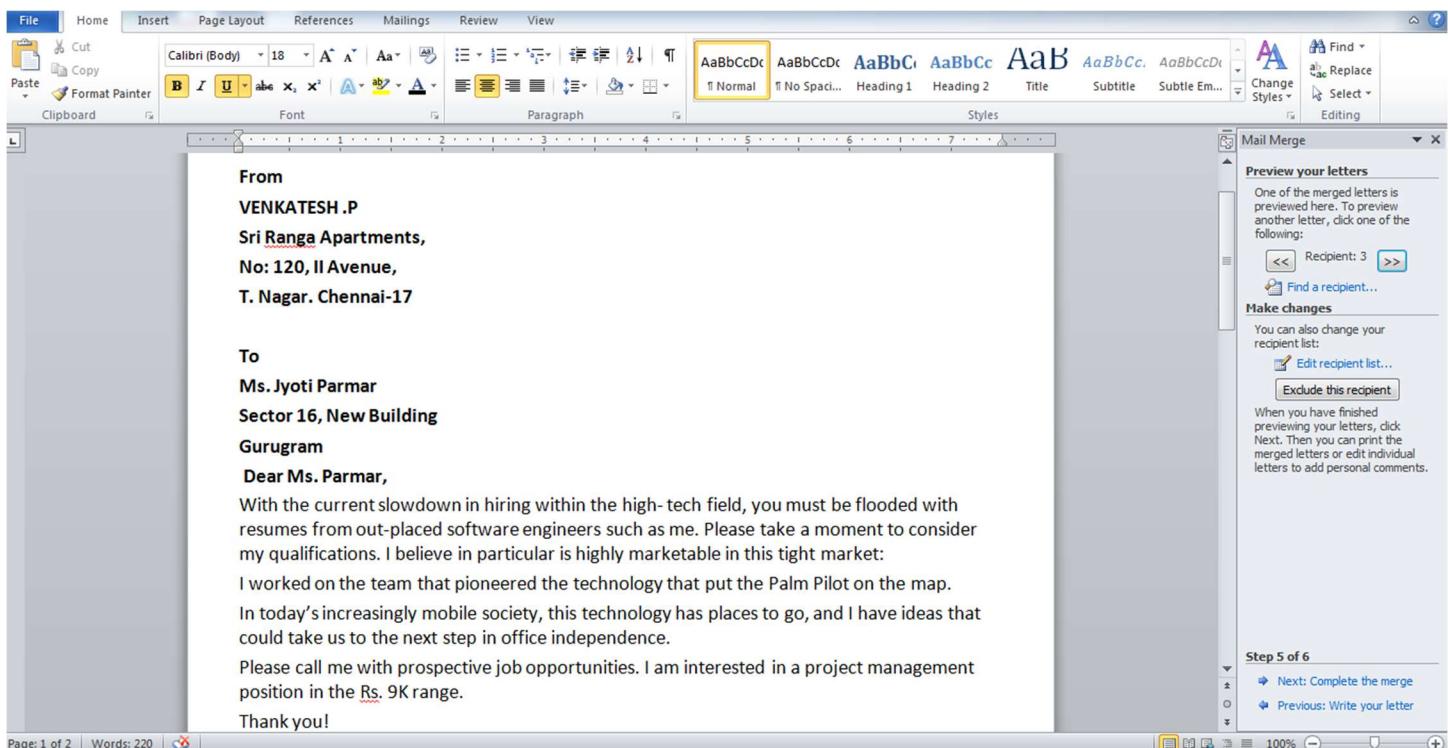
Exclude this recipient

When you have finished previewing your letters, click Next. Then you can print the merged letters or edit individual letters to add personal comments.

Step 5 of 6

Next: Complete the merge

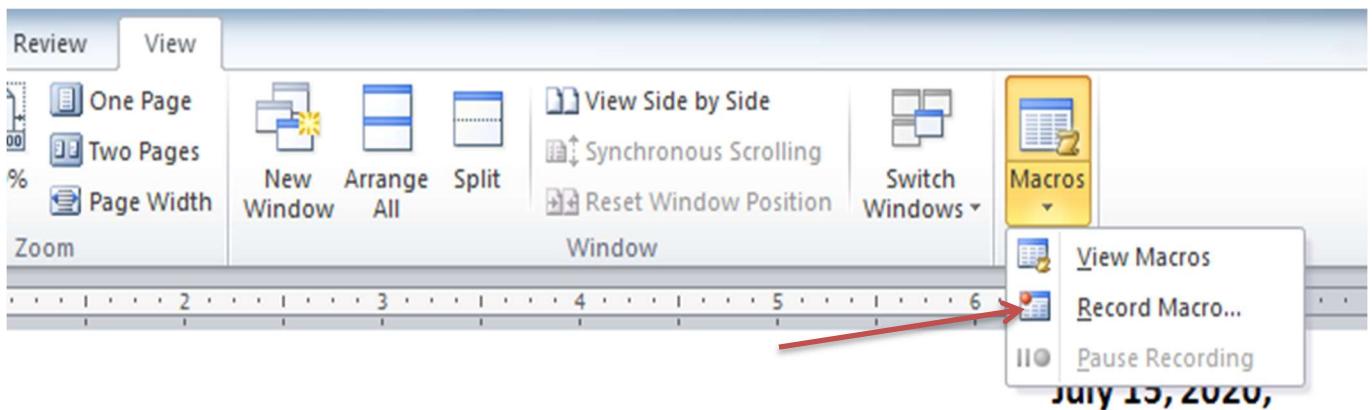
Previous: Write your letter



For (iii):

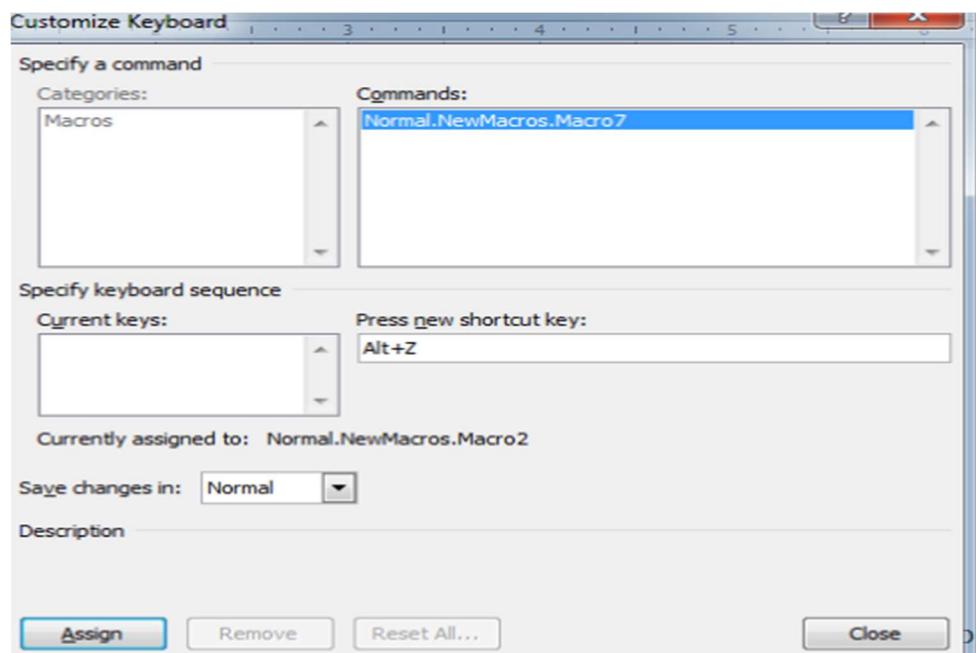
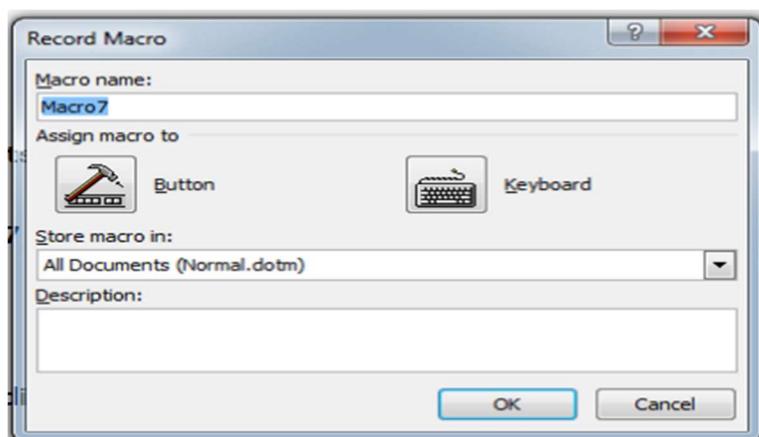
### **CREATING A MACRO:**

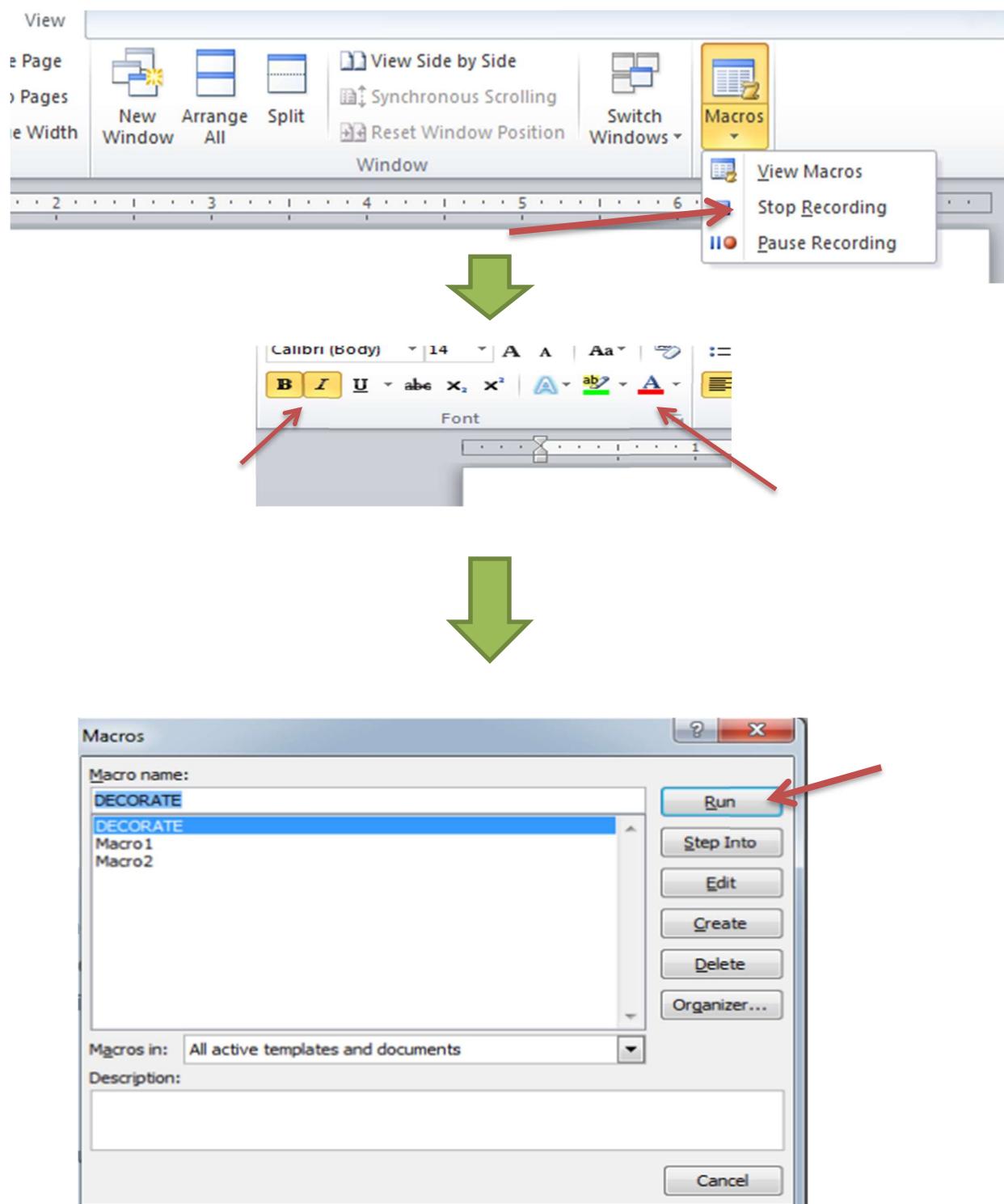
- Open a word document and go to the **View** tab. Click on the **Macros** dropdown button and select **Record macro**.
- A new window appears for recording a macro. Here, set the macro name as **Decorate**. After this select the **keyboard** icon.
- Assign the shortcut key as **Alt+Z**. Close the dialog box
- Press **Ctrl+D** to open the dialogue box for editing and applying the macro and select **BOLD**, **ITALIC** and **RED** font color.
- Once again go to the **View** tab. Click on **Macros** and then click on **Stop Recording**. Now click on **View Macros**. A new window appears which has the saved macro. Select **DECORATE** and click **run**.
- Select all the text and then use the assigned key **Alt+Z**. We get the desired result.



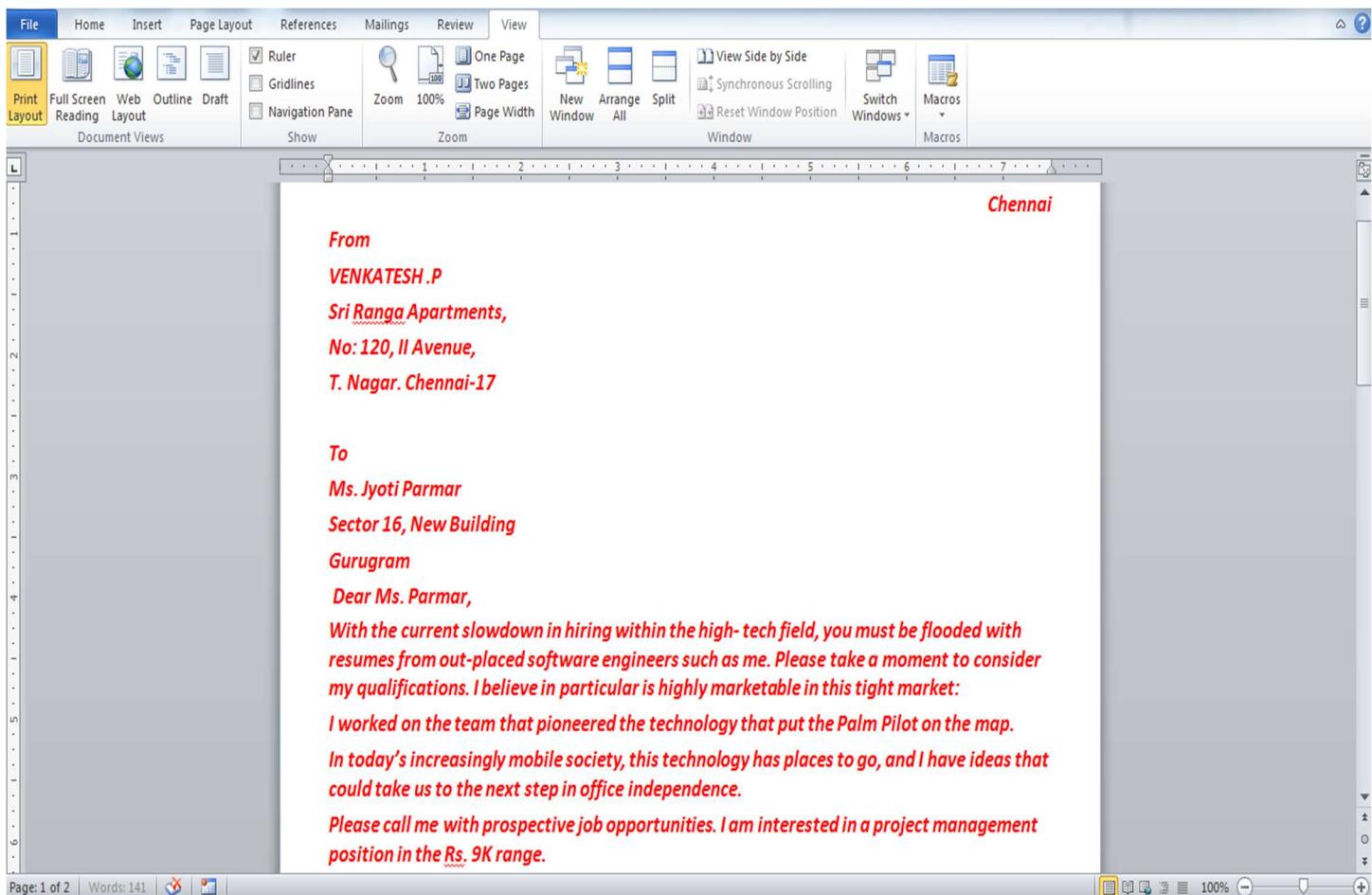
July 15, 2020,

Chennai





The result is shown below.



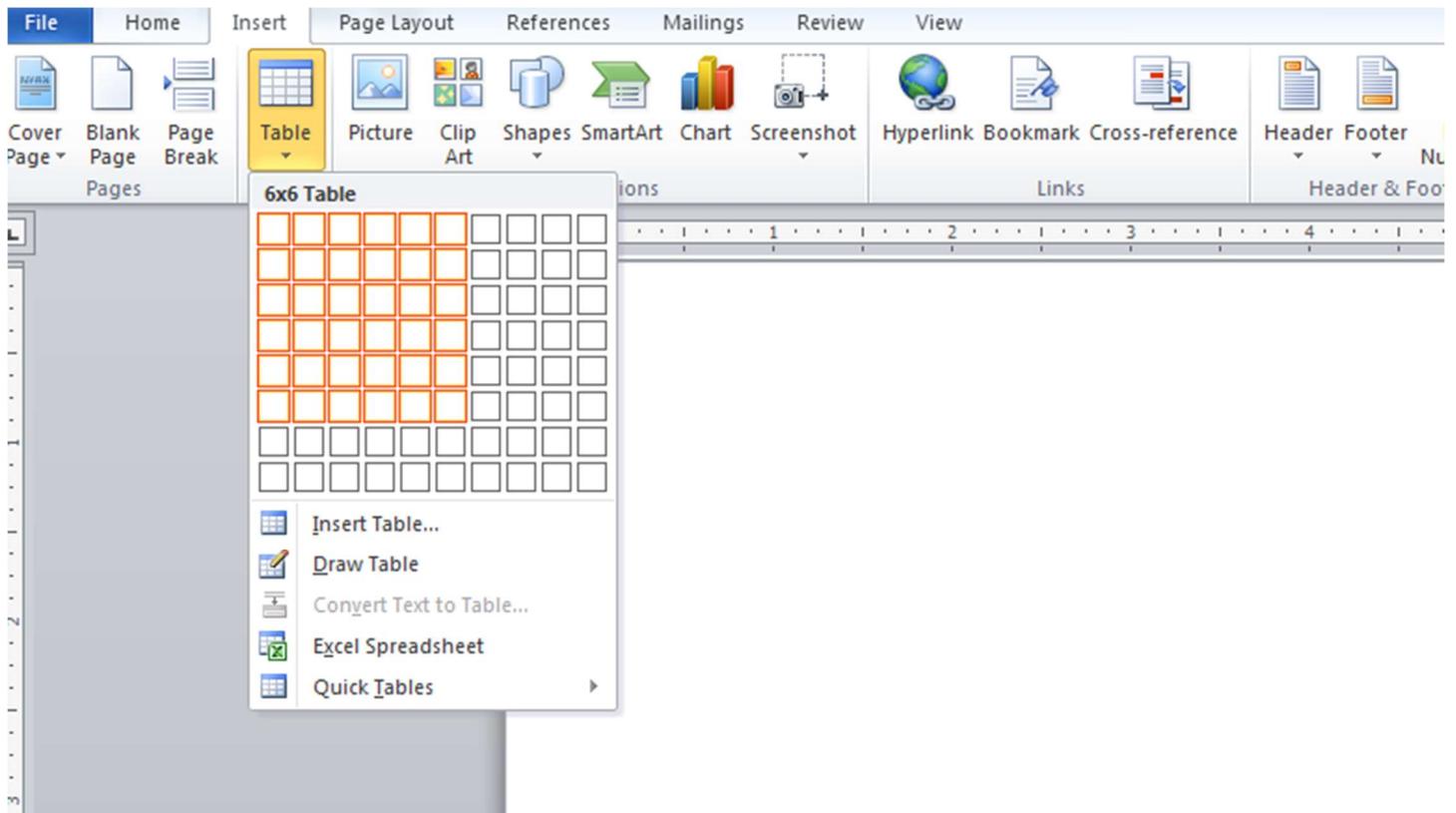
## #2 Create a table in word as shown below:

Do the following:

- (a) In the total marks column, entries should be calculated using formulas and it is the sum of marks in physics and marks in chemistry.
- (b) Insert a new row at the end of the table and also find grand total using formula.
- (c) Sort the table based on total marks.
- (d) The date and heading should be centre aligned.
- (e) Heading should be in bold and underlined

**STEPS:**

- Open a word document , go to **INSERT** tab and click on **TABLE** drop down box. Draw a 7X5 table.



- Enter the headings of every column. From the **LAYOUT** tab ,keep the headings centre aligned. From the **HOME** tab select bold and underlined to keep the headings that way as per the requirement of the question.Type down the rest of the entries.


- To calculate the values for the 5<sup>th</sup> column select the given cell and then click on **formula** from the **LAYOUT** tab. We are using sum formula since marks of physics and chemistry are to be added as per the question.

The screenshot shows a Microsoft Word document titled "letter.doc - Microsoft Word". A table is open with the following columns: ROLL NO., NAME, MARKS IN PHYSICS, MARKS IN CHEMISTRY, and TOTAL MARKS. The "MARKS IN PHYSICS" column contains values 80, 70, 60, 40, 30, and 80 respectively. The "TOTAL MARKS" column is empty. A formula dialog box is displayed over the cell F2 (the first cell in the "TOTAL MARKS" column). The dialog box shows the formula =SUM(LEFT) and the value 80. The "Layout" tab is selected in the ribbon.

ROLL NO.	NAME	MARKS IN PHYSICS	MARKS IN CHEMISTRY	TOTAL MARKS
1.	Sakshi	80		
2.	Rohit			
3.	Amit			
4.	Rakesh			
5.	Komal			
6.	Garima	80	80	

- After calculating the sum for each cell of the 5<sup>th</sup> column, insert a new row at the end of the table by using the **Insert Below** option from **LAYOUT** tab. Now calculate the grand total by clicking on the last cell and then using **formula** from **LAYOUT** tab. Type “**ABOVE**” in the formula to calculate the grand total of the marks.

The screenshot shows the same Microsoft Word document and table as the previous image. A red arrow points to the "Insert Below" button in the "Rows & Columns" group of the "Layout" tab ribbon. The table now includes a new last row with data: ROLL NO. 6, NAME Garima, MARKS IN PHYSICS 80, MARKS IN CHEMISTRY 80, and TOTAL MARKS 160. The "Layout" tab is still selected.

ROLL NO.	NAME	MARKS IN PHYSICS	MARKS IN CHEMISTRY	TOTAL MARKS
1.	Sakshi	80	70	150
2.	Rohit	70	80	150
3.	Amit	60	50	110
4.	Rakesh	40	60	100
5.	Komal	30	70	100
6.	Garima	80	80	160



Screenshot of Microsoft Word showing a table with student marks. The table has columns for Roll No., Name, Marks in Physics, Marks in Chemistry, and Total Marks. The last row is a Grand Total.

<u>ROLL NO.</u>	<u>NAME</u>	<u>MARKS IN PHYSICS</u>	<u>MARKS IN CHEMISTRY</u>	<u>TOTAL MARKS</u>
1.	Sakshi	80	70	150
2.	Rohit	70	80	150
3.	Amit	60	50	110
4.	Rakesh	40	60	100
5.	Komal	30	70	100
6.	Garima	80	80	160
<b>GRAND TOTAL OF MARKS</b>				



Screenshot of Microsoft Word showing the same table with a formula applied to the last cell. A context menu is open over the last cell, showing the formula `=SUM(ABOVE)`.

<u>ROLL NO.</u>	<u>NAME</u>	<u>MARKS IN PHYSICS</u>	<u>MARKS IN CHEMISTRY</u>	<u>TOTAL MARKS</u>
1.	Saks			150
2.	Roh			150
3.	Am			110
4.	Rake			100
5.	Kom...	30	70	100
6.	Garima	80	80	160
<b>GRAND TOTAL OF MARKS</b>				

The formula bar shows the formula `=SUM(ABOVE)`. A red arrow points to this formula.

- For sorting the table based on total marks, select the 5th column and click on the **SORT** option, and in the dialog box choose “descending order”.

The screenshot shows a Microsoft Word document with a table. The ribbon at the top has the 'Sort' button highlighted with a red arrow. A 'Sort' dialog box is open, showing the 'TOTAL MARKS' column selected for sorting. The 'Descending' radio button is selected. The table data is as follows:

<u>ROLL NO.</u>	<u>NAME</u>	<u>Marks in Physics</u>	<u>Marks in Chemistry</u>	<u>TOTAL MARKS</u>
1.	Sakshi	80	70	150
2.	Rohit	70	80	150
3.	Amit	60	50	110
4.	Rakesh	40	60	100
5.	Komal	30	70	100
6.	Garima	80	80	160
<b>GRAND TOTAL OF MARKS</b>				770

❖ This is the final table before sorting:

<u>ROLL NO.</u>	<u>NAME</u>	<u>Marks in Physics</u>	<u>Marks in Chemistry</u>	<u>TOTAL MARKS</u>
1.	Sakshi	80	70	150
2.	Rohit	70	80	150
3.	Amit	60	50	110
4.	Rakesh	40	60	100
5.	Komal	30	70	100
6.	Garima	80	80	160
<b>GRAND TOTAL OF MARKS</b>				770

❖ And this will be the final table after sorting based on total marks:

**ROLL NO.**    **NAME**    **Marks in Physics**    **Marks in Chemistry**    **Total Marks**

6.	Garima	80	80	160
1.	Sakshi	80	70	150
2.	Rohit	70	80	150
3.	Amit	60	50	110
4.	Rakesh	40	60	100
5.	Komal	30	70	100
**GRAND TOTAL OF MARKS**				770

**TABLE:**

**ROLL NO.**    **NAME**    **Marks in Physics**    **Marks in Chemistry**    **Total Marks**

6.	Garima	80	80	160
1.	Sakshi	80	70	150
2.	Rohit	70	80	150
3.	Amit	60	50	110
4.	Rakesh	40	60	100
5.	Komal	30	70	100
**GRAND TOTAL OF MARKS**				770

**#3** Using a spreadsheet package you have studied, construct T Morongo's payslip for December 2016 following the instructions below.

**Instructions:**

i) Housing Subsidy 6000.00 per year.

ii) Car Allowance 100.00 per month,

iii) Pension 8% on Basic Salary,

iv) P.A.Y.E. 636.83

v) Medical Aid 70.00

vi) U.I.F. 1% on Basic Salary + Housing Subsidy

vii) Bond Repayment 630.00

viii) Calculate Net Salary.

ix) Format all figures to two decimal places and insert ₹ currency symbol.

x) Insert a custom footer with your name, subject, and question number. Save it as salary advice2.

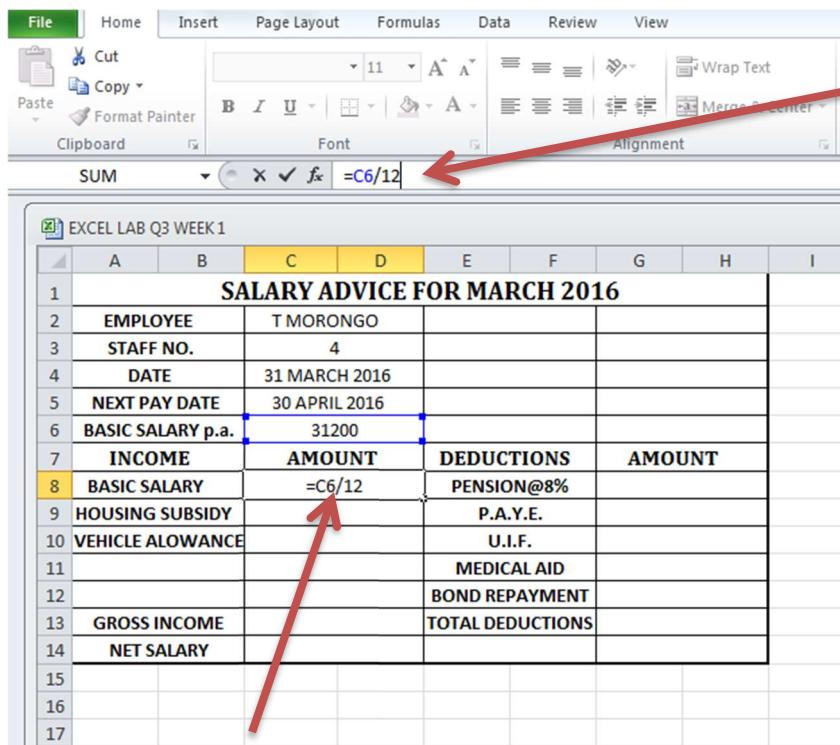
**STEPS :**

- Open a new workbook and fill in the entries that are given in the table (provided in the question). Also, apply borders to the table with the help of the border icon on Home tab.

The screenshot shows a Microsoft Excel spreadsheet titled "EXCEL LAB Q3 WEEK 1". The spreadsheet contains a table for a salary slip. The table has columns labeled A, B, and C. The rows contain various salary components like Employee Name, Staff No., Date, Next Pay Date, Basic Salary, Income, Amount, etc. The "Borders" dropdown menu is open over the table, showing options for applying borders to specific rows or columns. A red arrow points to the "All Borders" option in the "Borders" section of the menu.

SALARY A		
EMPLOYEE	T MORONGO	
STAFF NO.		
DATE	31 MARCH 2016	
NEXT PAY DATE	30 APRIL 2016	
BASIC SALARY	31,200.00	
INCOME	AMOUNT	
BASIC SALARY		
HOUSING SUBSIDY		
VEHICLE ALLOWANCE		
GROSS INCOME		
NET SALARY		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

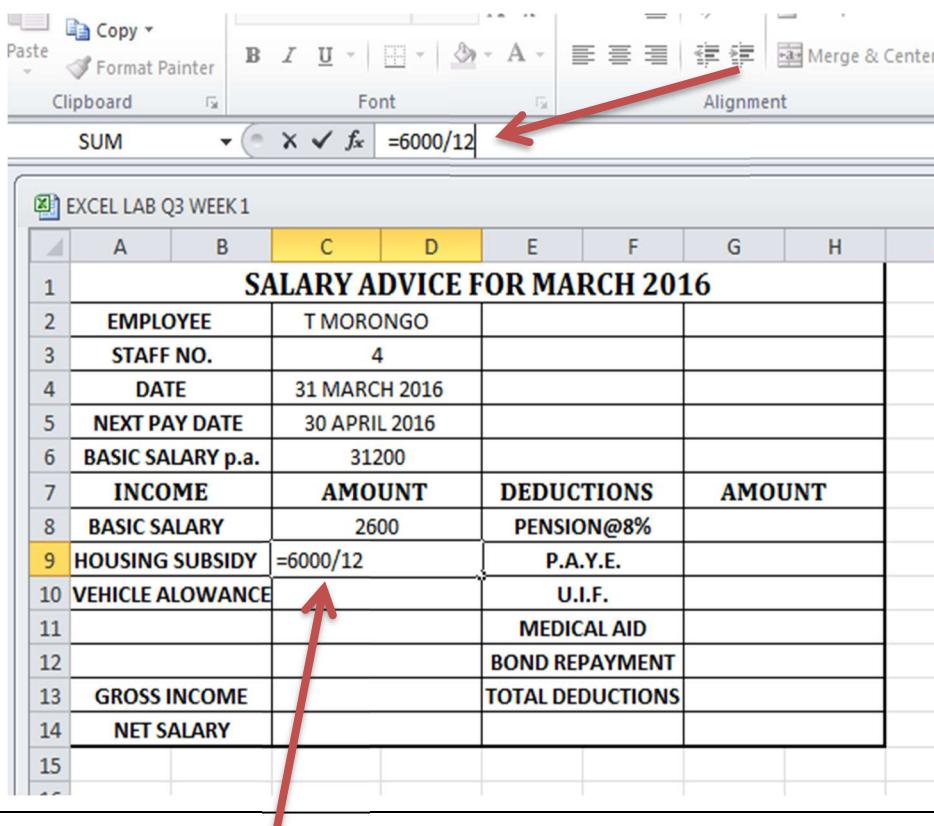
- Using the division formula, calculate **basic salary** per month by dividing **basic salary p.a.** by 12.



The screenshot shows a Microsoft Excel spreadsheet titled "EXCEL LAB Q3 WEEK 1". The spreadsheet is titled "SALARY ADVICE FOR MARCH 2016". Row 6 contains the formula  $=C6/12$  in the "AMOUNT" column for the "BASIC SALARY" row. A red arrow points from the formula bar to the formula in the cell.

SALARY ADVICE FOR MARCH 2016			
EMPLOYEE	T MORONGO		
STAFF NO.	4		
DATE	31 MARCH 2016		
NEXT PAY DATE	30 APRIL 2016		
BASIC SALARY p.a.	31200		
INCOME	AMOUNT	DEDUCTIONS	AMOUNT
BASIC SALARY	$=C6/12$	PENSION@8%	
HOUSING SUBSIDY		P.A.Y.E.	
VEHICLE ALLOWANCE		U.I.F.	
		MEDICAL AID	
		BOND REPAYMENT	
GROSS INCOME		TOTAL DEDUCTIONS	
NET SALARY			

- Next calculate the housing subsidy by dividing Rs.6000 by 12. Type “=6000/12” in the formula box.



The screenshot shows the same Microsoft Excel spreadsheet. Row 9 contains the formula  $=6000/12$  in the "AMOUNT" column for the "HOUSING SUBSIDY" row. A red arrow points from the formula bar to the formula in the cell.

SALARY ADVICE FOR MARCH 2016			
EMPLOYEE	T MORONGO		
STAFF NO.	4		
DATE	31 MARCH 2016		
NEXT PAY DATE	30 APRIL 2016		
BASIC SALARY p.a.	31200		
INCOME	AMOUNT	DEDUCTIONS	AMOUNT
BASIC SALARY	2600	PENSION@8%	
HOUSING SUBSIDY	$=6000/12$	P.A.Y.E.	
VEHICLE ALLOWANCE		U.I.F.	
		MEDICAL AID	
		BOND REPAYMENT	
GROSS INCOME		TOTAL DEDUCTIONS	
NET SALARY			

- Fill the entries for P.A.Y.E , Medical Aid, and Bond Repayment as per provided in the question. Next repeating the same process as before calculate :
  - Calculate the pension, using formula for “8% of base salary”, i.e, **=C8\*(8/100)**.
  - Calculate U.I.F., using formula “ 1% of basic salary + Housing subsidy”, i.e.,  
**= C8\*(1/100)+C9**.
  - Calculate Gross income, using addition of above columns according to “sum” formula, i.e., **=C8+C9+C10**.
  - Calculate Total Deductions, using addition of above columns according to “sum” formula,i.e., **=G8+G9+G10+G11+G12**.
  - Calculate Net salary by using formula “Net salary = Gross salary – Total deduction” ,i.e., **=C13-G13**.



Screenshot of Microsoft Excel showing a salary advice sheet for March 2016. The ribbon at the top includes File, Home, Insert, Page Layout, Formulas, Data, Review, and View tabs. The Home tab is selected, showing various font and alignment tools. The formula bar shows the current cell is C14 and the formula is =C13-G13.

EXCEL LAB Q3 WEEK 1							
SALARY ADVICE FOR MARCH 2016							
1	A	B	C	D	E	F	G
2	EMPLOYEE	T MORONGO					
3	STAFF NO.	4					
4	DATE	31 MARCH 2016					
5	NEXT PAY DATE	30 APRIL 2016					
6	BASIC SALARY p.a.	31200					
7	INCOME	AMOUNT	DEDUCTIONS	AMOUNT			
8	BASIC SALARY	2600	PENSION@8%	208			
9	HOUSING SUBSIDY	500	P.A.Y.E.	636.83			
10	VEHICLE ALLOWANCE	100	U.I.F.	526			
11			MEDICAL AID	70			
12			BOND REPAYMENT	630			
13	GROSS INCOME	3200	TOTAL DEDUCTIONS	2070.83			
14	NET SALARY					<b>1129.17</b>	
15							
16							
17							

- To show all the formulas used in the sheet go to the FORMULA tab and click on Show formulas.



Screenshot of the Microsoft Excel ribbon showing the 'Formulas' tab selected. A red arrow points to the 'Text' icon in the 'Function Library' group. Another red arrow points to the 'Show Formulas' button in the 'Formula Auditing' group. The formula bar shows '=C13-G13'. The worksheet title is 'WEEK 1' and the subtitle is 'SALARY ADVICE FOR MARCH 2016'.



Screenshot of the Microsoft Excel ribbon showing the 'Formulas' tab selected. A red arrow points to the 'fx' button in the 'Function Library' group. The formula bar shows '=C13-G13'. The worksheet title is 'EXCEL LAB Q3 WEEK 1' and the subtitle is 'SALARY ADVICE FOR MARCH 2016'.

	A	B	C	D	E	F	G	H	I
<b>SALARY ADVICE FOR MARCH 2016</b>									
1	EMPLOYEE		T MORONGO						
2	STAFF NO.		4						
3	DATE		31 MARCH 2016						
4	NEXT PAY DATE		30 APRIL 2016						
5	BASIC SALARY p.a.		31200						
6	INCOME		AMOUNT		DEDUCTIONS		AMOUNT		
7	BASIC SALARY		=C6/12		PENSION@8%		=C8*(8/100)		
8	HOUSING SUBSIDY		=6000/12		P.A.Y.E.		636.83		
9	VEHICLE ALLOWANCE		100		U.I.F.		=C8*(1/100)+C9		
10					MEDICAL AID		70		
11					BOND REPAYMENT		630		
12					TOTAL DEDUCTIONS		=G8+G9+G10+G11+G12		
13	GROSS INCOME		=C8+C9+C10						
14	NET SALARY		=C13-G13						
15									
16									
17									
18									
19									

- For formatting all the figures to two decimal places , select the column then click on the General drop down menu in the HOME tab and choose Number option.



Screenshot of Microsoft Excel showing the formula  $=C8*(8/100)$  in cell G8. A red arrow points from the formula bar to the result 208.00 in the cell. The formula dropdown shows various number formats.

SALARY ADVICE FOR MARCH 2016			
INCOME	AMOUNT	DEDUCTIONS	AMOUNT
BASIC SALARY	2600	PENSION@8%	208
HOUSING SUBSIDY	500	P.A.Y.E.	636.83
VEHICLE ALLOWANCE	100	U.I.F.	526
		MEDICAL AID	70
		BOND REPAYMENT	630
<b>GROSS INCOME</b>	<b>3200</b>	<b>TOTAL DEDUCTIONS</b>	<b>2070.83</b>
<b>NET SALARY</b>	<b>1129.17</b>		



Screenshot of Microsoft Excel showing the formula  $=C6/12$  in cell C8. A red arrow points from the formula bar to the result 2600.00 in the cell. The formula dropdown shows various number formats.

SALARY ADVICE FOR MARCH 2016			
INCOME	AMOUNT	DEDUCTIONS	AMOUNT
BASIC SALARY	2600	PENSION@8%	208.00
HOUSING SUBSIDY	500	P.A.Y.E.	636.83
VEHICLE ALLOWANCE	100	U.I.F.	526.00
		MEDICAL AID	70.00
		BOND REPAYMENT	630.00
<b>GROSS INCOME</b>	<b>3200</b>	<b>TOTAL DEDUCTIONS</b>	<b>2070.83</b>
<b>NET SALARY</b>	<b>1129.17</b>		

- For applying currency symbol, select the column of cells where the currency sign needs to symbol needs to be applied , then click on the **Format** drop-down menu on the left (from the **HOME** tab).In the drop-down menu , select **Format Cells**.

The screenshot shows a Microsoft Excel spreadsheet titled "EXCEL LAB Q3 WEEK 1". The spreadsheet contains a table for "SALARY ADVICE FOR MARCH 2016". The table has columns for Employee Name (T MORONGO), Staff No. (4), Date (31 MARCH 2016), Next Pay Date (30 APRIL 2016), Basic Salary p.a. (31200.00), Income (Basic Salary, Housing Subsidy, Vehicle Allowance), Deductions (Pension@8%, P.A.Y.E., U.I.F., Medical Aid, Bond Repayment), and Net Salary (1129.17). The "Format" button in the ribbon is highlighted with a yellow box and a red arrow points to it. A context menu is open, and another red arrow points to the "Format Cells..." option under the "Cell Size" section.

- A pop-up window will appear. Select the **Currency** option and choose the **INR** symbol. Press **OK**.

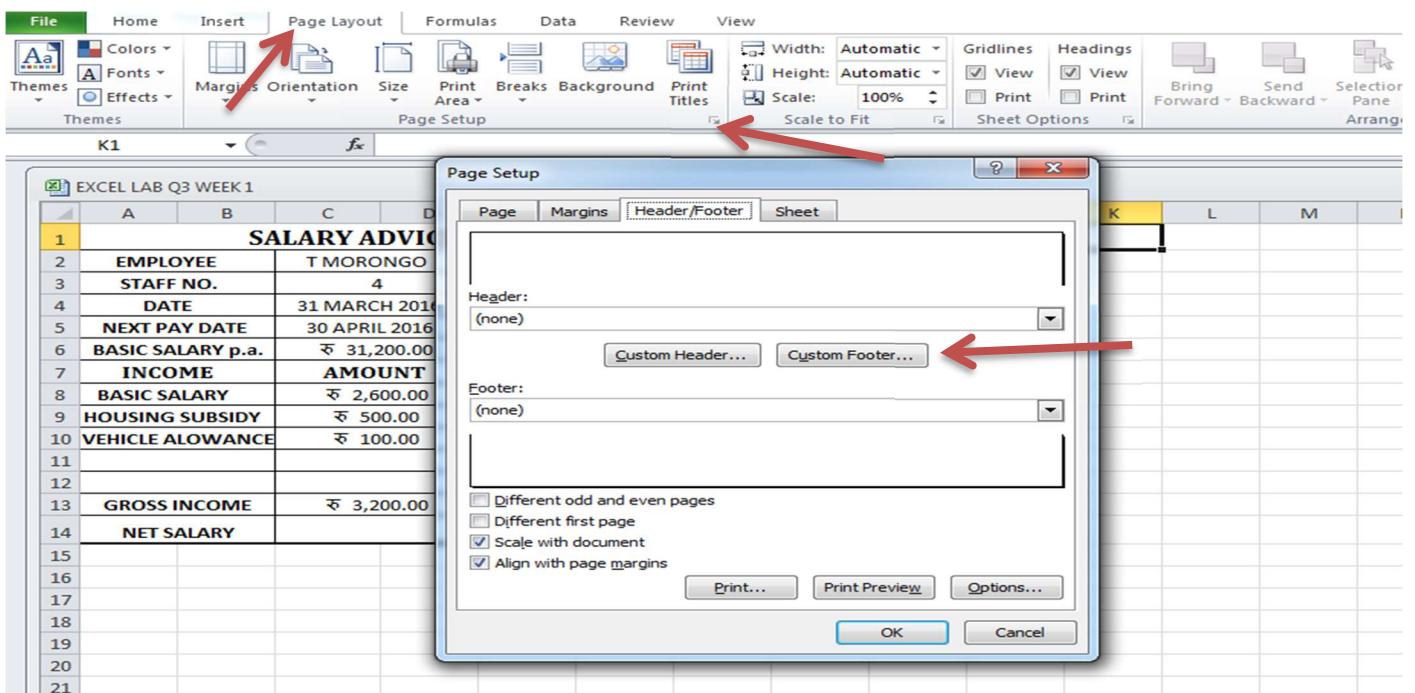
The screenshot shows the "Format Cells" dialog box open over the same salary advice table. The "Number" tab is selected. In the "Category" list, the "Currency" option is highlighted with a red arrow. The "Sample" field shows "208.00" and the "Decimal places:" dropdown is set to "2". The "Negative numbers:" list shows options like "-1234.10", "1234.10", "(1234.10)", and "(1234.10)". The dialog box includes an "OK" button at the bottom right.



EXCEL LAB Q3 WEEK 1

<b>SALARY ADVICE FOR MARCH 2016</b>			
<b>EMPLOYEE</b>	T MORONGO		
<b>STAFF NO.</b>	4		
<b>DATE</b>	31 MARCH 2016		
<b>NEXT PAY DATE</b>	30 APRIL 2016		
<b>BASIC SALARY p.a.</b>	₹ 31,200.00		
<b>INCOME</b>	<b>AMOUNT</b>	<b>DEDUCTIONS</b>	<b>AMOUNT</b>
<b>BASIC SALARY</b>	₹ 2,600.00	<b>PENSION@8%</b>	₹ 208.00
<b>HOUSING SUBSIDY</b>	₹ 500.00	<b>P.A.Y.E.</b>	₹ 636.83
<b>VEHICLE ALLOWANCE</b>	₹ 100.00	<b>U.I.F.</b>	₹ 526.00
		<b>MEDICAL AID</b>	₹ 70.00
		<b>BOND REPAYMENT</b>	₹ 630.00
<b>GROSS INCOME</b>	₹ 3,200.00	<b>TOTAL DEDUCTIONS</b>	₹ 2,070.83
<b>NET SALARY</b>	<b>1129.17</b>		

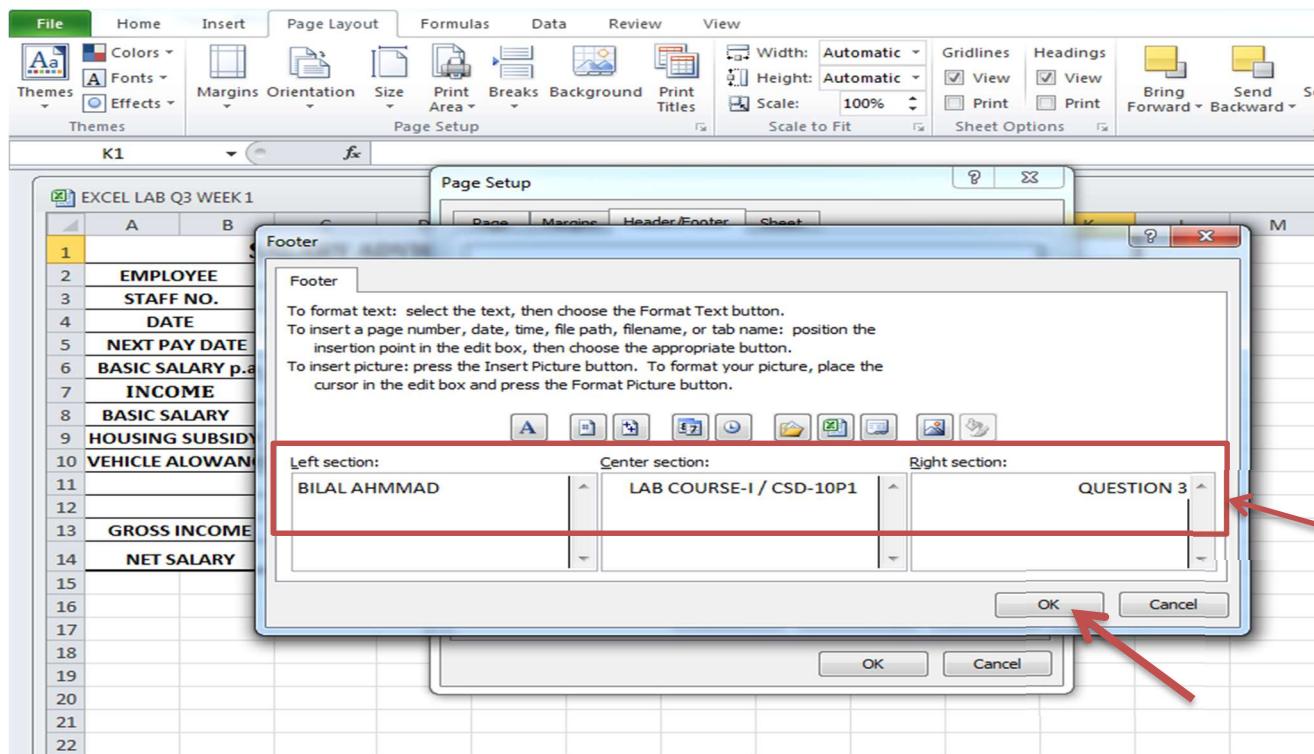
- For adding custom footer, go to the **PAGE LAYOUT** tab and click on **page setup** at the bottom of the ribbon. A new window appears. Select **Header/Footer** and next click on **custom footer**.



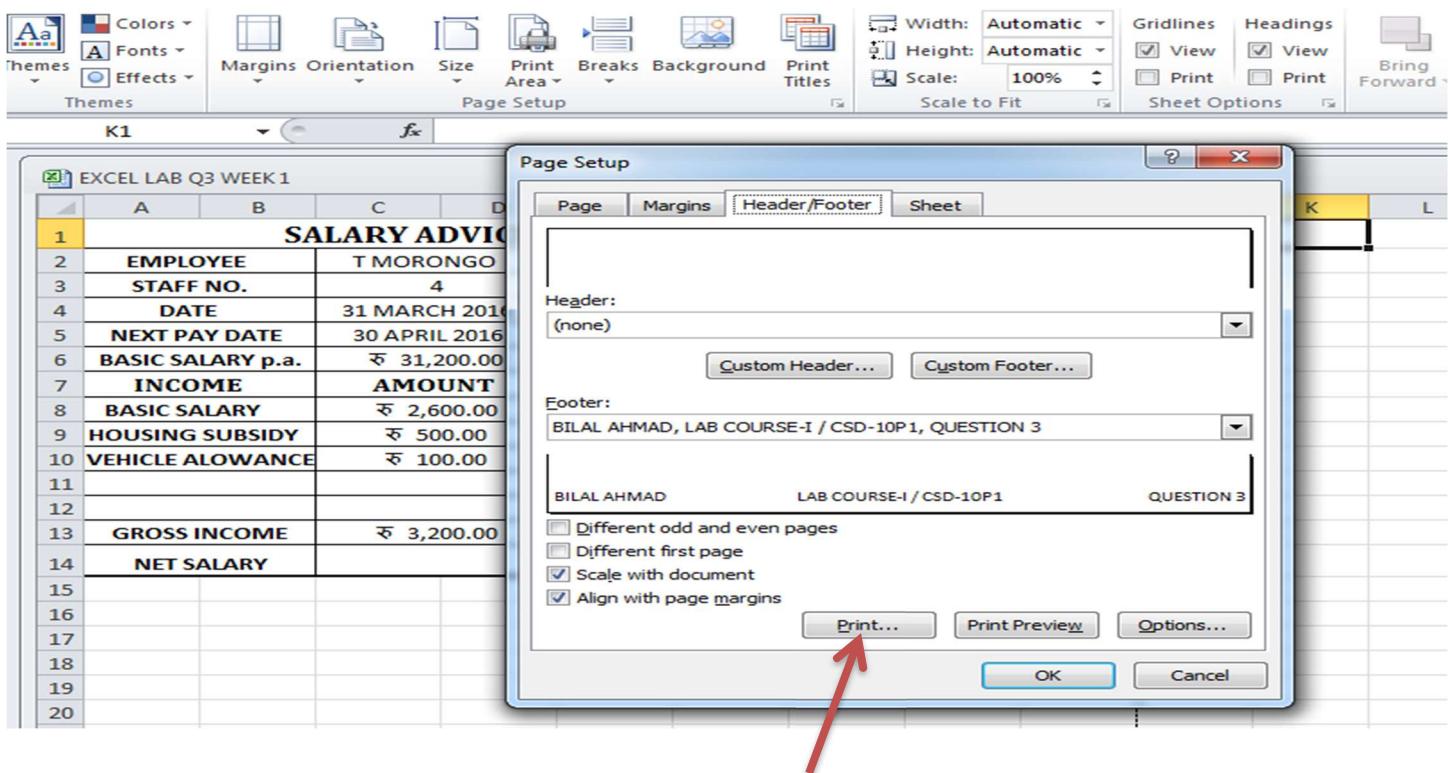
EXCEL LAB Q3 WEEK 1

<b>SALARY ADVICE FOR MARCH 2016</b>			
<b>EMPLOYEE</b>	T MORONGO		
<b>STAFF NO.</b>	4		
<b>DATE</b>	31 MARCH 2016		
<b>NEXT PAY DATE</b>	30 APRIL 2016		
<b>BASIC SALARY p.a.</b>	₹ 31,200.00		
<b>INCOME</b>	<b>AMOUNT</b>	<b>DEDUCTIONS</b>	<b>AMOUNT</b>
<b>BASIC SALARY</b>	₹ 2,600.00	<b>PENSION@8%</b>	₹ 208.00
<b>HOUSING SUBSIDY</b>	₹ 500.00	<b>P.A.Y.E.</b>	₹ 636.83
<b>VEHICLE ALLOWANCE</b>	₹ 100.00	<b>U.I.F.</b>	₹ 526.00
		<b>MEDICAL AID</b>	₹ 70.00
		<b>BOND REPAYMENT</b>	₹ 630.00
<b>GROSS INCOME</b>	₹ 3,200.00	<b>TOTAL DEDUCTIONS</b>	₹ 2,070.83
<b>NET SALARY</b>	<b>1129.17</b>		

- A new window **Footer** opens. As per the question, write down your name , subject and question number and then click on **OK**.



- Click on **Print**.



- Here is the final result :

SALARY ADVICE FOR MARCH 2016			
EMPLOYEE	T MORONGO		
STAFF NO.	4		
DATE	31 MARCH 2016		
NEXT PAY DATE	30 APRIL 2016		
BASIC SALARY p.a.	₹ 31,200.00		
INCOME	AMOUNT	DEDUCTIONS	AMOUNT
BASIC SALARY	₹ 2,600.00	PENSION@8%	₹ 208.00
HOUSING SUBSIDY	₹ 500.00	P.A.Y.E.	₹ 636.83
VEHICLE ALLOWANCE	₹ 100.00	U.I.F.	₹ 526.00
		MEDICALAID	₹ 70.00
		BOND REPAYMENT	₹ 630.00
GROSS INCOME	₹ 3,200.00	TOTAL DEDUCTIONS	₹ 2,070.83
NET SALARY			1129.17

**#4 Use a new workbook & construct a worksheet with the data given & save it as LYONS.**

- a) The MARKUP % (35%) must be inserted in a separate cell under the heading. USE IT as an absolute cell reference in the formula to calculate the mark up per item.
- b) Calculate the mark up for each item.
- c) Calculate the selling price for each item.
- d) Calculate the Total Income for each item.
- e) Calculate the profit for each item.
- f) Format the column LITRES SOLD to display the number of litres as integers. The rest of the worksheet must be formatted to display two decimals.
- g) Use statistical functions to calculate the:
  - ② AVERAGE
  - ② HIGHEST (MAX)
  - ② LOWEST (MIN) for Selling Price column up to Profit Column.
- h) Show all formulas you have used in a new sheet. Adjust the column width so that the formulae are displayed in full and the sheets fits into one side of A4 landscape format and save it as formulas.
- i) Under the worksheet Create a pie chart titled PRODUCT COST PER UNIT for Product & Cost price per Litre columns. Data labels indicating percentages should be displayed.
- j) Put borders neatly on the on the work sheet & save it as LYONS2.

### **STEPS:**

- Open a new workbook and construct a table of required size, fill in all the entries from the question.
- Calculate the markup ,selling price ,total income and profit for each item using these:
  - Markup = Cost price/Litre x 35%
  - Selling price= Cost price/Litre + Mark up
  - Total income= Litres sold x Selling Price
  - Profit = Total income – (Cost price/Litre x Litres sold)



SUM  $\times \checkmark f_x = B8*35\%$

LYONS INC ORANGE JUICE SALES						
PRODUCT	COST PRICE	MARK UP PER ITEM	SELLING PRICE	LITRES SOLD	TOTAL INCOME	PROFIT
	PER LITRE	35%				
Cascade	3.75	1.3125		234		
Quench	3.65	1.2775		345		
Xtra	4.25	=B8*35%		456		
SUN	1.5			123		
Splash				245		
House Brand	1.5					
<b>TOTAL</b>						
<b>HIGHEST</b>						
<b>LOWEST</b>						



SUM  $\times \checkmark f_x = B8+C8$

LYONS INC ORANGE JUICE SALES						
PRODUCT	COST PRICE	MARK UP PER ITEM	SELLING PRICE	LITRES SOLD	TOTAL INCOME	PROFIT
	PER LITRE	35%				
Cascade	3.75	1.3125	5.0625	234		
Quench	3.65	1.2775	4.9275	345		
Xtra	4.25	1.4875	=B8+C8	456		
SUN	1.5	0.525		123		
Splash				245		
House Brand	1.5	0.525				
<b>TOTAL</b>						
<b>HIGHEST</b>						
<b>LOWEST</b>						



SUM  $\times \checkmark f_x = D9*E9$

LYONS INC ORANGE JUICE SALES						
PRODUCT	COST PRICE	MARK UP PER ITEM	SELLING PRICE	LITRES SOLD	TOTAL INCOME	PROFIT
	PER LITRE	35%				
Cascade	3.75	1.3125	5.0625	234	1184.625	
Quench	3.65	1.2775	4.9275	345	1699.988	
Xtra	4.25	1.4875	5.7375	456	2616.3	
SUN	1.5	0.525	2.025	123		
Splash				245		
House Brand	1.5	0.525	2.025			
<b>TOTAL</b>						
<b>HIGHEST</b>						
<b>LOWEST</b>						

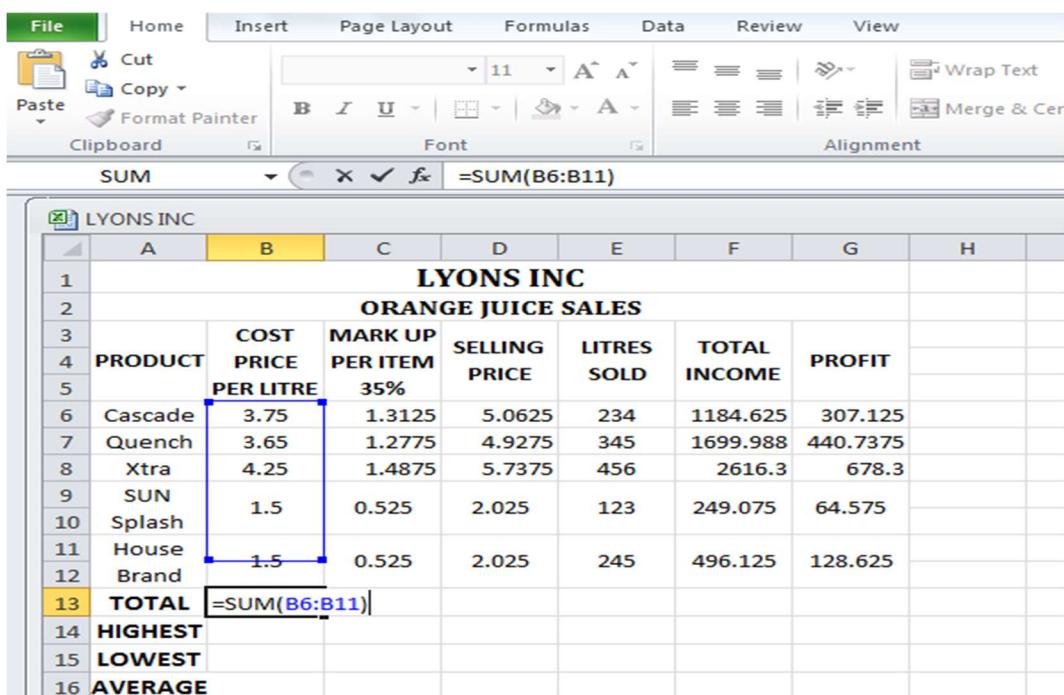


SUM  $\times \checkmark f_x = F8-(B8*E8)$

LYONS INC ORANGE JUICE SALES						
PRODUCT	COST PRICE	MARK UP PER ITEM	SELLING PRICE	LITRES SOLD	TOTAL INCOME	PROFIT
	PER LITRE	35%				
Cascade	3.75	1.3125	5.0625	234	1184.625	307.125
Quench	3.65	1.2775	4.9275	345	1699.988	440.7375
Xtra	4.25	1.4875	5.7375	456	2616.3	=F8-(B8*E8)
SUN	1.5	0.525	2.025	123	249.075	
Splash				245	496.125	
House Brand	1.5	0.525	2.025			
<b>TOTAL</b>						
<b>HIGHEST</b>						
<b>LOWEST</b>						

- Now calculate the **total** value , the **highest**,the **lowest** and **average** values for each column using the given statistical formulas:
  - TOTAL =SUM(CELL ADDRESS)
  - HIGHEST = MAX(CELL ADDRESS)
  - LOWEST =MIN(CELL ADDRESS)
  - AVERAGE =AVERAGE(CELL ADDRESS)

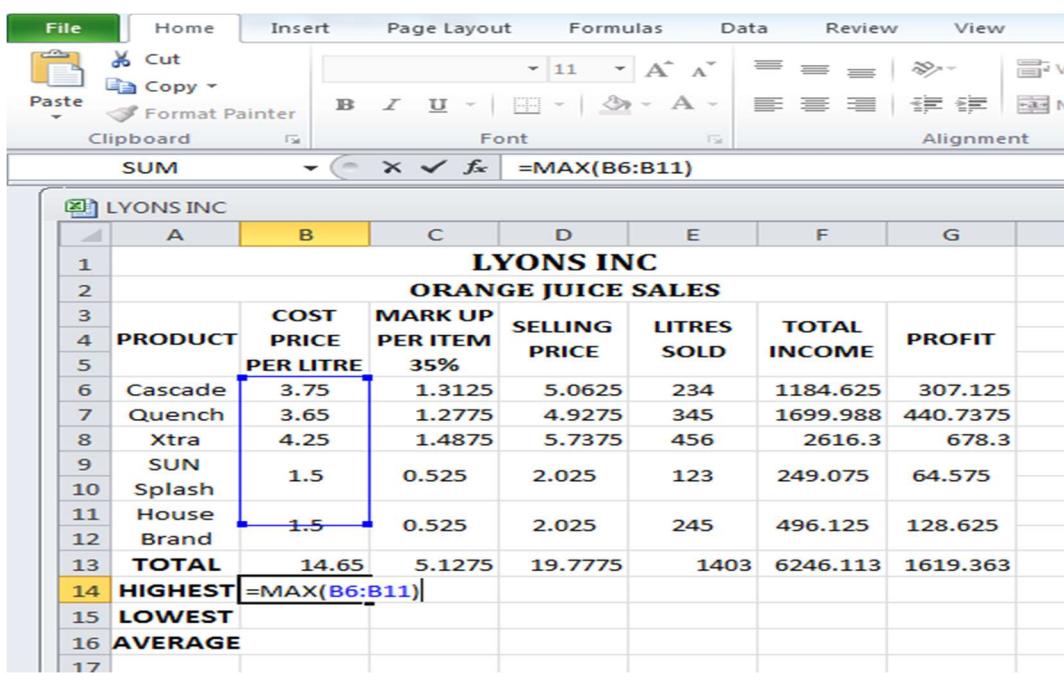
### FOR TOTAL:



The screenshot shows an Excel spreadsheet titled "LYONS INC" with a subtitle "ORANGE JUICE SALES". The data starts at row 6 and ends at row 12. Row 13 contains the formula `=SUM(B6:B11)`. The columns are labeled: PRODUCT, COST PRICE PER LITRE, MARK UP PER ITEM, SELLING PRICE, LITRES SOLD, TOTAL INCOME, and PROFIT.

PRODUCT	COST PRICE PER LITRE	MARK UP PER ITEM	SELLING PRICE	LITRES SOLD	TOTAL INCOME	PROFIT
Cascade	3.75	1.3125	5.0625	234	1184.625	307.125
Quench	3.65	1.2775	4.9275	345	1699.988	440.7375
Xtra	4.25	1.4875	5.7375	456	2616.3	678.3
SUN		0.525	2.025	123	249.075	64.575
Splash	1.5					
House Brand	1.5	0.525	2.025	245	496.125	128.625
<b>TOTAL</b>						
<b>HIGHEST</b>						
<b>LOWEST</b>						
<b>AVERAGE</b>						

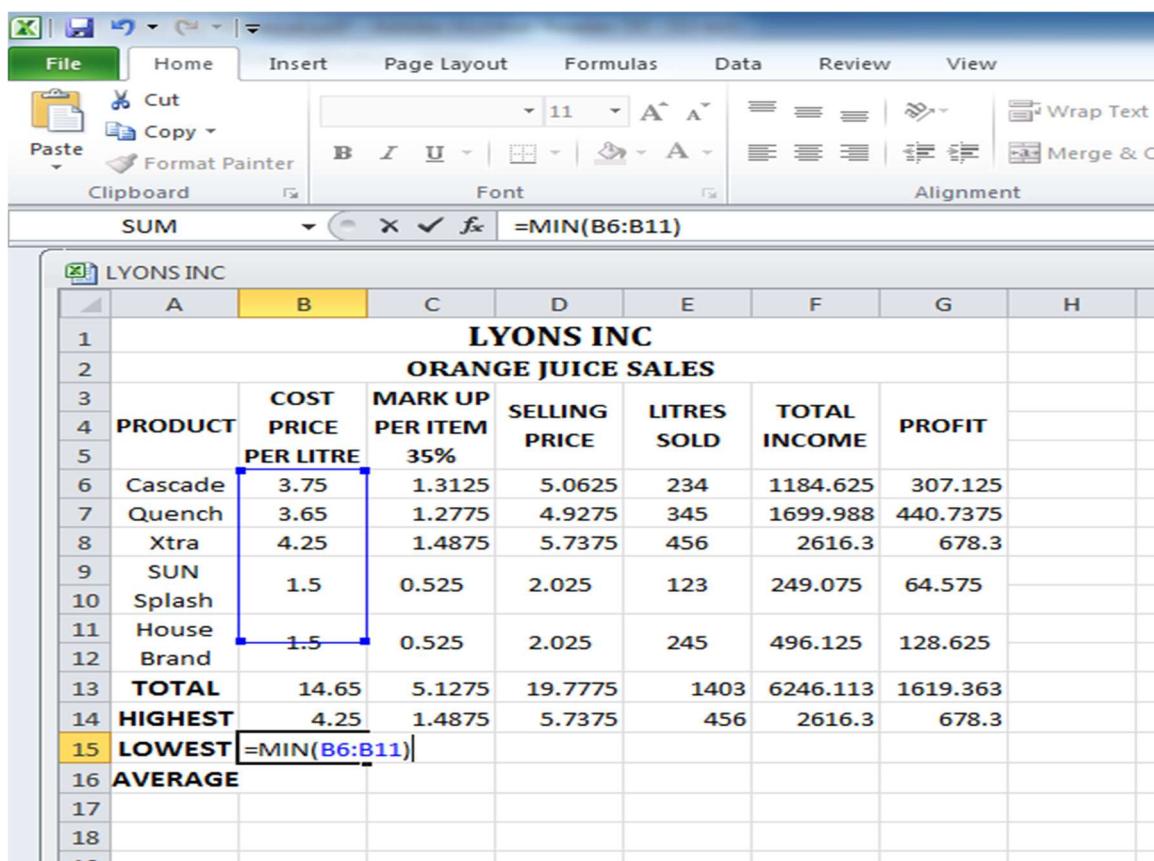
### FOR HIGHEST VALUE:



The screenshot shows the same Excel spreadsheet as the previous one, but the formula in cell B14 has changed to `=MAX(B6:B11)`. The data rows remain the same, but the calculated values in the last three rows have changed based on the MAX function.

PRODUCT	COST PRICE PER LITRE	MARK UP PER ITEM	SELLING PRICE	LITRES SOLD	TOTAL INCOME	PROFIT
Cascade	3.75	1.3125	5.0625	234	1184.625	307.125
Quench	3.65	1.2775	4.9275	345	1699.988	440.7375
Xtra	4.25	1.4875	5.7375	456	2616.3	678.3
SUN		0.525	2.025	123	249.075	64.575
Splash	1.5					
House Brand	1.5	0.525	2.025	245	496.125	128.625
<b>TOTAL</b>	14.65	5.1275	19.7775		1403	6246.113
<b>HIGHEST</b>						
<b>LOWEST</b>						
<b>AVERAGE</b>						

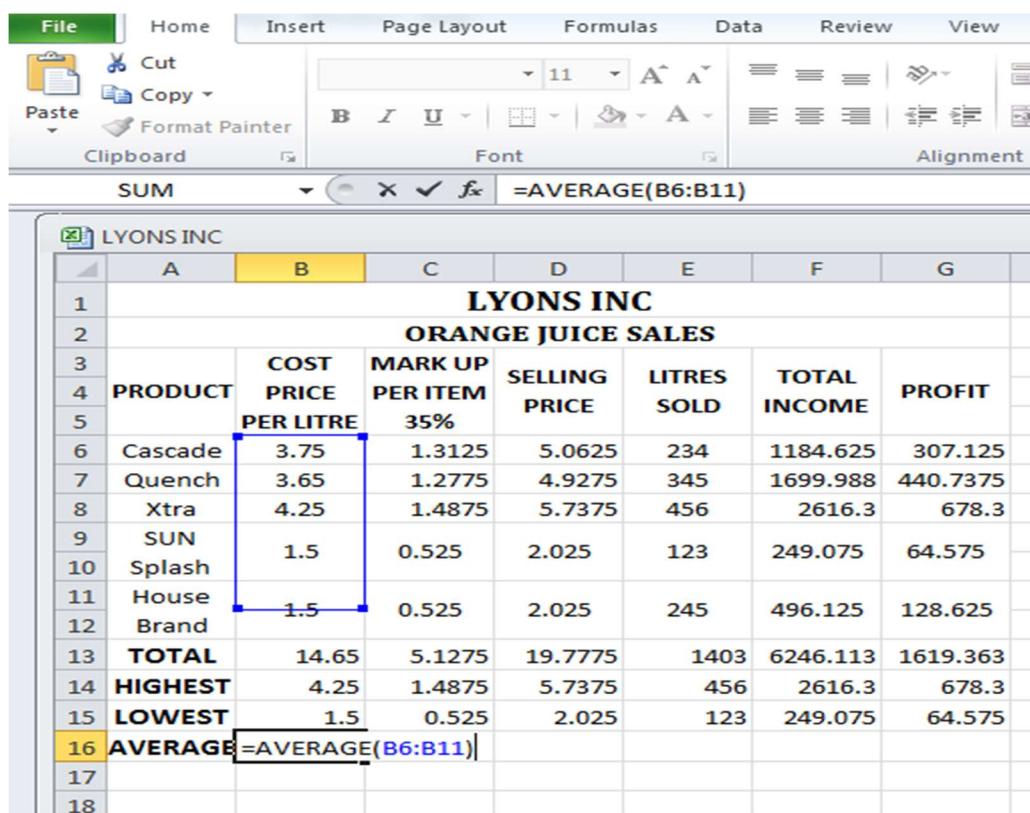
## FOR LOWEST VALUE:



The screenshot shows an Excel spreadsheet titled "LYONS INC" with the subtitle "ORANGE JUICE SALES". The data is organized into columns: PRODUCT, COST PRICE PER LITRE, MARK UP PER ITEM, SELLING PRICE, LITRES SOLD, TOTAL INCOME, and PROFIT. Row 15 contains the formula `=MIN(B6:B11)` in cell B15, which calculates the lowest cost price per litre among the listed products.

	A	B	C	D	E	F	G	H
1	<b>LYONS INC</b>							
2	<b>ORANGE JUICE SALES</b>							
3	PRODUCT	COST PRICE PER LITRE	MARK UP PER ITEM	SELLING PRICE	LITRES SOLD	TOTAL INCOME	PROFIT	
4	Cascade	3.75	1.3125	5.0625	234	1184.625	307.125	
5	Quench	3.65	1.2775	4.9275	345	1699.988	440.7375	
6	Xtra	4.25	1.4875	5.7375	456	2616.3	678.3	
7	SUN	1.5	0.525	2.025	123	249.075	64.575	
8	Splash	1.5	0.525	2.025	245	496.125	128.625	
9	House Brand	1.5	0.525	2.025	456	2616.3	678.3	
10	<b>TOTAL</b>	14.65	5.1275	19.7775	1403	6246.113	1619.363	
11	<b>HIGHEST</b>	4.25	1.4875	5.7375	456	2616.3	678.3	
12	<b>LOWEST</b>	<code>=MIN(B6:B11)</code>						
13	<b>AVERAGE</b>							
14								
15								
16								
17								
18								
19								

## FOR AVERAGE:



The screenshot shows an Excel spreadsheet titled "LYONS INC" with the subtitle "ORANGE JUICE SALES". The data is organized into columns: PRODUCT, COST PRICE PER LITRE, MARK UP PER ITEM, SELLING PRICE, LITRES SOLD, TOTAL INCOME, and PROFIT. Row 16 contains the formula `=AVERAGE(B6:B11)` in cell B16, which calculates the average cost price per litre among the listed products.

	A	B	C	D	E	F	G	
1	<b>LYONS INC</b>							
2	<b>ORANGE JUICE SALES</b>							
3	PRODUCT	COST PRICE PER LITRE	MARK UP PER ITEM	SELLING PRICE	LITRES SOLD	TOTAL INCOME	PROFIT	
4	Cascade	3.75	1.3125	5.0625	234	1184.625	307.125	
5	Quench	3.65	1.2775	4.9275	345	1699.988	440.7375	
6	Xtra	4.25	1.4875	5.7375	456	2616.3	678.3	
7	SUN	1.5	0.525	2.025	123	249.075	64.575	
8	Splash	1.5	0.525	2.025	245	496.125	128.625	
9	House Brand	1.5	0.525	2.025	456	2616.3	678.3	
10	<b>TOTAL</b>	14.65	5.1275	19.7775	1403	6246.113	1619.363	
11	<b>HIGHEST</b>	4.25	1.4875	5.7375	456	2616.3	678.3	
12	<b>LOWEST</b>	1.5	0.525	2.025	123	249.075	64.575	
13	<b>AVERAGE</b>	<code>=AVERAGE(B6:B11)</code>						
14								
15								
16								
17								
18								
19								

- Apply borders to the table using the border icon from HOME tab. Also format the litres sold column to integers and the rest of the columns to two decimal places. For this, select the required column and click on the General drop-down option in the HOME tab.

The screenshot shows two Excel windows side-by-side. The left window displays a table with a border applied to the entire range A1:I16. The right window shows the same table after further formatting: the 'LITRES SOLD' column has its number format set to 'General' (No specific format), resulting in values like 12 instead of 12.12. A red arrow points to the 'Number' dropdown menu in the right-hand ribbon.

LYONS INC						
ORANGE JUICE SALES						
PRODUCT	COST PRICE PER LITRE	MARK UP PER ITEM 35%	SELLING PRICE	LITRES SOLD	TOTAL INCOME	PROFIT
Cascade	3.75	1.3125	5.0625	234	1184.625	307.125
Quench	3.65	1.2775	4.9275	345	1699.988	440.7375
Xtra	4.25	1.4875	5.7375	456	2616.3	678.3
SUN	1.5	0.525	2.025	123	249.075	64.575
Splash						
House	1.5	0.525	2.025	245	496.125	128.625
Brand						
<b>TOTAL</b>	<b>14.65</b>	<b>5.1275</b>	<b>19.7775</b>	<b>1403</b>	<b>6246.113</b>	<b>1619.363</b>
<b>HIGHEST</b>	<b>4.25</b>	<b>1.4875</b>	<b>5.7375</b>	<b>456</b>	<b>2616.3</b>	<b>678.3</b>
<b>LOWEST</b>	<b>1.5</b>	<b>0.525</b>	<b>2.025</b>	<b>123</b>	<b>249.075</b>	<b>64.575</b>
<b>AVERAGE</b>	<b>2.93</b>	<b>1.0255</b>	<b>3.9555</b>	<b>280.6</b>	<b>1249.223</b>	<b>323.8725</b>

This is the final result :

LYONS INC						
ORANGE JUICE SALES						
PRODUCT	COST PRICE PER LITRE	MARK UP PER ITEM 35%	SELLING PRICE	LITRES SOLD	TOTAL INCOME	PROFIT
Cascade	3.75	1.31	5.06	234	1184.63	307.13
Quench	3.65	1.28	4.93	345	1699.99	440.74
Xtra	4.25	1.49	5.74	456	2616.30	678.30
SUN	1.5	0.53	2.03	123	249.08	64.58
Splash						
House	1.5	0.53	2.03	245	496.13	128.63
Brand						
<b>TOTAL</b>	<b>14.65</b>	<b>5.13</b>	<b>19.78</b>	<b>1403</b>	<b>6246.11</b>	<b>1619.36</b>
<b>HIGHEST</b>	<b>4.25</b>	<b>1.49</b>	<b>5.74</b>	<b>456</b>	<b>2616.30</b>	<b>678.30</b>
<b>LOWEST</b>	<b>1.5</b>	<b>0.53</b>	<b>2.03</b>	<b>123</b>	<b>249.08</b>	<b>64.58</b>
<b>AVERAGE</b>	<b>2.93</b>	<b>1.03</b>	<b>3.96</b>	<b>280.6</b>	<b>1249.22</b>	<b>323.87</b>

- For showing all the formulas used in this excel sheet ,click on the FORMULAS ribbon and then click on Show Formulas on the left.

**LYONS INC formula sheet**

	A	B	C	D	E	F	G
1	<b>LYONS INC</b>						
2	<b>ORANGE JUICE SALES</b>						
3	<b>PRODUCT</b>	<b>COST PRICE PER LITRE</b>	<b>MARK UP PER ITEM</b>	<b>SELLING PRICE</b>	<b>LITRES SOLD</b>	<b>TOTAL INCOME</b>	<b>PROFIT</b>
4	Cascade	3.75	=B6*35%	=B6+C6	234	=D6*E6	=F6-(B6*E6)
5	Quench	3.65	=B7*35%	=B7+C7	345	=D7*E7	=F7-(B7*E7)
6	Xtra	4.25	=B8*35%	=B8+C8	456	=D8*E8	=F8-(B8*E8)
7	SUN Splash	1.5	=B9*35%	=B9+C9	123	=D9*E9	=F9-(B9*E9)
8	House Brand	1.5	=B11*35%	=B11+C11	245	=D11*E11	=F11-(B11*E11)
9	<b>TOTAL</b>	=SUM(B6:B11)	=SUM(C6:C11)	=SUM(D6:D11)	=SUM(E6:E11)	=SUM(F6:F11)	=SUM(G6:G11)
10	<b>HIGHEST</b>	=MAX(B6:B11)	=MAX(C6:C11)	=MAX(D6:D11)	=MAX(E6:E11)	=MAX(F6:F11)	=MAX(G6:G11)
11	<b>LOWEST</b>	=MIN(B6:B11)	=MIN(C6:C11)	=MIN(D6:D11)	=MIN(E6:E11)	=MIN(F6:F11)	=MIN(G6:G11)
12	<b>AVERAGE</b>	=AVERAGE(B6:B11)	=AVERAGE(C6:C11)	=AVERAGE(D6:D11)	=AVERAGE(E6:E11)	=AVERAGE(F6:F11)	=AVERAGE(G6:G11)
13							
14							
15							
16							
17							

- For creating a pie chart, go to the INSERT tab and select PIE. After selecting the design for pie chart, click on Select Data on the top-left. Select the column of Product and Cost per litre and press OK.

**LYONS INC formula sheet**

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	<b>LYONS INC</b>																	
2	<b>ORANGE JUICE SALES</b>																	
3	<b>PRODUCT</b>	<b>COST PRICE PER LITRE</b>	<b>MARK UP PER ITEM</b>	<b>SELLING PRICE</b>	<b>LITRES SOLD</b>	<b>TOTAL INCOME</b>	<b>PROFIT</b>											
4	Cascade	3.75	1.31	5.06	234	1184.63	307.13											
5	Quench	3.65	1.28	4.93	345	1699.99	440.74											
6	Xtra	4.25	1.49	5.74	456	2616.30	678.30											
7	SUN Splash	1.5	0.53	2.03	123	249.08	64.58											
8	House Brand	1.5	0.53	2.03	245	496.13	128.63											
9	<b>TOTAL</b>	14.65	5.13	19.78	1403	6246.11	1619.36											
10	<b>HIGHEST</b>	4.25	1.49	5.74	456	2616.30	678.30											
11	<b>LOWEST</b>	1.5	0.53	2.03	123	249.08	64.58											
12	<b>AVERAGE</b>	2.93	1.03	3.96	280.6	1249.22	323.87											
13																		
14																		
15																		
16																		
17																		
18																		
19																		
20																		
21																		

**PRODUCT COST PRICE PER LITRE**

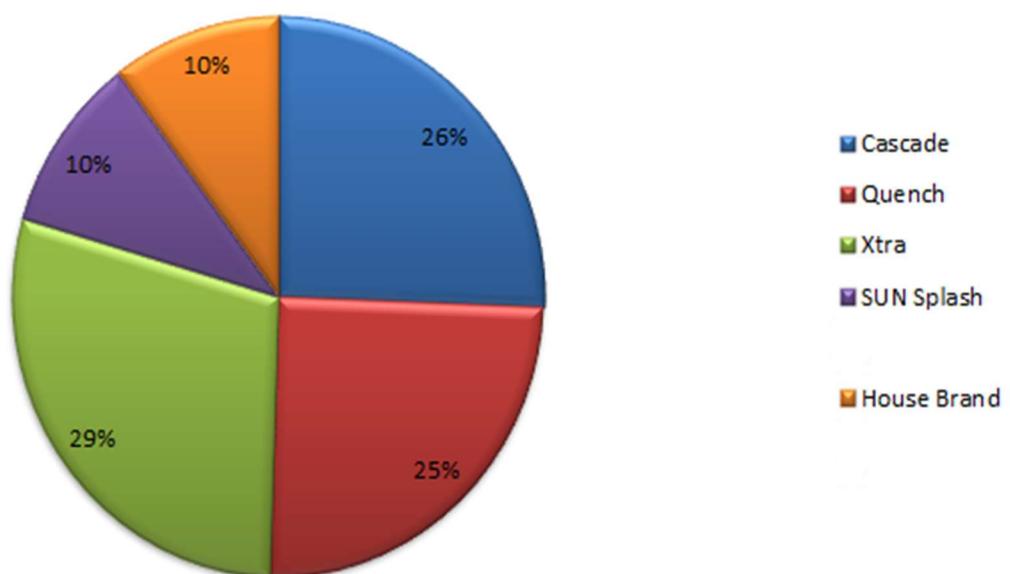
Product	Percentage
Cascade	26%
Quench	25%
Xtra	29%
SUN Splash	10%
House Brand	10%

**THIS IS THE FINAL RESULT:**

<b>LYONS INC</b>						
<b>ORANGE JUICE SALES</b>						
<b>PRODUCT</b>	<b>COST PRICE PER LITRE</b>	<b>MARK UP PER ITEM 35%</b>	<b>SELLING PRICE</b>	<b>LITRES SOLD</b>	<b>TOTAL INCOME</b>	<b>PROFIT</b>
Cascade	3.75	1.31	5.06	234	1184.63	307.13
Quench	3.65	1.28	4.93	345	1699.99	440.74
Xtra	4.25	1.49	5.74	456	2616.30	678.30
SUN Splash	1.5	0.53	2.03	123	249.08	64.58
House Brand	1.5	0.53	2.03	245	496.13	128.63
<b>TOTAL</b>	14.65	5.13	19.78	1403	6246.11	1619.36
<b>HIGHEST</b>	4.25	1.49	5.74	456	2616.30	678.30
<b>LOWEST</b>	1.5	0.53	2.03	123	249.08	64.58
<b>AVERAGE</b>	2.93	1.03	3.96	280.6	1249.22	323.87



### PRODUCT COST PRICE PER LITRE

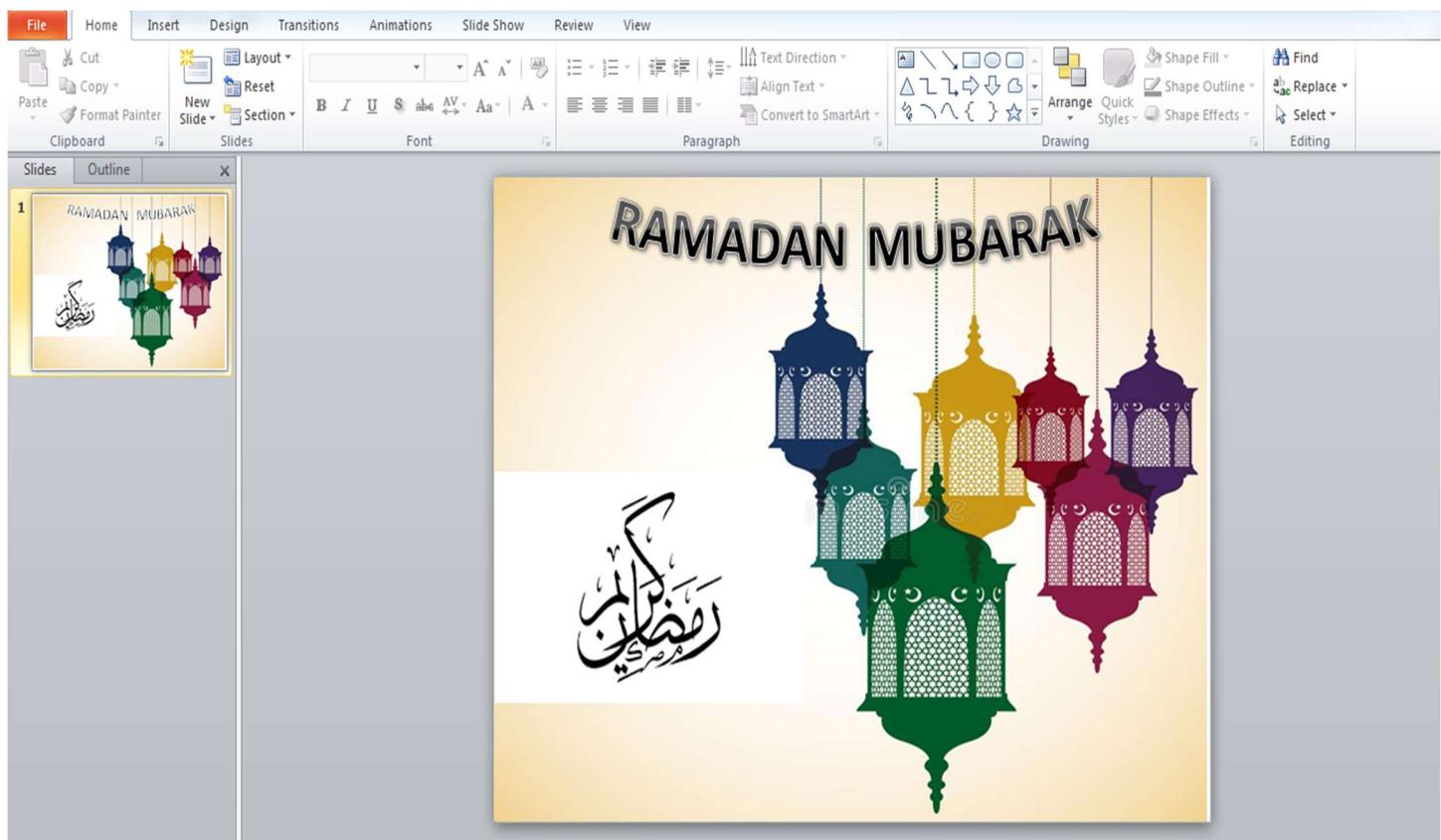


# WEEK 2

## WEEK 2

### **#1 Design Seasonal Greeting cards using MS-Power Point.**

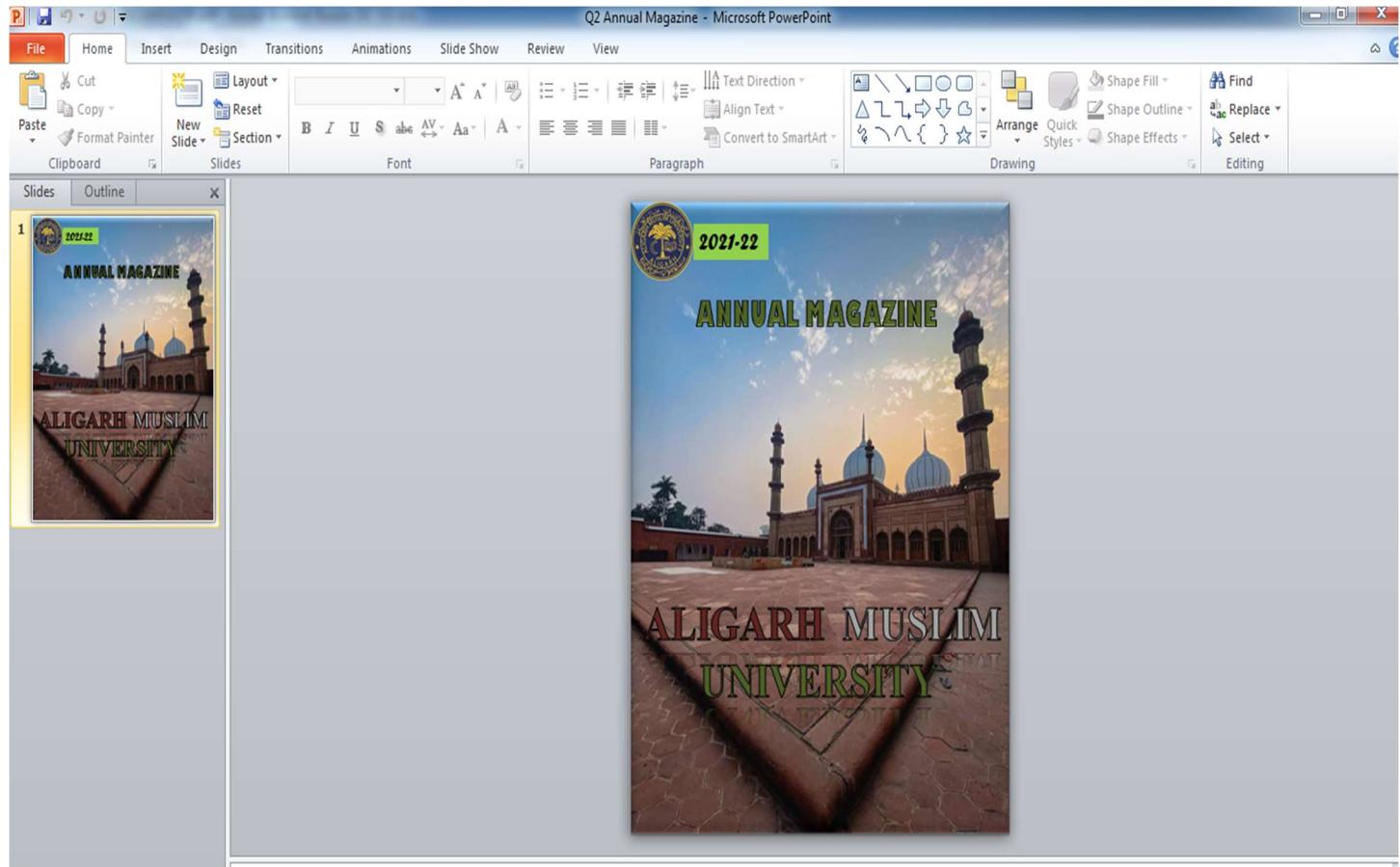
#### **OUTPUT:**



## #2. Design a AMU Magazine cover in MS-Power Point. Use the following:

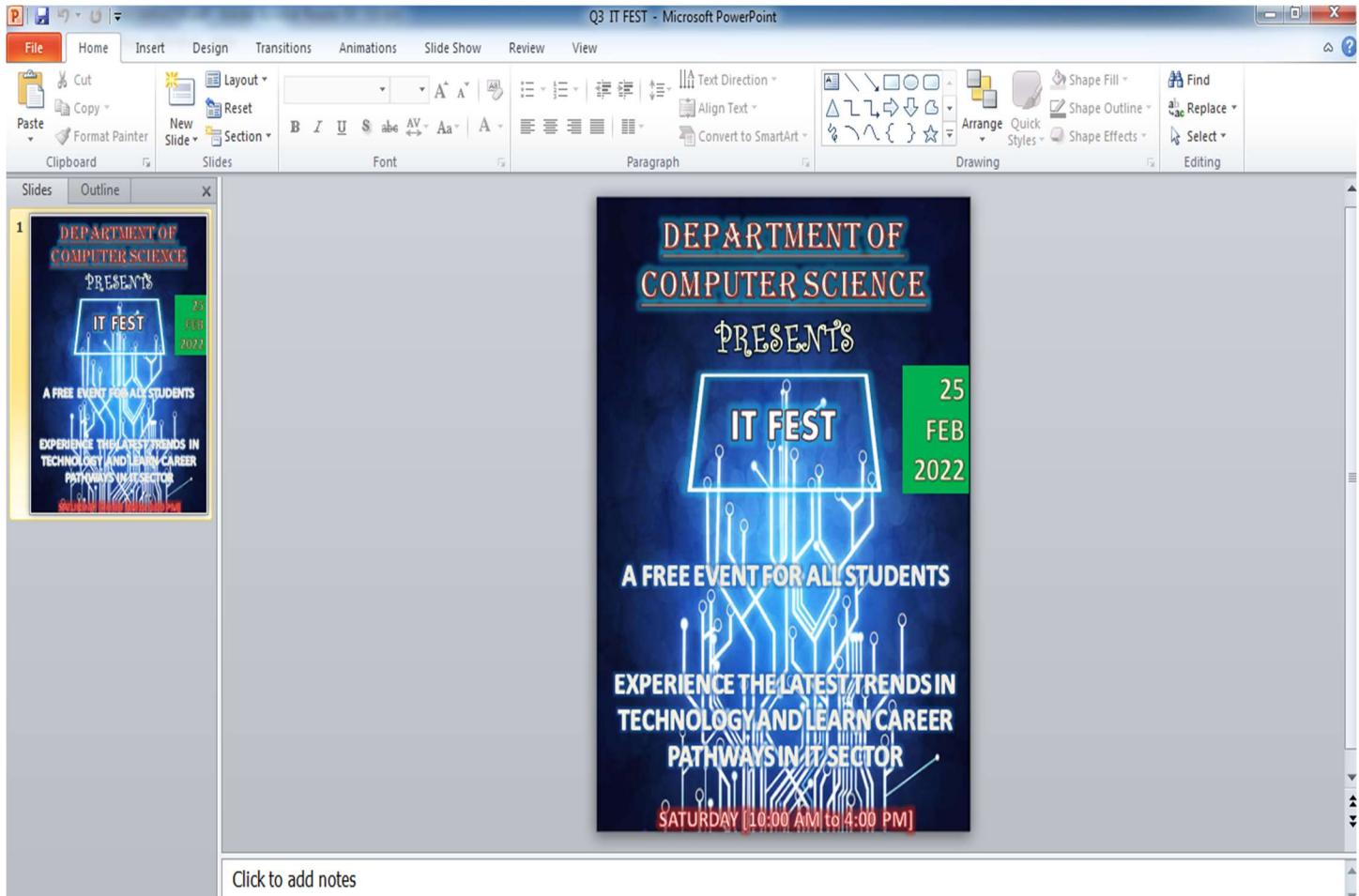
- Select a theme for the page.
- Insert either a picture or clipart, and
- Use WordArt.

### OUTPUT:



#3. Design a poster inviting all students of your department to the IT Fest (using MS-Power Point).

## OUTPUT:



#4 Create a 5-slide presentation on any topic. Use Images, Graphs, Chart, Tables, Animation, Time, Bullets, Transition, Sound, Hyperlink, Background template, Header and Footer (using MS-Power Point).

All the slides are shown below:

## SLIDE 1

**SUPERCONDUCTORS AND THEIR APPLICATIONS**

**PRESENTED BY:**  
BILAL AHMAD  
21 CAMSA 109  
GI1527

**PRESENTED TO:**  
MR. NAVED IQBAL

## SLIDE 2

**OVERVIEW**

**INTRODUCTION**

**OCCURENCE**

**PROPERTIES**

**TYPES OF SUPERCONDUCTORS**

**MAGNETIC LEVITATION**

**APPLICATIONS**

## SLIDE 3

**INTRODUCTION**

- ❑ Superconductivity, complete disappearance of electrical resistance in various solids when they are cooled below a characteristic temperature, called the critical temperature. It varies for different materials but generally is below 20 K ( $-253^{\circ}\text{C}$ ).
- ❑ It was discovered in 1911 by the Dutch physicist *Kamerlingh Onnes*; he was awarded the Nobel Prize for Physics in 1913 for his low-temperature research. *Kamerlingh Onnes* found that the electrical resistivity of a mercury wire disappears suddenly when it is cooled below a temperature of about 4 K ( $-269^{\circ}\text{C}$ ).
- ❑ Superconductors are different from ordinary conductors, even very good ones. Ordinary conductors lose their resistance slowly as they get colder. In contrast, superconductors loose their resistance all at

## SLIDE 4

once. This is an example of a phase transition.

- ❑ High magnetic fields destroy superconductivity and restore the normal conducting state.
- ❑ Suggested uses for superconducting materials include medical magnetic-imaging devices, magnetic energy-storage systems, motors, generators, transformers, computer parts, and very sensitive devices for measuring magnetic fields, voltages, or currents.

Temperature T (K)	Resistance (ohms)
4.2	0.0
5.0	0.1
10.0	0.2

## SLIDE 5

**OCCURENCE**

Superconductivity occurs in many metallic elements of the periodic system and also in some intermetallic compounds, and doped semiconductors.

**PROPERTIES**

A superconductor exhibits no electrical resistance. When temperature is reduced below a critical temperature, called  $T_c$ , the resistance of the material drops to zero. This phenomenon is known as superconducting transition. The magnetic field which is applied to a superconductor at a certain critical value  $H_c$  and then goes to the normal state. This is called Meissner effect. The magnetic field which is applied to a superconductor at a certain critical value  $H_c$  and then goes to the normal state. This is called Meissner effect.

**TYPES OF SUPERCONDUCTORS**

The superconductors are classified into two types according to their  $T_c$  values:

- TYPE I**: These materials exhibit superconducting transition at low temperatures. The superconducting transition temperature is around 20 K or less. These materials are called Type I superconductors.
- TYPE II**: These materials exhibit superconducting transition at higher temperatures. The superconducting transition temperature is around 70 K or more. These materials are called Type II superconductors.

**Superconducting Elements**

Superconducting Elements	$T_c$ (K)
Sn (Tin)	3.72
Hg (Mercury)	4.15
Pb (Lead)	7.19

**OCCURENCE**

Superconductivity occurs in many metallic elements of the periodic system and also in some intermetallic compounds, and doped semiconductors.

Niobium, tantalum, thallium, gallium, bismuth, tin, mercury, lead, boron, strontium are some elements that show superconductivity at their  $T_c$ . The critical temperature lies between 90 K to 0 K for different elements.

Click to add notes

## SLIDE 6

**PROPERTIES**

A superconductor exhibits no electrical dc resistance.

The temperature at which resistance vanishes is called its superconducting transition temperature and denoted as  $T_c$ .

The value of the magnetic field at which the superconductivity vanishes is called the threshold or the critical field,  $H_c$ .

Superconductivity may also get destroyed by the magnetic field due to the current flowing in the wire. The maximum value of current flowing through the superconductor at which superconductivity is destroyed is called *critical current*.

Entropy is the measure of disorder in a material. By reducing the temperature of a material, it goes into superconducting state.

**OCCURENCE**

Superconductivity occurs in many metallic elements of the periodic system and also in some intermetallic compounds, and doped semiconductors.

**PROPERTIES**

A superconductor exhibits no electrical resistance. When temperature is reduced below a critical temperature, called  $T_c$ , the resistance of the material drops to zero. This phenomenon is known as superconducting transition. The magnetic field which is applied to a superconductor at a certain critical value  $H_c$  and then goes to the normal state. This is called Meissner effect.

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**Superconducting Elements**

Superconducting Elements	$T_c$ (K)
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Click to add notes

## SLIDE 7

**Slides** Outline **Font** **Paragraph** **Drawing** **Editing**

**OCCURRENCE**

- Superconductors occur in specific regions of the periodic table and are at high temperatures and low temperatures.
- Magnesium, titanium, gallium, bismuth, mercury, and tin are superconductors at a temperature of 72 K.
- The critical temperature for a metal is around 10 K.
- For example, niobium has a critical temperature of 9.2 K.
- Below this temperature, the metal becomes superconducting.

**PROPERTIES**

- A superconductor exhibits no normal resistance.
- At temperatures below its critical temperature, it excludes magnetic fields from its interior.
- When cooled below its critical temperature, it becomes diamagnetic.
- It also shows zero thermal resistance.

**Meissner Effect**

**TYPES OF SUPERCONDUCTORS**

**TYPE I**

- These superconductors follow the Meissner effect.
- They have a lower critical temperature.
- They exhibit perfect diamagnetism below their critical temperature.
- They revert to their normal state abruptly when the magnetic field exceeds a critical value.
- Examples include Al, Zn, Hg, Sn.

**TYPE II**

- These superconductors do not strictly follow the Meissner effect.
- They have a higher critical temperature.
- They exhibit gradual transition between superconducting and normal states.
- They can support higher magnetic fields.
- Alloys like Nb-Sn, Nb-Ti, Nb-Zr are examples.

Click to add notes

## SLIDE 8

**Slides** Outline **Font** **Paragraph** **Drawing** **Editing**

**OCCURRENCE**

- Superconductors occur in specific regions of the periodic table and are at high temperatures and low temperatures.
- Magnesium, titanium, gallium, bismuth, mercury, and tin are superconductors at a temperature of 72 K.
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**PROPERTIES**

- A superconductor exhibits no normal resistance.
- At temperatures below its critical temperature, it excludes magnetic fields from its interior.
- When cooled below its critical temperature, it becomes diamagnetic.
- It also shows zero thermal resistance.

**Meissner Effect**

**TYPES OF SUPERCONDUCTORS**

**TYPE I**

- The superconductors that strictly follow the Meissner effect are known as type I superconductors.
- These superconductors exhibit perfect diamagnetism below a critical field  $H_c$ . For most of the cases, it is of the order of 0.1 tesla.
- For magnetic field greater than  $H_c$ , the field penetrates the material completely and the material abruptly reverts to its normal state.
- Pure specimens of Al, Zn, Hg and Sn are some examples of Type I superconductors.

**TYPE II**

- These superconductors do not strictly follow the Meissner effect.
- These are not perfectly diamagnetic. They have two critical magnetic fields.
- These materials undergoes a gradual transition from the superconducting state to the normal state between the two critical magnetic fields.
- Alloys like Nb-Sn, Nb-Ti, Nb-Zr, are some examples of type II superconductors.

## SLIDE 9

**MAGNETIC LEVITATION**

- ❑ Magnetic levitation (maglev) or magnetic suspension is a method by which an object is suspended with no support other than magnetic fields. Magnetic force is used to counteract the effects of the gravitational acceleration and any other accelerations.
- ❑ Superconductors may be considered perfect diamagnets, and completely expel magnetic fields due to the Meissner effect when the superconductivity initially forms; thus superconducting levitation can be considered a particular instance of diamagnetic levitation.
- ❑ Magnetic fields are actively excluded from superconductors due to the Meissner effect. If a small magnet is brought near a superconductor, it will be repelled because induced supercurrents will produce mirror images of each pole. Levitation currents in the superconductor produce effective magnetic poles that repel and support the magnet.

**The Meissner Effect**

Click to add notes

## SLIDE 10

**APPLICATIONS**

- ❑ The biggest application for superconductivity is in producing the large-volume, stable, and high-intensity magnetic fields required for *MRI* and *NMR*.
- ❑ Since the current in a superconducting wire can flow without any change in magnitude, it can be used for transmission lines. High temperature superconductors are being used increasingly for making such power cables.
- ❑ Due to a subtlety of the quantum mechanics of how superconductors interact with magnetic fields, it is possible to make the most sensitive magnetometers possible called *SQUIDS* (Superconducting Quantum Interference Devices).
- ❑ It is also possible to use superconducting magnets to produce a levitating train. The idea is to put very powerful light superconducting magnets on the train, then use copper coils in the track which use repulsion to lift the train up to make it levitate. It is also possible to use the track magnets to push the train along.

## SLIDE 11

Q4. superconductor × Microsoft PowerPoint

**SLIDES**

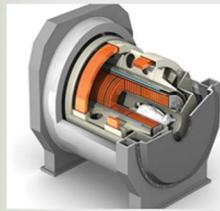
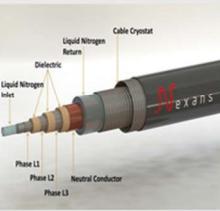
**9 MAGNETIC LEVITATION**

**10 APPLICATIONS**

**11**

**12 THANK YOU**

Because this force is not limited by friction between wheels and a track it is theoretically possible for a maglev train to go much faster and more importantly accelerate and brake faster than a conventional train. Various test maglev trains have been built, in Birmingham, Japan and Germany, although the only one used commercially is a German design built in Shanghai, which uses very strong permanent magnets instead of superconductors.

**MRI**      **POWER CABLE**      **MAGLEV TRAIN**

Click to add notes

## SLIDE 12

File Home Insert Design Transitions Animations Slide Show Review View

**SLIDES**

**9 MAGNETIC LEVITATION**

**10 APPLICATIONS**

**11**

**12 THANK YOU**



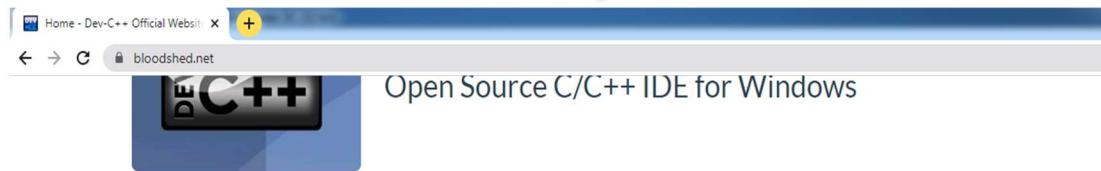
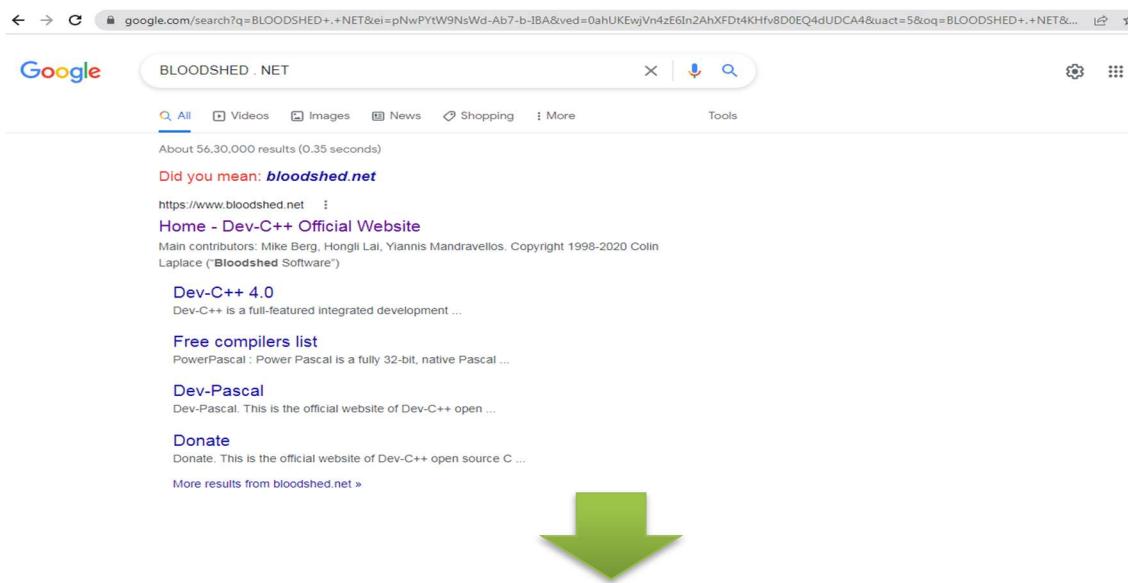
# WEEK 3

# WEEK 3

## INSTALLATION OF DEV C++

### STEPS:

- We can get the appropriate installable for dev-C++ IDE from <https://www.bloodshed.net/>



Dev-C++ is a full-featured C and C++ Integrated Development Environment (IDE) for Windows platforms. Millions of developers, students and researchers use Dev-C++ since the first version was released in 1998. It has been featured in dozens of C++ and scientific books and remains one of the favorite learning tool among universities & schools worldwide.

```

#include <iostream>
#include <fstream>
#include <string>
#include <assert.h>

using namespace std;

int main()
{
    string strLine;
    ifstream fin("text.txt");
    ofstream fout("text2.txt");
    assert(fin.is_open());
    assert(fout.is_open());
    int i = 0;
    while (getline(fin, strLine))
    {
        cout << strLine << endl;
        if (strLine == "Hello")
            i++;
    }
    cout << "Count = " << i << endl;
    fin.close();
    fout.close();
}

```

**Get Dev-C++**

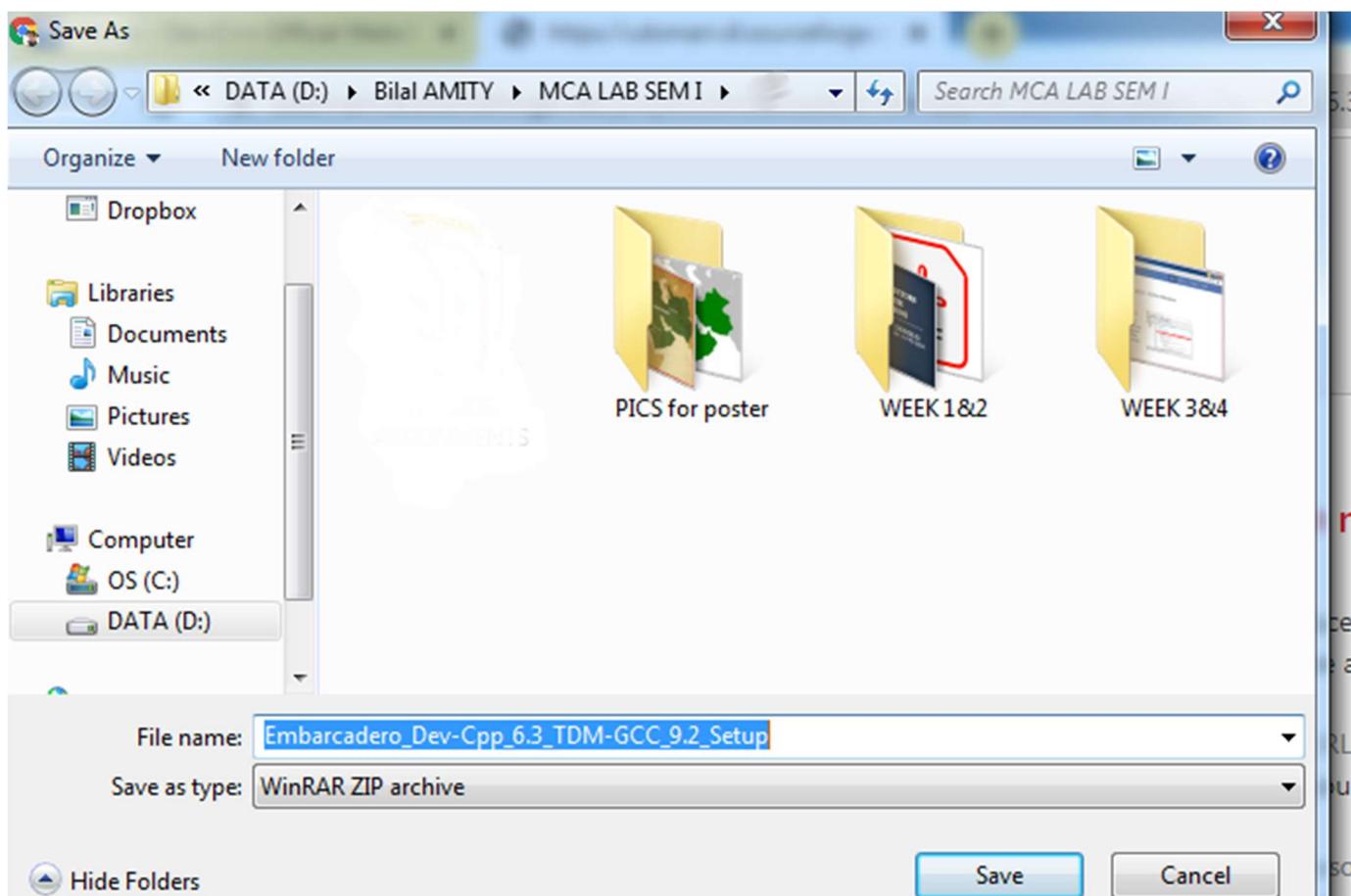
[Download Embarcadero Dev-C++ 6.3 for Windows 7 and later](#)

Supports Windows 7, 8, 10, 11

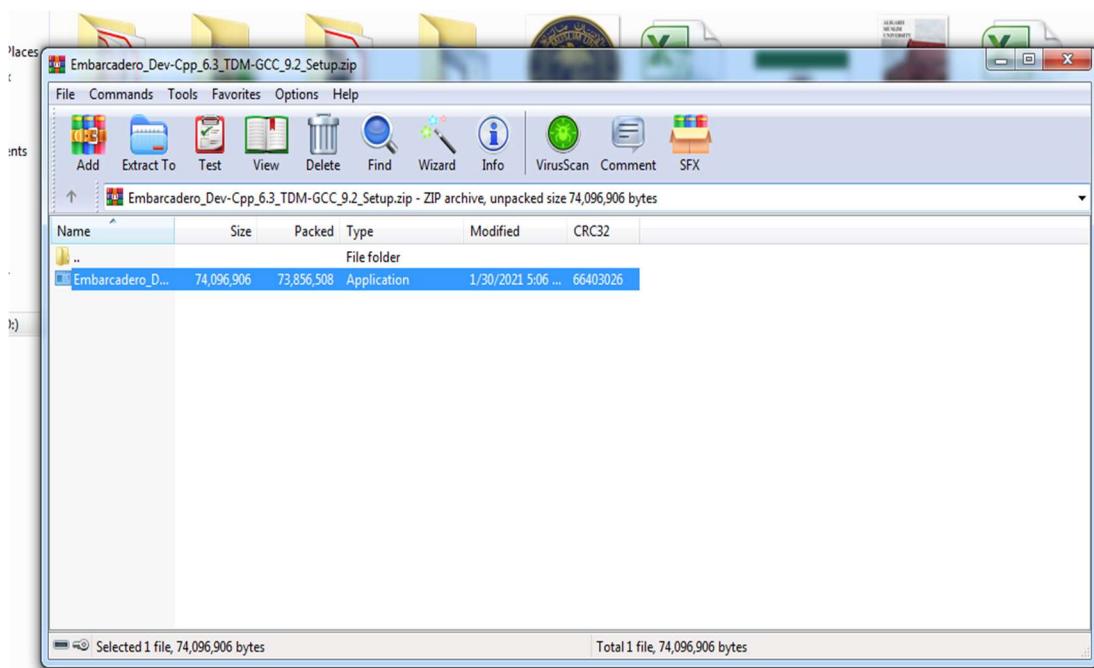
- Click on Download.

The screenshot shows the SourceForge project page for Dev-C++. The page features a banner for Adobe Photoshop with a 25% discount offer. The main title is "Dev-C++ for Windows 10/8/7". Below it, it says "A fast, portable, simple, and free C/C++ IDE" and "Brought to you by: emiliano-emb, fmxexpress". It displays "21 Reviews", "Downloads: 10,453 This Week", and "Last Update: 2021-03-23". A prominent green "Download" button is highlighted with a red arrow. The page also includes tabs for "Summary", "Files", "Reviews", "Support", "Tickets", "Blog", and "Code". A sidebar on the right contains an advertisement for Adobe and links for "Get latest updates about Open Source Project Conferences and News", "Sign Up", and "No, Thank you".

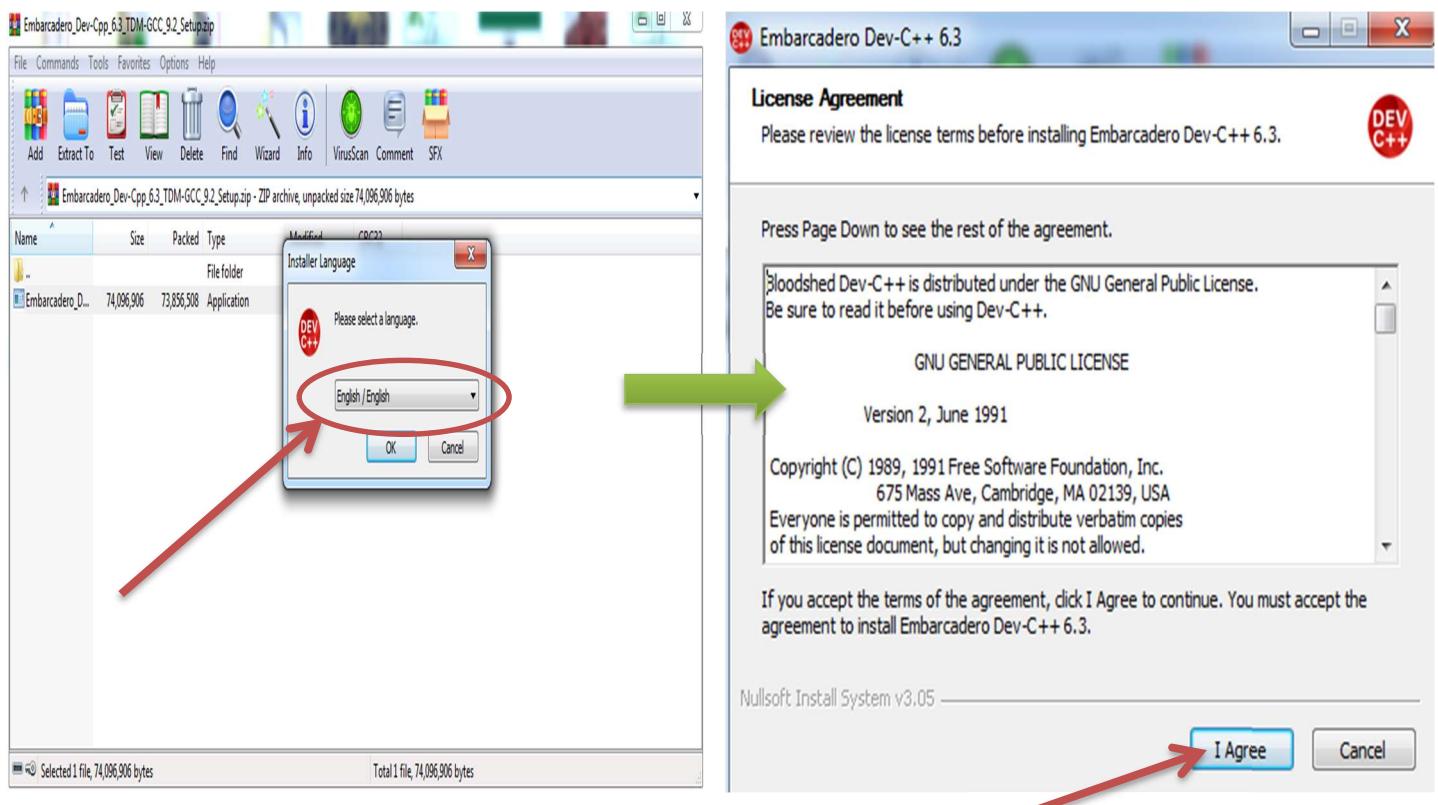
- Save the setup

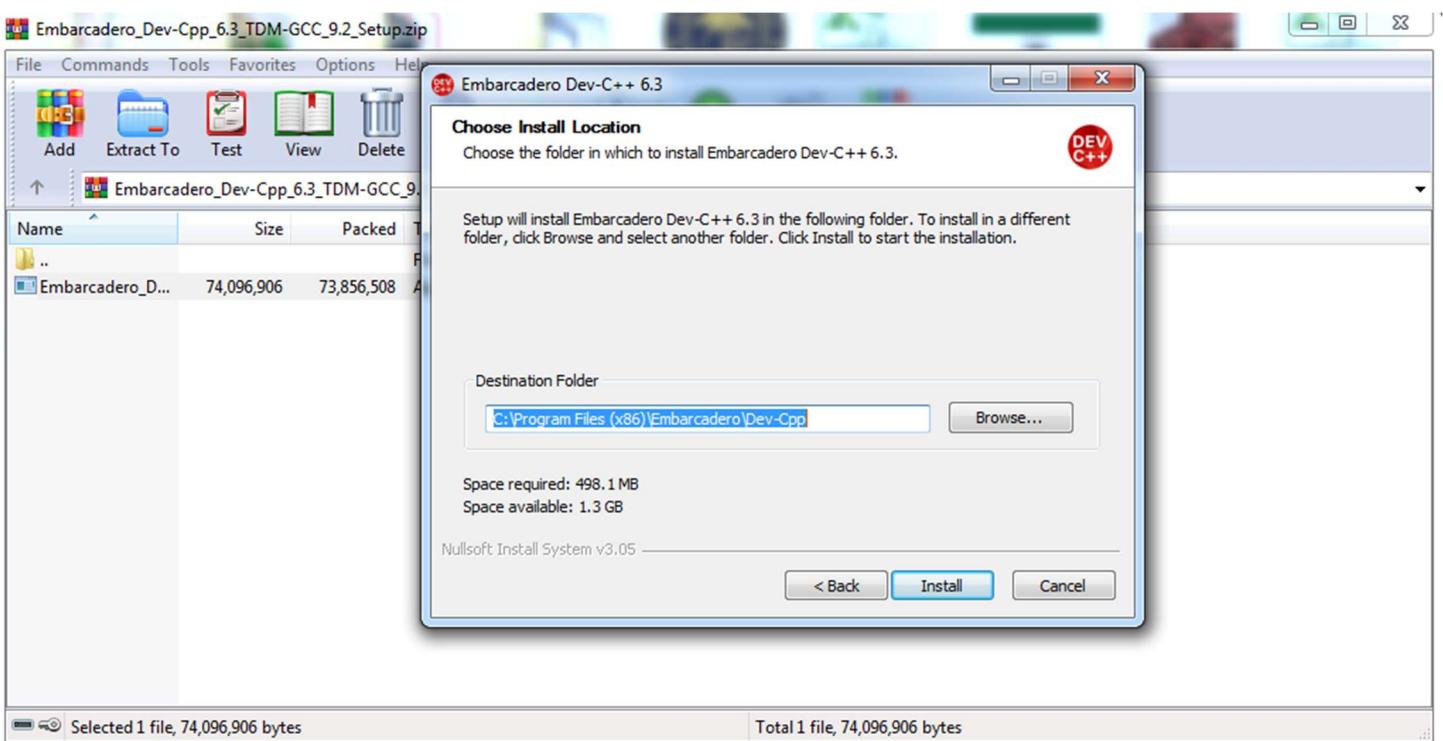
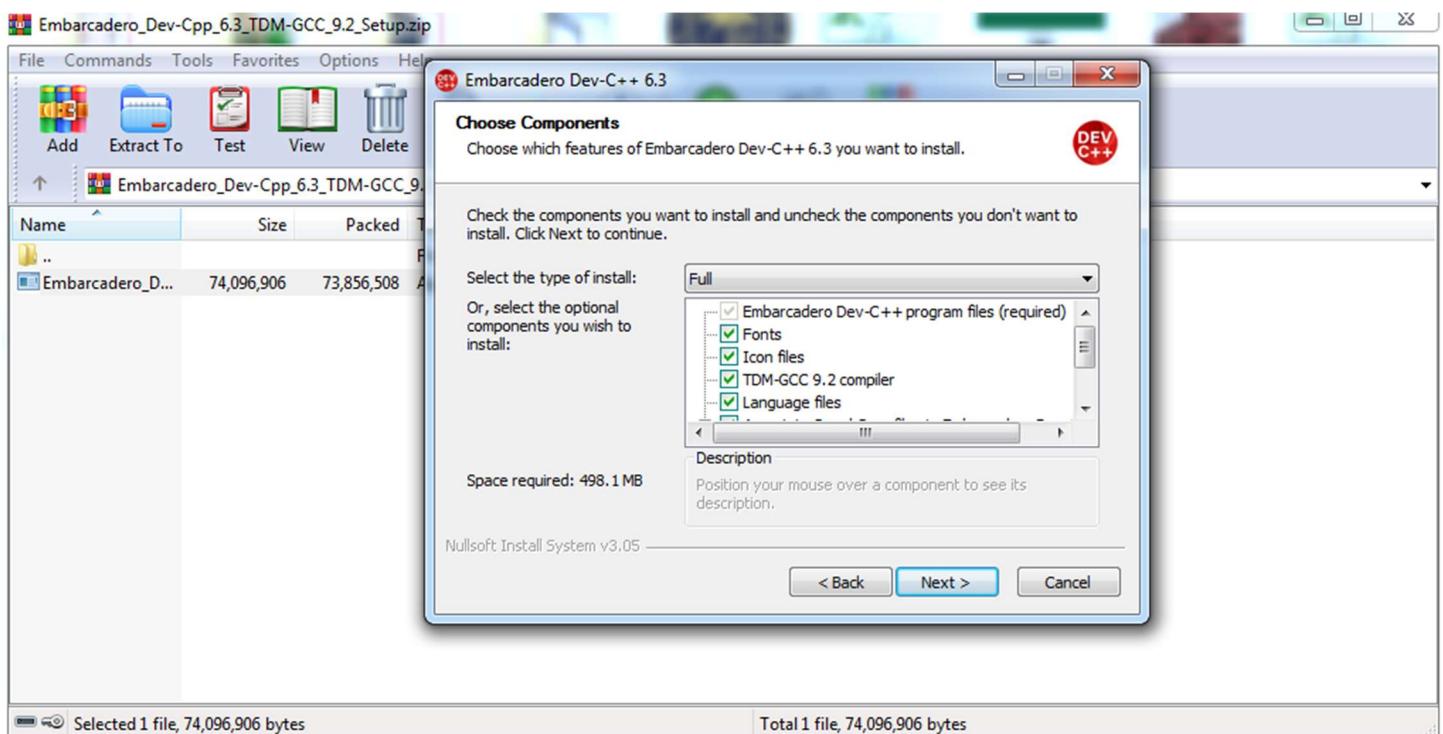


- Open the zip file and start extracting files.

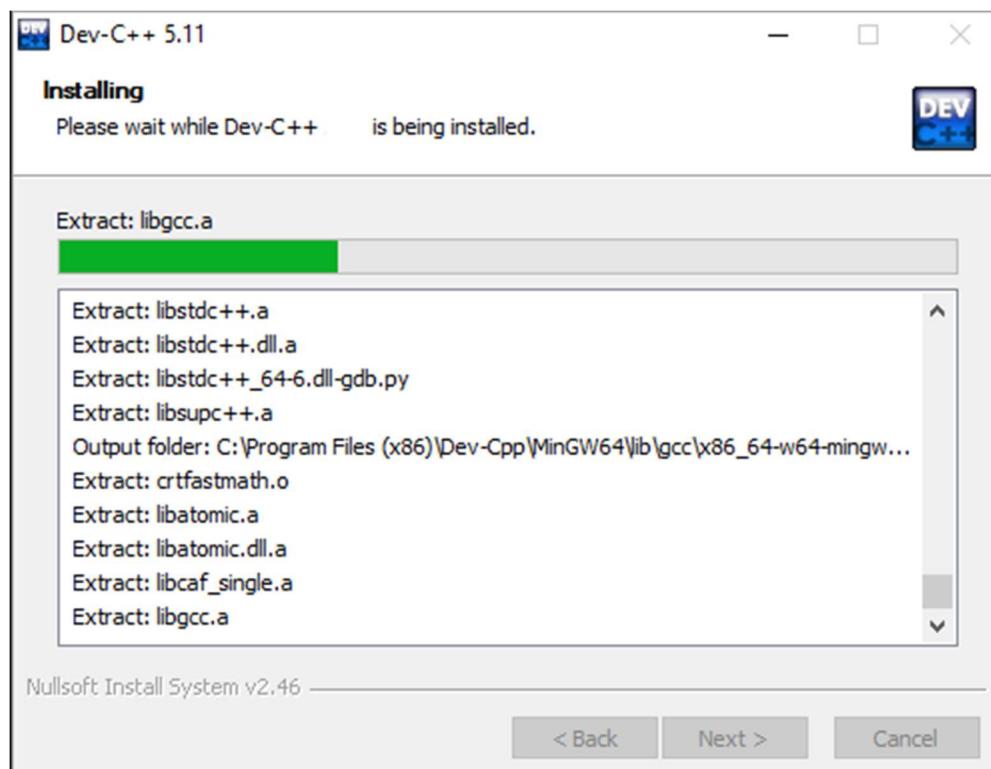


- Select the language, click I Agree on the license and install the rest of the components that come through.

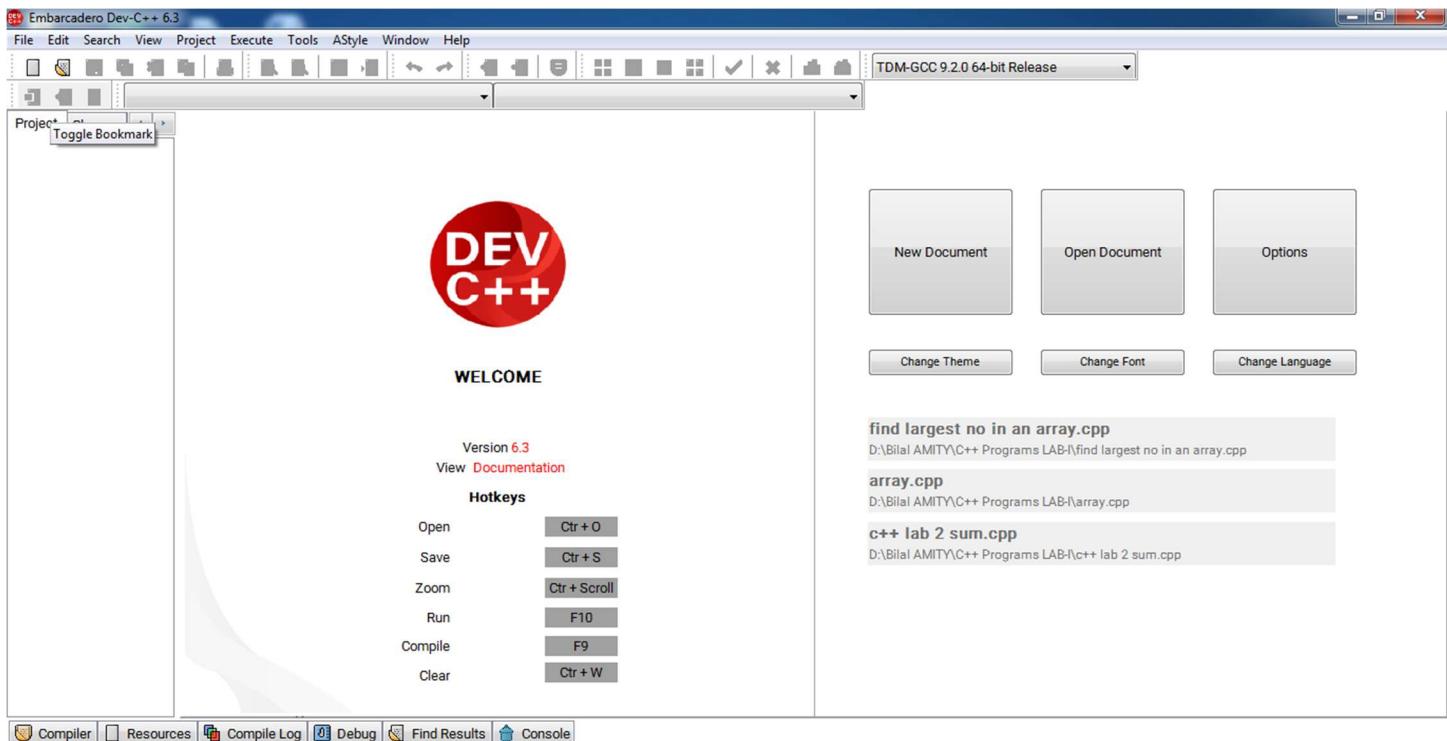




- The following screenshot shows the progress of the installation.



- Dev C++ has been installed. This is the end result.



- Here is a simple basic program on this compiler.

The screenshot shows the Embarcadero Dev-C++ 6.3 IDE interface. The main window displays a code editor with the file 'Untitled1.cpp' containing the following C++ code:

```
1 #include<iostream>
2 using namespace std;
3 int main()
4 {
5     cout<<"hello world";
6     return 0;
7 }
```

To the right of the code editor is a terminal window titled 'D:\Bilal AMITY\C++ Programs LAB-I\Untitled1.exe' showing the output of the program:

```
hello world
Process exited after 1.571 seconds with return value 0
Press any key to continue . . .
```

Below the terminal window is a 'Compiler' tab bar with several options: Compiler (50), Resources, Compile Log, Debug, and Find Results. The 'Compile Log' tab is selected, displaying the compilation results:

```
Compilation results...
-----
- Errors: 0
- Warnings: 0
- Output Filename: D:\Bilal AMITY\C++ Programs LAB-I\Untitled1.exe
- Output Size: 2.98854827880859 MiB
- Compilation Time: 7.66s
```

# WEEK 4

# WEEK 4

**#1 Write a C++ program to check whether a number is even or odd using ternary operator.**

This is the required code :

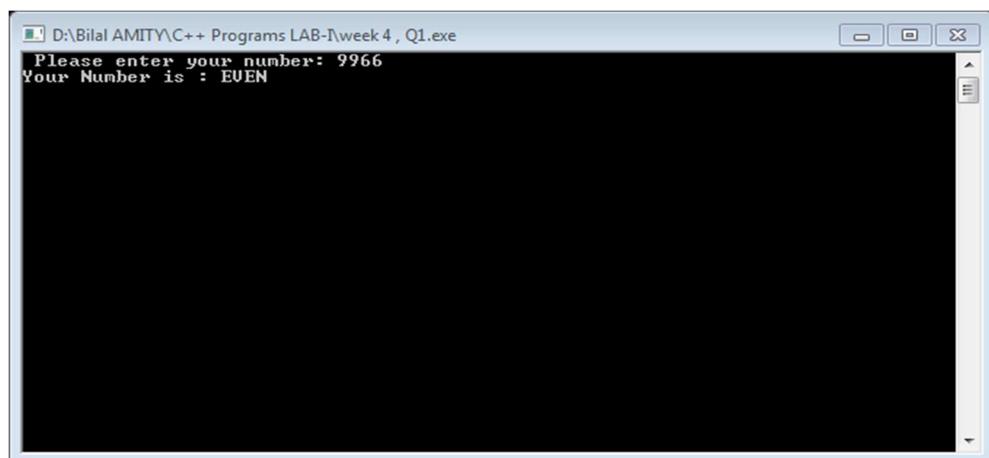
The screenshot shows the Embarcadero Dev-C++ 6.3 IDE interface. The main window displays a C++ source code file named "week 4, Q1.cpp". The code uses a ternary operator to determine if a number is even or odd. The code is as follows:

```
1 #include<iostream>
2 #include<conio.h>
3 using namespace std ;
4 int main ( )
5 {
6
7     int X ;
8     cout << " Please enter your number: " ;
9     cin >> X ;
10    cout <<"Your Number is : ";
11    X % 2 == 0 ? cout << "EVEN" : cout << "ODD ";
12    getch();
13    return 0;
14 }
```

Below the code editor, the "Compiler (1)" tab is selected in the toolbar, showing the compilation results:

```
Compilation results...
-----
- Errors: 0
- Warnings: 0
- Output Filename: D:\Bilal AMITY\C++ Programs LAB-I\week 4 , Q1.exe
- Output Size: 2.98871421813965 MiB
- Compilation Time: 3.34s
```

And this is it's result:



## #2 Write a C++ program to perform the addition of two numbers without using + operator.

This is the required code:

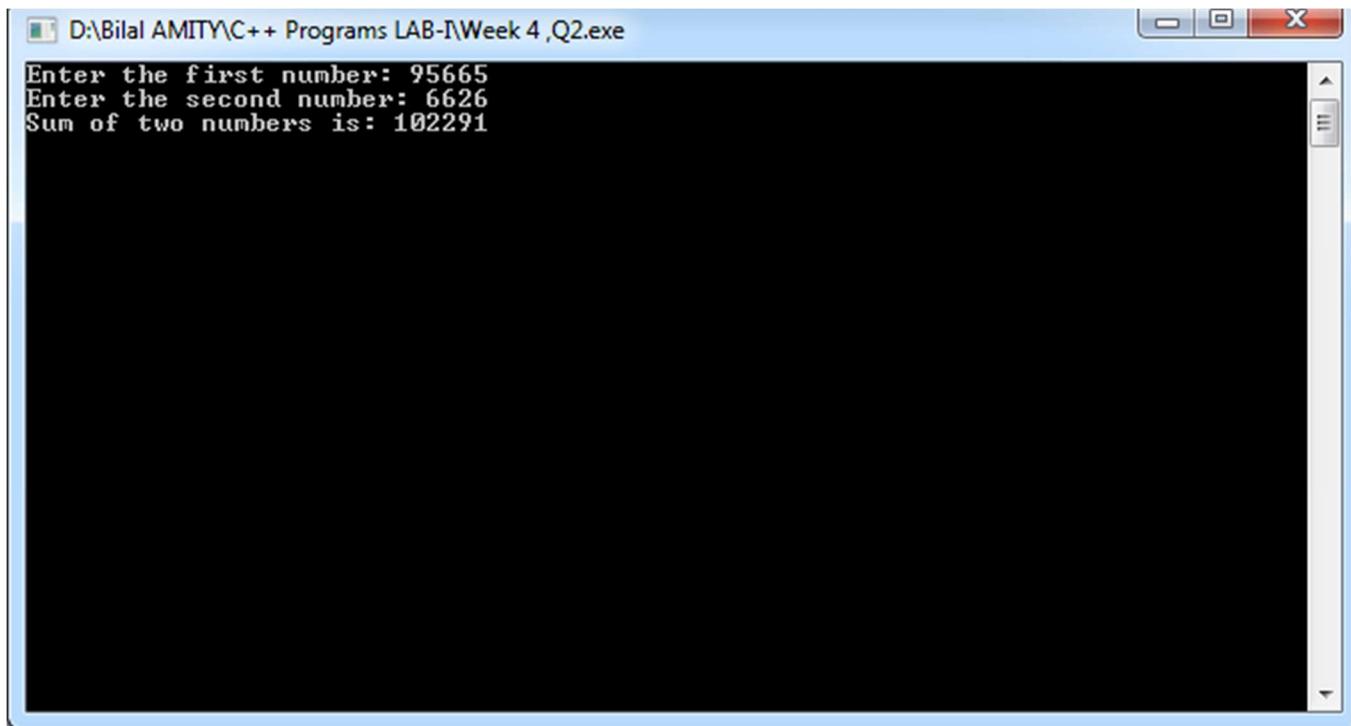
The screenshot shows the Embarcadero Dev-C++ 6.3 IDE interface. The main window displays a C++ source code file named "Week 4,Q2.cpp". The code uses a for loop to iterate through the digits of the second number and adds them to the first number one by one. The output window at the bottom shows the compilation results, indicating 0 errors and 0 warnings, and provides details about the compiled executable.

```
#include<iostream>
#include<conio.h>
using namespace std ;
int main()
{
    int num1,num2,i;
    cout<<"Enter the first number: ";
    cin>>num1;
    cout<<"Enter the second number: ";
    cin>>num2;
    for(i=0; i<num2; i++)
    {
        num1++;
    }
    cout<<"Sum of two numbers is: "<<num1;
    getch();
}
```

Compiler (2) Resources Compile Log Debug Find Results Console Close

Compilation results...  
-----  
- Errors: 0  
- Warnings: 0  
- Output Filename: D:\Bilal AMITY\C++ Programs LAB-I\Week 4 ,Q2.exe  
- Output Size: 2.98871421813965 MiB  
- Compilation Time: 3.78s

And this is the end result:



```
D:\Bilal AMITY\C++ Programs LAB-I\Week 4 ,Q2.exe
Enter the first number: 95665
Enter the second number: 6626
Sum of two numbers is: 102291
```

### 3# Write a C++ program to evaluate the arithmetic expression

$((a + b / c * d - e) * (f - g))$ . Read the values a, b, c, d, e, f, g from the standard input device.

The require code for the given program is given below:

D:\Bilal AMITY\C++ Programs LAB-I\Week 4 , Q3.cpp - [Executing] - Embarcadero Dev-C++ 6.3

File Edit Search View Project Execute Tools AStyle Window Help

(globals)

Project Classes Week 4 , Q3.cpp X

```
1 #include<iostream>
2 using namespace std;
3 int main()
4 {
5     int a , b , c , d , e , f , g;
6     cout<<"The value of 'a' is:"<<endl;
7     cin>>a;
8     cout<<"The value of 'b' is:"<<endl;
9     cin>>b;
10    cout<<"The value of 'c' is:"<<endl;
11    cin>>c;
12    cout<<"The value of 'd' is:"<<endl;
13    cin>>d;
14    cout<<"The value of 'e' is:"<<endl;
15    cin>>e;
16    cout<<"The value of 'f' is:"<<endl;
17    cin>>f;
18    cout<<"The value of 'g' is:"<<endl;
19    cin>>g;
20    cout<< "The solution of the given expression is : "<< ((a + b / c * d - e) *( f - g));
21    return 0;
22 }
23
```

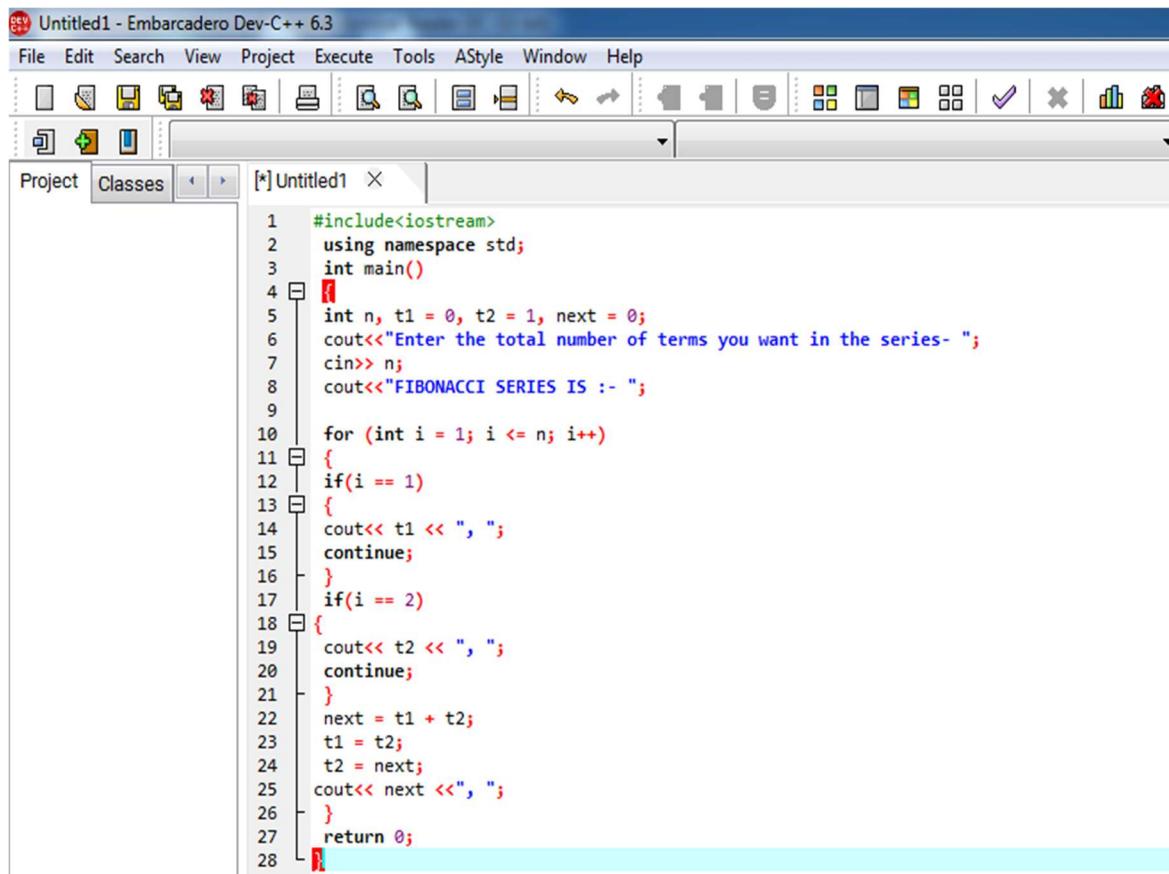
And it's result is:

D:\Bilal AMITY\C++ Programs LAB-I\Week 4 , Q3.exe

```
The value of 'a' is:
89
The value of 'b' is:
63
The value of 'c' is:
82
The value of 'd' is:
75
The value of 'e' is:
38
The value of 'f' is:
25
The value of 'g' is:
987
The solution of the given expression is : -49062
Process exited after 17.46 seconds with return value 0
Press any key to continue . . .
```

4# A Fibonacci sequence is defined as follows: The first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C++ program to generate the first n terms of the sequence.

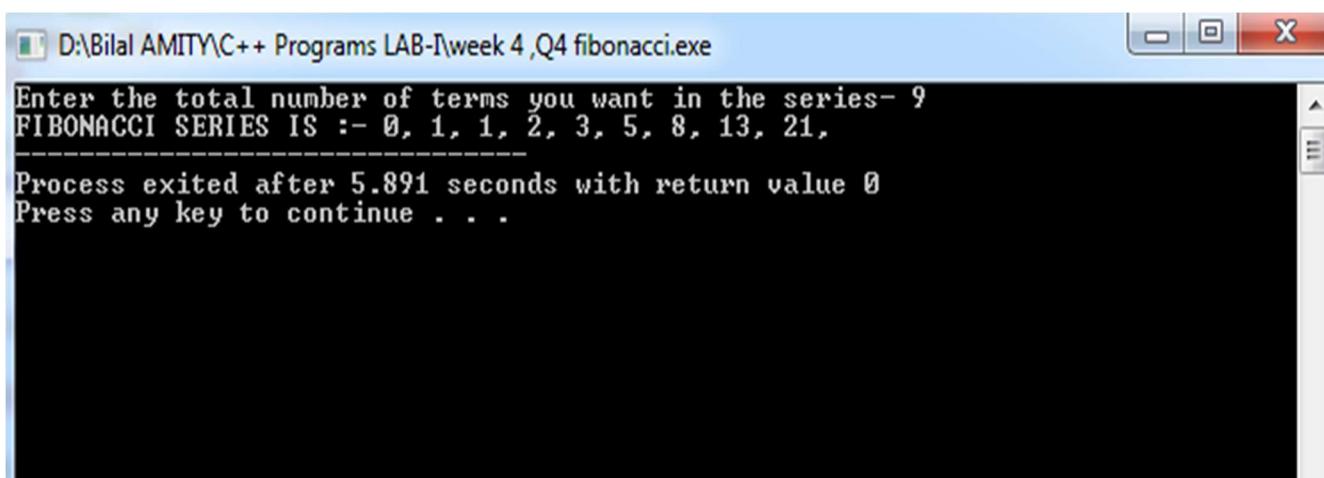
This is the required code for Fibonacci sequence:



The screenshot shows the Dev-C++ IDE interface. The menu bar includes File, Edit, Search, View, Project, Execute, Tools, AStyle, Window, and Help. The toolbar contains various icons for file operations like Open, Save, Print, and Build. The left sidebar has Project and Classes tabs, with Untitled1 selected. The main code editor window displays the following C++ code:

```
1 #include<iostream>
2 using namespace std;
3 int main()
4 {
5     int n, t1 = 0, t2 = 1, next = 0;
6     cout<<"Enter the total number of terms you want in the series- ";
7     cin>> n;
8     cout<<"FIBONACCI SERIES IS :- ";
9
10    for (int i = 1; i <= n; i++)
11    {
12        if(i == 1)
13        {
14            cout<< t1 << ", ";
15            continue;
16        }
17        if(i == 2)
18        {
19            cout<< t2 << ", ";
20            continue;
21        }
22        next = t1 + t2;
23        t1 = t2;
24        t2 = next;
25        cout<< next << ", ";
26    }
27    return 0;
28 }
```

The end result is:

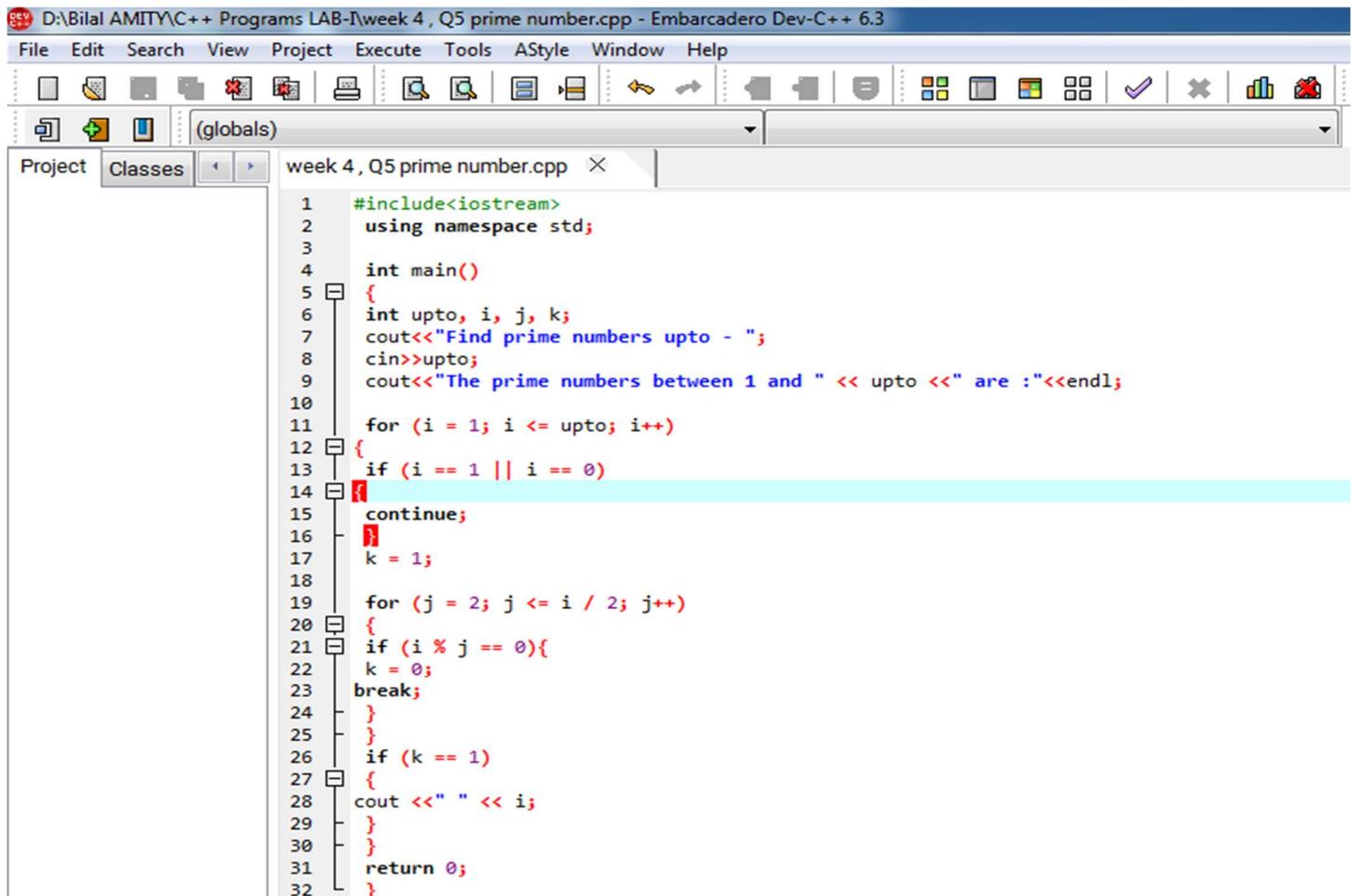


The screenshot shows the terminal window output for the generated executable. The title bar reads "D:\Bilal AMITY\C++ Programs LAB-I\week 4,Q4 fibonacci.exe". The console output is:

```
Enter the total number of terms you want in the series- 9
FIBONACCI SERIES IS :- 0, 1, 1, 2, 3, 5, 8, 13, 21,
Process exited after 5.891 seconds with return value 0
Press any key to continue . . .
```

#5 Write a C++ program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

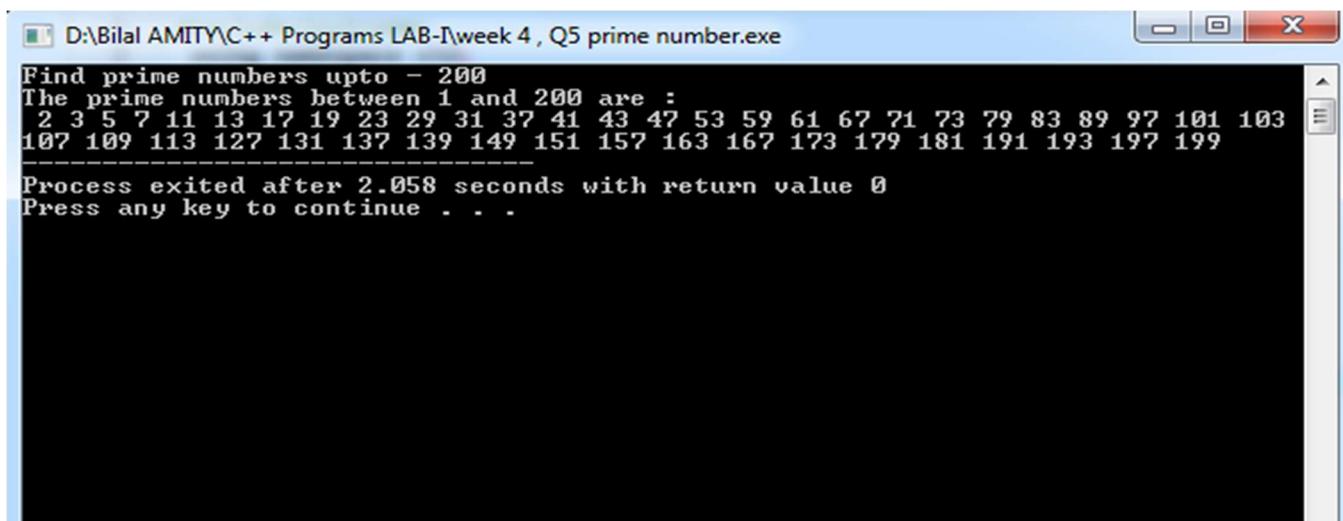
This is the required code :



The screenshot shows the Embarcadero Dev-C++ 6.3 IDE interface. The title bar reads "D:\Bilal AMITY\C++ Programs LAB-I\week 4 , Q5 prime number.cpp - Embarcadero Dev-C++ 6.3". The menu bar includes File, Edit, Search, View, Project, Execute, Tools, AStyle, Window, Help. The toolbar has various icons for file operations. The left sidebar shows a "Project" tab and a "Classes" tab. The main editor window displays the following C++ code:

```
1 #include<iostream>
2 using namespace std;
3
4 int main()
5 {
6     int upto, i, j, k;
7     cout<<"Find prime numbers upto - ";
8     cin>>upto;
9     cout<<"The prime numbers between 1 and " << upto <<" are :"<<endl;
10
11    for (i = 1; i <= upto; i++)
12    {
13        if (i == 1 || i == 0)
14        {
15            continue;
16        }
17        k = 1;
18
19        for (j = 2; j <= i / 2; j++)
20        {
21            if (i % j == 0){
22                k = 0;
23                break;
24            }
25        }
26        if (k == 1)
27        {
28            cout <<" " << i;
29        }
30    }
31    return 0;
32 }
```

And it's result is :



The screenshot shows a terminal window titled "D:\Bilal AMITY\C++ Programs LAB-I\week 4 , Q5 prime number.exe". The output of the program is displayed:

```
Find prime numbers upto - 200
The prime numbers between 1 and 200 are :
2 3 5 7 11 13 17 19 23 29 31 37 41 43 47 53 59 61 67 71 73 79 83 89 97 101 103
107 109 113 127 131 137 139 149 151 157 163 167 173 179 181 191 193 197 199

Process exited after 2.058 seconds with return value 0
Press any key to continue . . .
```

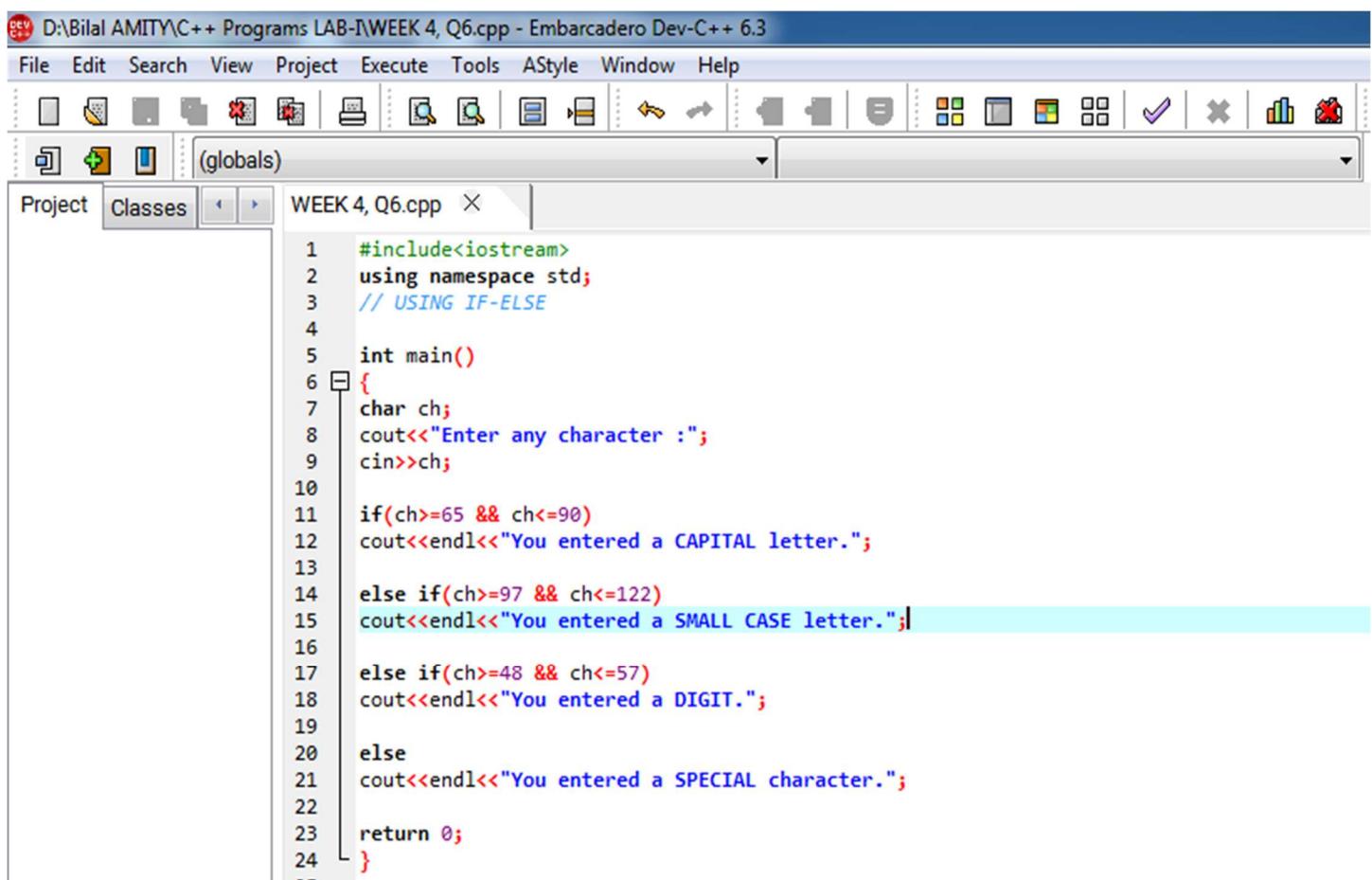
6# A character is entered through keyboard. Write a C++ program to determine whether the character entered is a capital letter, a small case letter, a digit or a special symbol using if-else and switch case. The following table shows the range of ASCII values for various characters.

### Characters

ASCII values A – Z: 65 – 90, a – z: 97 – 122, 0 – 9: 48 – 57

Special symbols 0 – 47, 58 – 64, 91 – 96, 123 – 127

This is the required code :



The screenshot shows the Dev-C++ IDE interface with the following details:

- Title Bar:** D:\Bilal AMITY\C++ Programs LAB-I\WEEK 4, Q6.cpp - Embarcadero Dev-C++ 6.3
- Menu Bar:** File, Edit, Search, View, Project, Execute, Tools, AStyle, Window, Help
- Toolbar:** Standard icons for file operations like Open, Save, Print, Find, etc.
- Toolbox:** Various development tools and icons.
- Project Explorer:** Shows "Project" and "Classes" sections, with "WEEK 4, Q6.cpp" selected.
- Code Editor:** Displays the C++ code for Q6.cpp. The code uses if-else statements to check if a character is a capital letter, small case letter, digit, or special character based on its ASCII value.

```
#include<iostream>
using namespace std;
// USING IF-ELSE

int main()
{
    char ch;
    cout<<"Enter any character :";
    cin>>ch;

    if(ch>=65 && ch<=90)
        cout<<endl<<"You entered a CAPITAL letter.";

    else if(ch>=97 && ch<=122)
        cout<<endl<<"You entered a SMALL CASE letter.";

    else if(ch>=48 && ch<=57)
        cout<<endl<<"You entered a DIGIT.";

    else
        cout<<endl<<"You entered a SPECIAL character.";

    return 0;
}
```

This is it's result:

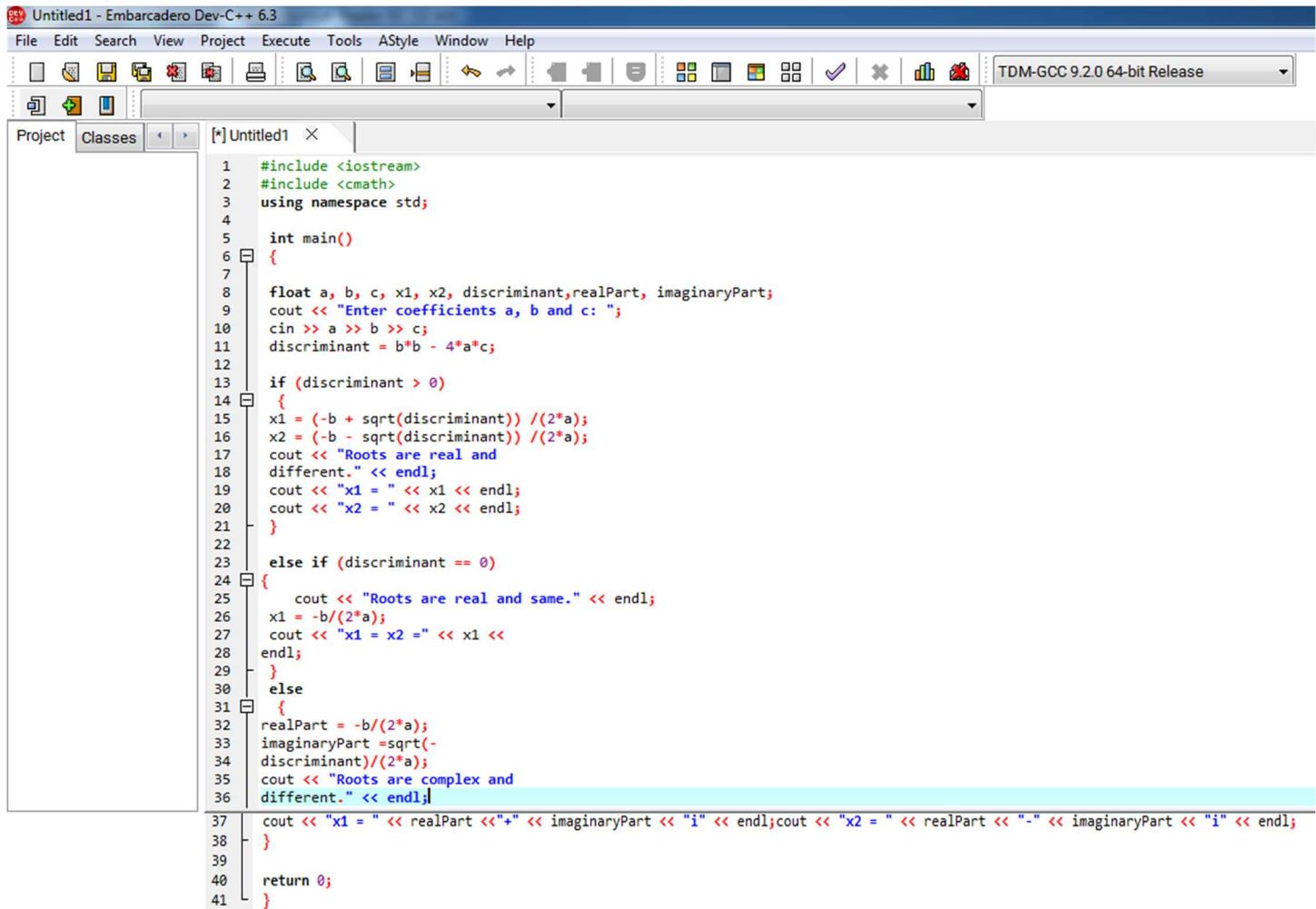
```
D:\Bilal AMITY\C++ Programs LAB-I\WEEK 4, Q6.exe
Enter any character :B
You entered a CAPITAL letter.
Process exited after 5.94 seconds with return value 0
Press any key to continue . . .
```

```
D:\Bilal AMITY\C++ Programs LAB-I\WEEK 4, Q6.exe
Enter any character :e
You entered a SMALL CASE letter.
Process exited after 3.781 seconds with return value 0
Press any key to continue . . .
```

```
D:\Bilal AMITY\C++ Programs LAB-I\WEEK 4, Q6.exe
Enter any character :85
You entered a DIGIT.
Process exited after 3.359 seconds with return value 0
Press any key to continue . . .
```

## #7 Write a C++ program to find the roots of a quadratic equation.

The required code is:



```

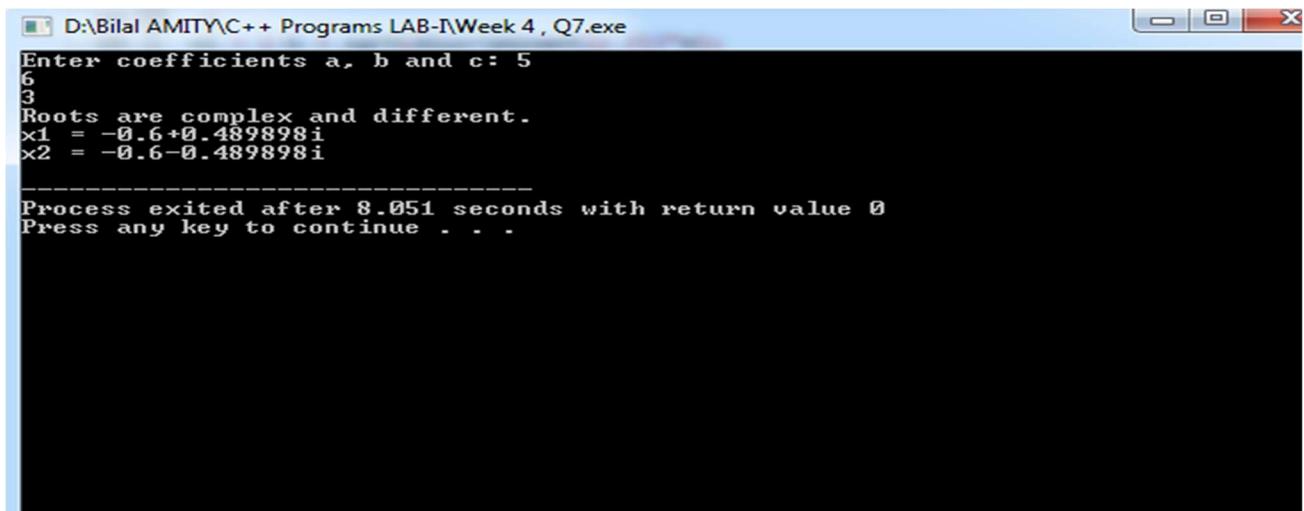
#include <iostream>
#include <cmath>
using namespace std;

int main()
{
    float a, b, c, x1, x2, discriminant, realPart, imaginaryPart;
    cout << "Enter coefficients a, b and c: ";
    cin >> a >> b >> c;
    discriminant = b*b - 4*a*c;

    if (discriminant > 0)
    {
        x1 = (-b + sqrt(discriminant)) / (2*a);
        x2 = (-b - sqrt(discriminant)) / (2*a);
        cout << "Roots are real and different." << endl;
        cout << "x1 = " << x1 << endl;
        cout << "x2 = " << x2 << endl;
    }
    else if (discriminant == 0)
    {
        cout << "Roots are real and same." << endl;
        x1 = -b/(2*a);
        cout << "x1 = x2 = " << x1 << endl;
    }
    else
    {
        realPart = -b/(2*a);
        imaginaryPart = sqrt(-discriminant)/(2*a);
        cout << "Roots are complex and different." << endl;
        cout << "x1 = " << realPart << "+" << imaginaryPart << "i" << endl;
        cout << "x2 = " << realPart << "-" << imaginaryPart << "i" << endl;
    }
    return 0;
}

```

This is it's end result:



```

D:\Bilal AMITY\C++ Programs LAB-I\Week 4 , Q7.exe
Enter coefficients a, b and c: 5
6
3
Roots are complex and different.
x1 = -0.6+0.489898i
x2 = -0.6-0.489898i

Process exited after 8.051 seconds with return value 0
Press any key to continue . .

```

#8 Write a C++ program to check whether a given 3 digit number is Armstrong number or not.

This is the required code:

The screenshot shows the Dev-C++ IDE interface. The title bar reads "D:\Bilal AMITY\c++ Programs LAB-I\Week 4, Q8.cpp - Embarcadero Dev-C++ 6.3". The menu bar includes File, Edit, Search, View, Project, Execute, Tools, AStyle, Window, and Help. Below the menu is a toolbar with various icons. The main window has tabs for "Project" and "Classes", with "Project" selected. The code editor displays "Week 4, Q8.cpp" containing the following C++ code:

```
1 #include <iostream>
2 using namespace std;
3 int main()
4 {
5     int num, r, sum=0, ArmNum;
6     cout << "Enter number to check Armstrong number ";
7     cin >> num;
8     ArmNum = num;
9     while(num > 0)
10    {
11        r = num % 10; // taking the last digit of number
12        sum = sum + (r * r * r);
13        num = num / 10; // skipping the last digit of number
14    }
15    if (ArmNum == sum)
16        cout << "Entered number is Armstrong Number." << endl;
17    else
18        cout << "Entered number is not Armstrong Number." << endl;
19    return 0;
20 }
```

This is the end result:

The screenshot shows a terminal window titled "D:\Bilal AMITY\c++ Programs LAB-I\Week 4, Q8.exe". The window displays the following output:

```
Enter number to check Armstrong number 407
Entered number is Armstrong Number.

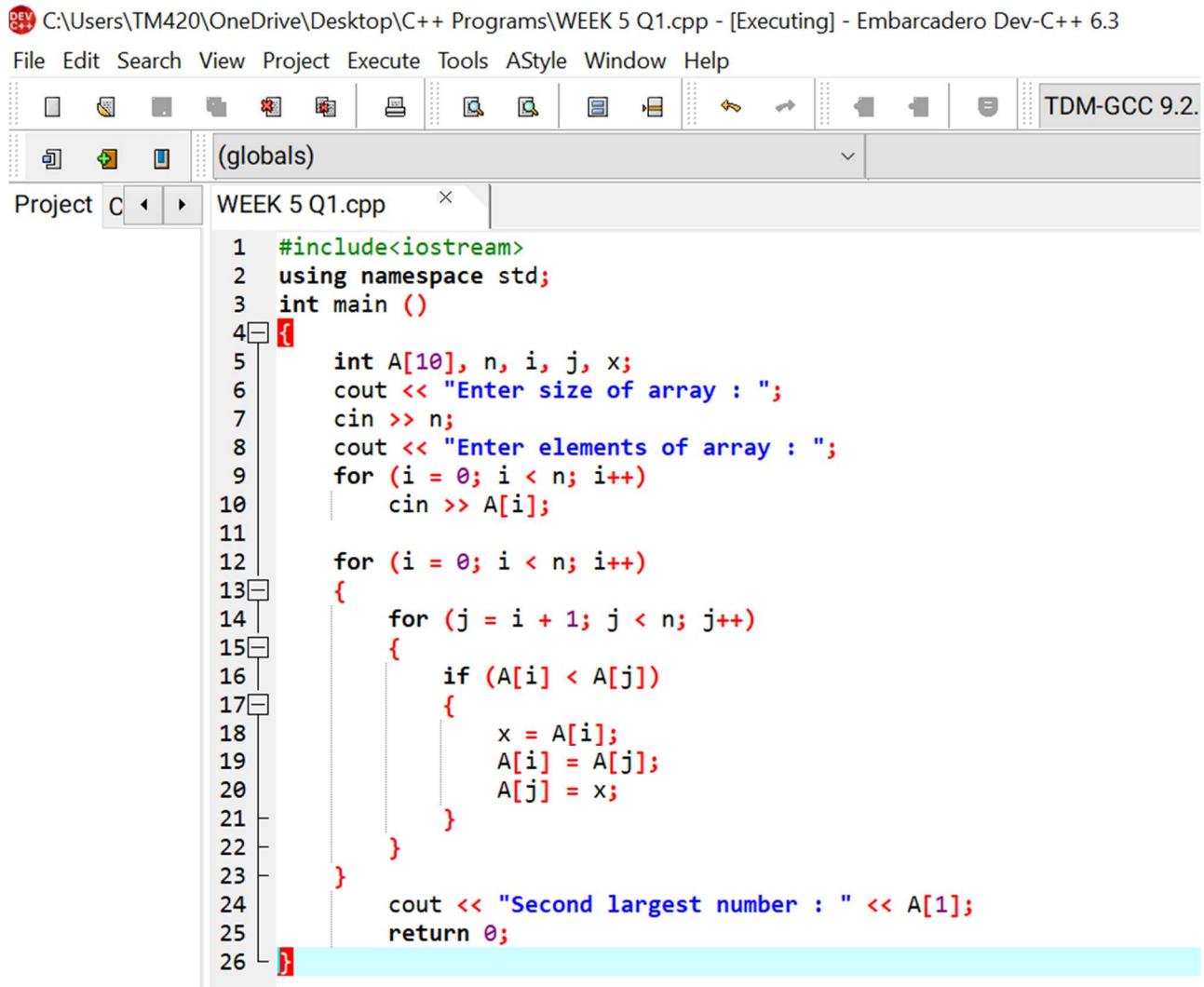
Process exited after 7.248 seconds with return value 0
Press any key to continue . . .
```

# WEEK 5

# WEEK 5

**#1** Write a C++ program to find the second largest integer in a list of integers.

This program will need the concept of arrays. The required code is given below:



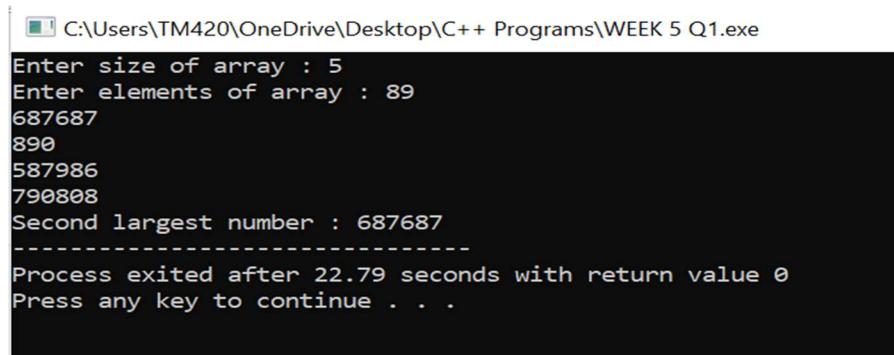
The screenshot shows the Dev-C++ IDE interface. The menu bar includes File, Edit, Search, View, Project, Execute, Tools, AStyle, Window, and Help. The toolbar has various icons for file operations. The title bar says "C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 5 Q1.cpp - [Executing] - Embarcadero Dev-C++ 6.3". The project tree on the left shows "Project C". The main code editor window contains the following C++ code:

```

1 #include<iostream>
2 using namespace std;
3 int main ()
4 {
5     int A[10], n, i, j, x;
6     cout << "Enter size of array : ";
7     cin >> n;
8     cout << "Enter elements of array : ";
9     for (i = 0; i < n; i++)
10        cin >> A[i];
11
12    for (i = 0; i < n; i++)
13    {
14        for (j = i + 1; j < n; j++)
15        {
16            if (A[i] < A[j])
17            {
18                x = A[i];
19                A[i] = A[j];
20                A[j] = x;
21            }
22        }
23    }
24    cout << "Second largest number : " << A[1];
25    return 0;
26 }

```

And this is the required result:



The terminal window shows the execution of the program. The user enters the size of the array as 5 and the elements as 89, 68, 76, 87, and 68. The program then prints the second largest number, which is 687687.

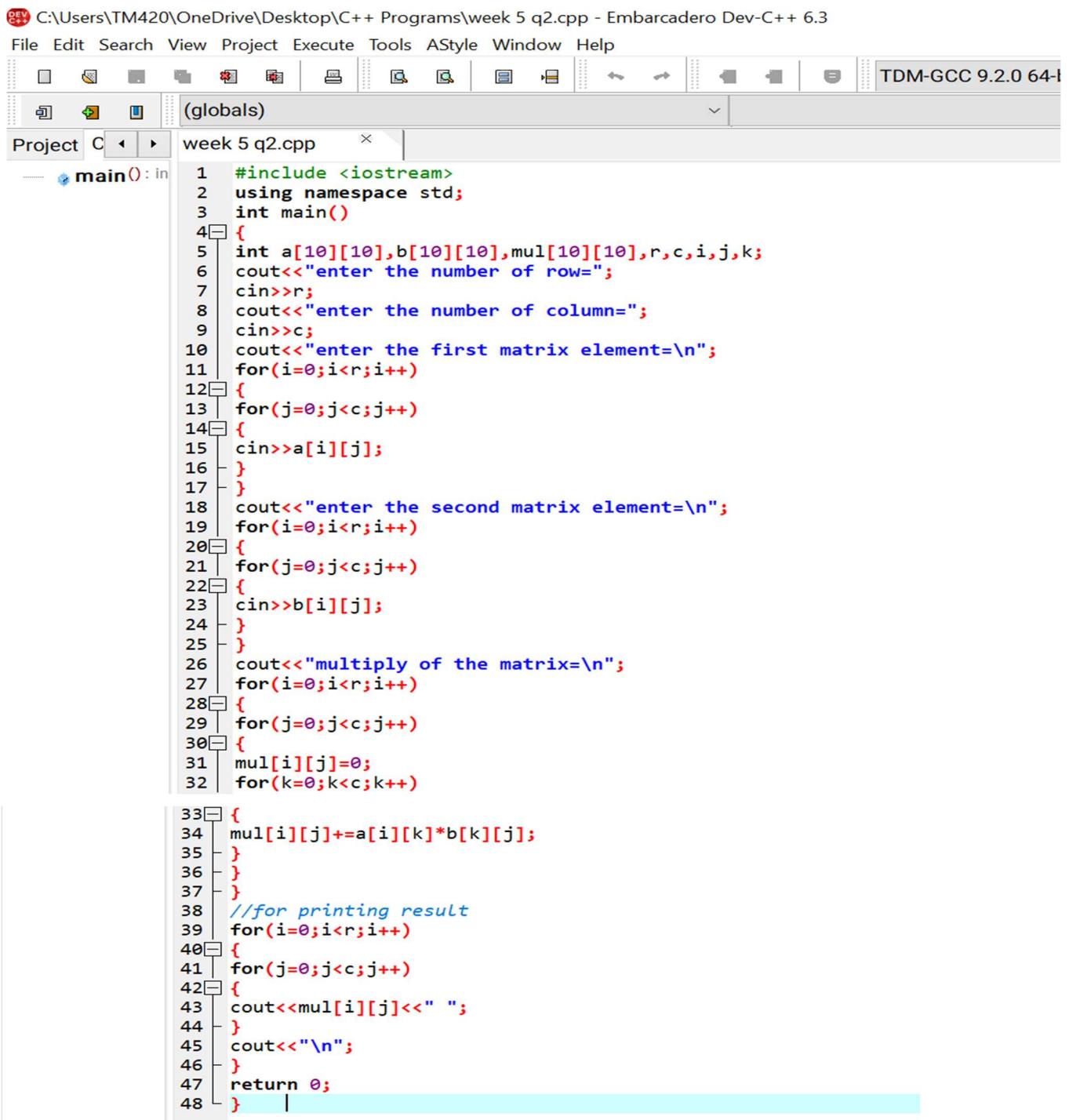
```

C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 5 Q1.exe
Enter size of array : 5
Enter elements of array : 89
687687
890
587986
790808
Second largest number : 687687
-----
Process exited after 22.79 seconds with return value 0
Press any key to continue . . .

```

## #2 Write a C++ program to perform the following the addition and multiplication of two matrices.

Once again we'll be using the concept of arrays to solve this problem. This is the required code for the multiplication of matrices:



The screenshot shows the Dev-C++ IDE interface with the following details:

- Title Bar:** C:\Users\TM420\OneDrive\Desktop\C++ Programs\week 5 q2.cpp - Embarcadero Dev-C++ 6.3
- Menu Bar:** File, Edit, Search, View, Project, Execute, Tools, AStyle, Window, Help
- Toolbar:** Standard Dev-C++ toolbar with icons for file operations.
- Project Explorer:** Shows a project named "week 5 q2.cpp" containing a main function.
- Code Editor:** Displays the C++ code for matrix multiplication. The code uses nested loops to input two 10x10 matrices (a and b) and calculate their product (mul). It includes comments for row and column counts and a section for printing the result.

```

1 #include <iostream>
2 using namespace std;
3 int main()
4 {
5     int a[10][10],b[10][10],mul[10][10],r,c,i,j,k;
6     cout<<"enter the number of row=";
7     cin>>r;
8     cout<<"enter the number of column=";
9     cin>>c;
10    cout<<"enter the first matrix element=\n";
11    for(i=0;i<r;i++)
12    {
13        for(j=0;j<c;j++)
14        {
15            cin>>a[i][j];
16        }
17    }
18    cout<<"enter the second matrix element=\n";
19    for(i=0;i<r;i++)
20    {
21        for(j=0;j<c;j++)
22        {
23            cin>>b[i][j];
24        }
25    }
26    cout<<"multiply of the matrix=\n";
27    for(i=0;i<r;i++)
28    {
29        for(j=0;j<c;j++)
30        {
31            mul[i][j]=0;
32            for(k=0;k<c;k++)
33            {
34                mul[i][j]+=a[i][k]*b[k][j];
35            }
36        }
37    }
38    //for printing result
39    for(i=0;i<r;i++)
40    {
41        for(j=0;j<c;j++)
42        {
43            cout<<mul[i][j]<<" ";
44        }
45        cout<<"\n";
46    }
47    return 0;
48 }

```

And this is its result:

```
C:\Users\TM420\OneDrive\Desktop\C++ Programs\week 5 q2.exe
enter the number of row=2
enter the number of column=2
enter the first matrix element=
12
15
10
23
enter the second matrix element=
31
9
8
7
multiply of the matrix=
492 213
494 251

-----
Process exited after 28.62 seconds with return value 0
Press any key to continue . . .
```

And the required code for the addition of two matrices is given on the next page :

C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 5 Q2 ADD.cpp - Embarcadero Dev-C++ 6.3

File Edit Search View Project Execute Tools AStyle Window Help

TDM-GCC 9.2.0 64-bit Release

(globals)

Project C WEEK 5 Q2 ADD.cpp

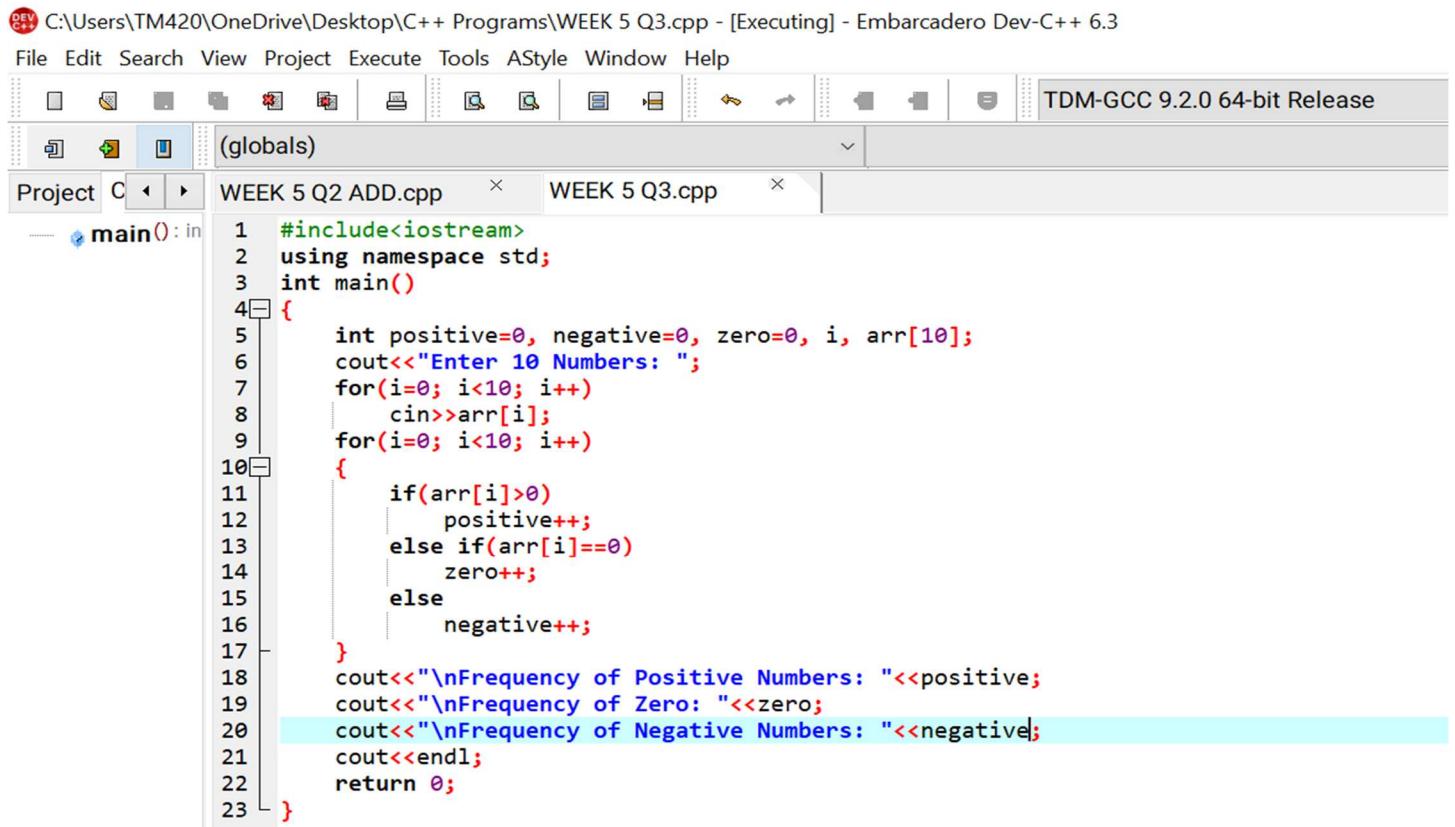
```
1 #include<iostream>
2 using namespace std;
3 int main()
4 {
5     int row, col, m1[10][10], m2[10][10], sum[10][10];
6     cout<<"Enter the number of rows(should be >1 and <10):\n ";
7     cin>>row;
8     cout<<"Enter the number of column(should be >1 and <10):\n ";
9     cin>>col;
10    cout << "Enter the elements of first 1st matrix:\n";
11    for (int i = 0;i<row;i++ ) {
12        for (int j = 0;j < col;j++ ) {
13            cin>>m1[i][j];
14        }
15    }
16    cout << "Enter the elements of first 1st matrix:\n";
17    for (int i = 0;i<row;i++ ) {
18        for (int j = 0;j < col;j++ ) {
19            cin>>m2[i][j];
20        }
21    }
22    cout<<"Output: \n";
23    for (int i = 0;i<row;i++ ) {
24        for (int j = 0;j < col;j++ ) {
25            sum[i][j]=m1[i][j]+m2[i][j];
26            cout<<sum[i][j]<< " ";
27        }
28    }
29    return 0;
30 }
```

And this is its required result:

```
C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 5 Q2 ADD.exe
Enter the number of rows(should be >1 and <10):
2
Enter the number of column(should be >1 and <10):
2
Enter the elements of first 1st matrix:
67
78
86
89
Enter the elements of first 1st matrix:
76
76
98
54
Output:
143 154 184 143
-----
Process exited after 21.66 seconds with return value 0
Press any key to continue . . .
```

### #3 Write a C++ program to count and display positive, negative, odd and even numbers in an array.

This is the required code for this question:



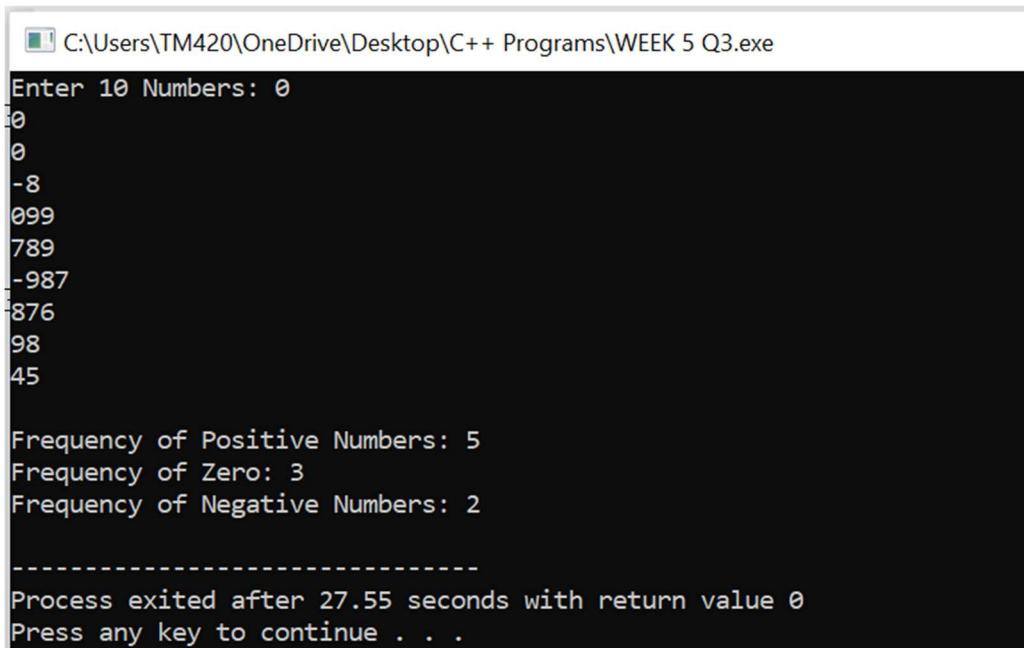
The screenshot shows the Dev-C++ IDE interface. The title bar reads "C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 5 Q3.cpp - [Executing] - Embarcadero Dev-C++ 6.3". The menu bar includes File, Edit, Search, View, Project, Execute, Tools, AStyle, Window, Help. The toolbar has various icons for file operations. The status bar at the bottom right says "TDM-GCC 9.2.0 64-bit Release". The project window shows two files: "WEEK 5 Q2 ADD.cpp" and "WEEK 5 Q3.cpp". The code editor displays the following C++ code:

```

1 #include<iostream>
2 using namespace std;
3 int main()
4 {
5     int positive=0, negative=0, zero=0, i, arr[10];
6     cout<<"Enter 10 Numbers: ";
7     for(i=0; i<10; i++)
8         cin>>arr[i];
9     for(i=0; i<10; i++)
10    {
11        if(arr[i]>0)
12            positive++;
13        else if(arr[i]==0)
14            zero++;
15        else
16            negative++;
17    }
18    cout<<"\nFrequency of Positive Numbers: "<<positive;
19    cout<<"\nFrequency of Zero: "<<zero;
20    cout<<"\nFrequency of Negative Numbers: "<<negative;
21    cout<<endl;
22    return 0;
23 }

```

And this is its result:



The terminal window shows the execution of the program. It prompts the user to enter 10 numbers. The user enters the following sequence: 0, 0, -8, 099, 789, -987, 876, 98, 45. The program then outputs the frequency of positive numbers (5), zero (3), and negative numbers (2). Finally, it exits with a return value of 0.

```

C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 5 Q3.exe
Enter 10 Numbers: 0
0
0
-8
099
789
-987
876
98
45

Frequency of Positive Numbers: 5
Frequency of Zero: 3
Frequency of Negative Numbers: 2

-----
Process exited after 27.55 seconds with return value 0
Press any key to continue . . .

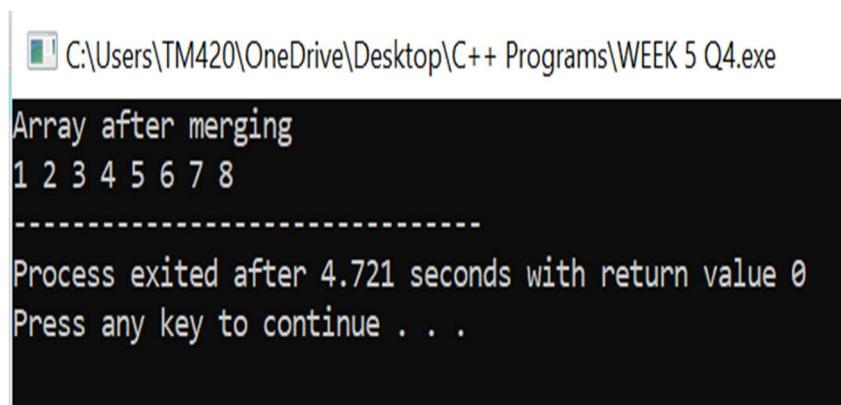
```

## #4 Write a C++ program to merge two sorted arrays into another array in sorted order.

This is the required code:

```
1 #include<iostream>
2 using namespace std;
3 void mergeArrays(int arr1[], int arr2[], int n1, int n2, int arr3[])
4 {
5     int i = 0, j = 0, k = 0;
6     while (i < n1 && j < n2)
7     {
8
9         if (arr1[i] < arr2[j])
10            arr3[k++] = arr1[i++];
11        else
12            arr3[k++] = arr2[j++];
13    }
14    while (i < n1)
15        arr3[k++] = arr1[i++];
16
17    while (j < n2)
18        arr3[k++] = arr2[j++];
19 }
20 int main()
21 {
22     int arr1[] = {1, 3, 5, 7};
23     int n1 = sizeof(arr1) / sizeof(arr1[0]);
24     int arr2[] = {2, 4, 6, 8};
25     int n2 = sizeof(arr2) / sizeof(arr2[0]);
26     int arr3[n1+n2];
27     mergeArrays(arr1, arr2, n1, n2, arr3);
28     cout << "Array after merging" << endl;
29     for (int i=0; i < n1+n2; i++)
30         cout << arr3[i] << " ";
31     return 0;
32 }
```

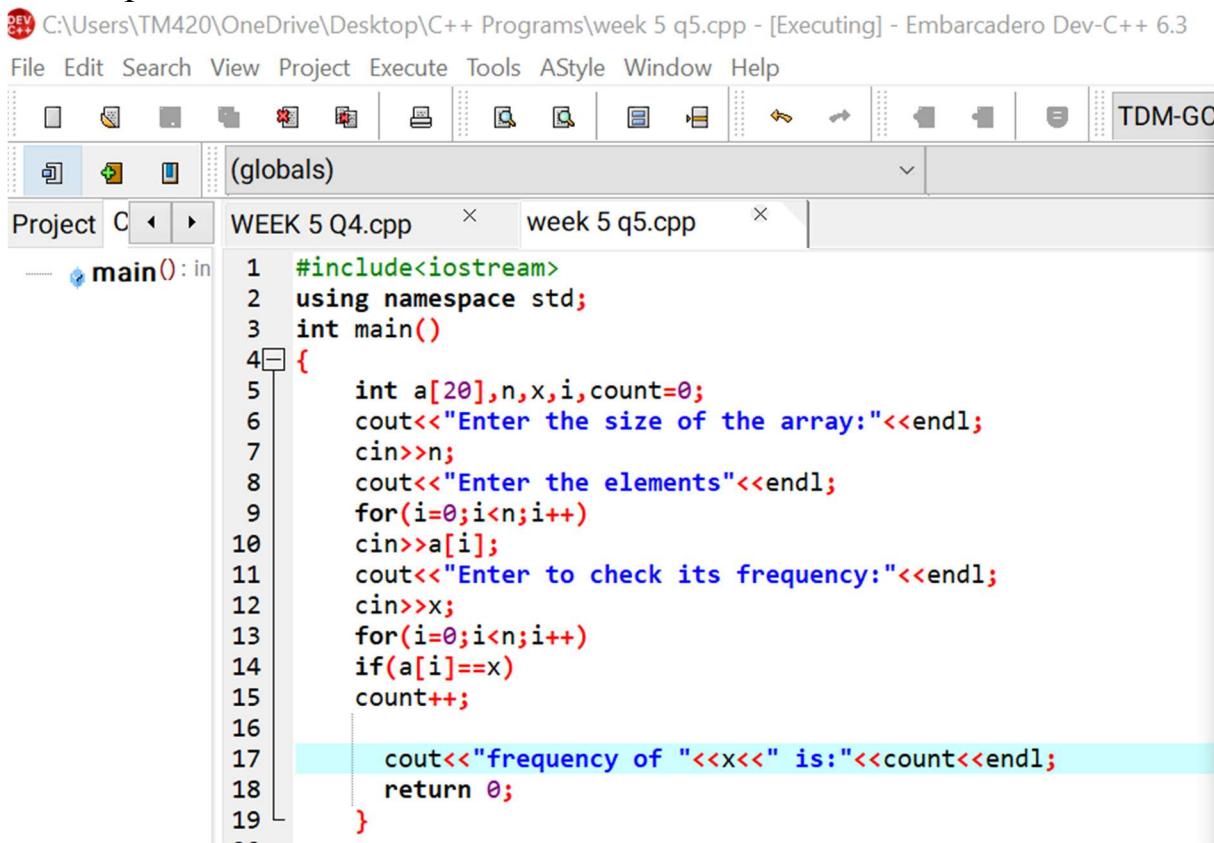
And this is its result:



```
C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 5 Q4.exe
Array after merging
1 2 3 4 5 6 7 8
-----
Process exited after 4.721 seconds with return value 0
Press any key to continue . . .
```

## #5 Write a C++ program to find the frequency of a particular number in a list of integers.

This is the required code:



```

C:\Users\TM420\OneDrive\Desktop\C++ Programs\week 5 q5.cpp - [Executing] - Embarcadero Dev-C++ 6.3

File Edit Search View Project Execute Tools AStyle Window Help
TDM-GC

(globals)

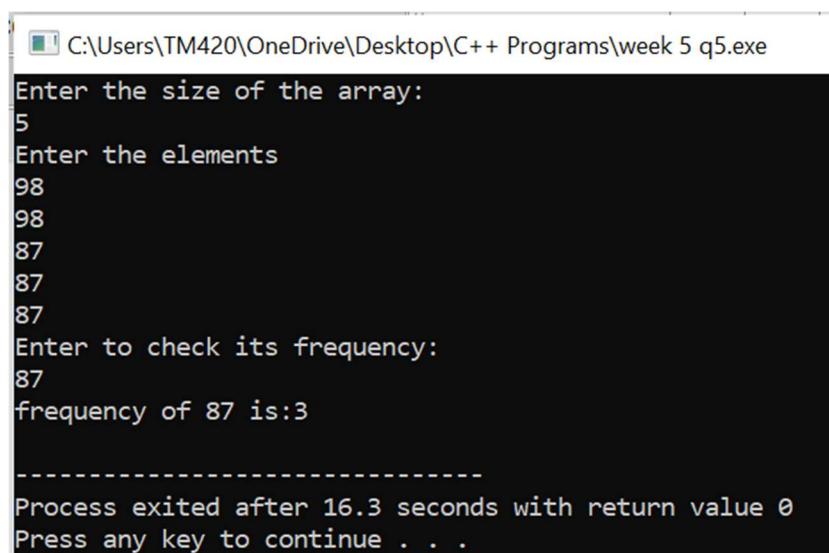
Project C WEEK 5 Q4.cpp week 5 q5.cpp

main() : in

1 #include<iostream>
2 using namespace std;
3 int main()
4 {
5     int a[20],n,x,i,count=0;
6     cout<<"Enter the size of the array:"<<endl;
7     cin>>n;
8     cout<<"Enter the elements"<<endl;
9     for(i=0;i<n;i++)
10    cin>>a[i];
11    cout<<"Enter to check its frequency:"<<endl;
12    cin>>x;
13    for(i=0;i<n;i++)
14    if(a[i]==x)
15        count++;
16
17    cout<<"frequency of "<<x<<" is:"<<count<<endl;
18    return 0;
19 }

```

And its result is:



```

C:\Users\TM420\OneDrive\Desktop\C++ Programs\week 5 q5.exe

Enter the size of the array:
5
Enter the elements
98
98
87
87
87
Enter to check its frequency:
87
frequency of 87 is:3

-----
Process exited after 16.3 seconds with return value 0
Press any key to continue . . .

```

# WEEK 6

# WEEK 6

#1 Write a C++ program to concatenate two strings using pointers.

This is the required code:

The screenshot shows the Embarcadero Dev-C++ IDE interface. The title bar reads "C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 6 Q1.cpp - [Executing] - Embarcadero Dev-C++". The menu bar includes File, Edit, Search, View, Project, Execute, Tools, AStyle, Window, and Help. The toolbar has various icons for file operations. The left sidebar shows a project tree with "Project C" and "main() in WEEK 6 Q1.cpp". The main editor window displays the following C++ code:

```
1 #include<iostream>
2 using namespace std;
3 int main()
4 {
5     char a[100],b[100],*p,*q;
6     cout<<"Enter the first string: "<<endl;
7     gets(a);
8     cout<<"Enter the second string: "<<endl;
9     gets(b);
10    p=a,q=b;
11    while(*p!='\0')
12    {
13        *p=*q;
14        p++;
15        q++;
16    }
17    cout<<"New string is:"<<a;
18 }
19
20 }
```

And this is its result:

The screenshot shows a terminal window with the following text:

```
C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 6 Q1.exe
Enter the first string:
BILAL
Enter the second string:
AHMAD
New string is:BILALAHMAD
-----
Process exited after 5.863 seconds with return value 0
Press any key to continue . . .
```

**#2 Write a program for reading elements using a pointer into an array and display the values using an array.**

i. Declare a set of elements.

ii. Declare pointer and initialize it to first element address of a set of elements (array).

iii. Repeat loop until the pointer reaches to last element and display each element.

This is the required code:

```
((): in 1 #include<iostream>
2 using namespace std;
3 int main()
4 {
5     int a[20],n,*p,i;
6     cout<<"Enter the size of the array: "<<endl;
7     cin>>n;
8     cout<<"Enter the element of array:"<<endl;
9     p=a;
10    for(i=0;i<n;i++)
11    {
12        cin>>*p;
13        p++;
14    }
15    cout<<"Display array using pointer: "<<endl;
16    p=a;
17    for(i=0;i<n;i++)
18        cout<<a[i]<< " ";
19
20 }
```

And this is its result:

```
C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 6 Q2.exe
Enter the size of the array:
5
Enter the element of array:
23
37467843
-9739
6392
647852
Display array using pointer:
23 37467843 -9739 6392 647852
-----
Process exited after 21 seconds with return value 0
Press any key to continue . . .
```

### #3 Write a program through pointer variable to sum of n elements from array.

This is the required code:

The screenshot shows the Dev-C++ IDE interface. The title bar reads "C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 6 Q3.cpp - [Executing] - Embarcadero Dev-C++ 6.3". The menu bar includes File, Edit, Search, View, Project, Execute, Tools, AStyle, Window, and Help. The toolbar has various icons for file operations. The status bar on the right says "TDM-GCC 9.2.". The main window shows a project named "WEEK 6 Q3.cpp" with a single file "main()". The code is as follows:

```
1 #include<iostream>
2 using namespace std;
3 int main()
4 {
5     int n,sum=0;
6     cout<<"Enter the size of the array"<<endl;
7     cin>>n;
8     cout<<"Enter the "<<n<<" elements of the array:"<<endl;
9     int*p=new int[n];
10    for(int i=0;i<n;i++)
11    {
12        cin>>*p;
13        p++;
14    }
15
16
17    for(int i=0;i<n;i++)
18    p--;
19    for(int i=0;i<n;i++)
20    {
21        sum+=*p;
22        p++;
23    }
24    cout<<"sum of given array is :"<<sum<<endl;
25
26 }
```

And this is its result:

The terminal window shows the execution of the program. It prompts for the size of the array (3), then asks for 3 elements (656, 8679, 9807), and finally displays the sum (19142).

```
C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 6 Q3.exe
Enter the size of the array
3
Enter the 3 elements of the array:
656
8679
9807
sum of given array is :19142

-----
Process exited after 23.94 seconds with return value 0
Press any key to continue . . .
```

## #4 Write a program for reading elements using pointer into array and display the values using array.

This is the required code:

The screenshot shows the Dev-C++ IDE interface. The menu bar includes File, Edit, Search, View, Project, Execute, Tools, AStyle, Window, and Help. The toolbar has various icons for file operations like Open, Save, Print, and Find. The project tree on the left shows a single file named WEEK 6 Q4.cpp under a C project. The code editor window displays the following C++ code:

```
1 #include<iostream>
2 using namespace std;
3 int main()
4 {
5     int a[20],n,*p,i;
6     cout<<"Enter the size of the array: "<<endl;
7     cin>>n;
8     cout<<"Enter the element of array:"<<endl;
9     p=a;
10    for(i=0;i<n;i++)
11    {
12        cin>>*p;
13        p++;
14    }
15    cout<<"Display array using pointer: "<<endl;
16    p=a;
17    for(i=0;i<n;i++)
18        cout<<a[i]<<" ";
19
20 }
```

And this is its result:

The terminal window shows the execution of the program. It prompts for the size of the array (5), then asks for the elements (42, 4242, 543, 5435, 133). It then displays the array using a pointer, showing the output 42 4242 543 5435 133. Finally, it exits after 10.64 seconds with a return value of 0.

```
Enter the size of the array:
5
Enter the element of array:
42
4242
543
5435
133
Display array using pointer:
42 4242 543 5435 133
-----
Process exited after 10.64 seconds with return value 0
Press any key to continue . . .
```

## #5 Write a C++ program to reverse a string using pointers.

This is the required code:

The screenshot shows the Embarcadero IDE interface. The menu bar includes File, Edit, Search, View, Project, Execute, Tools, AStyle, Window, and Help. The toolbar has various icons for file operations like Open, Save, Print, and Find. The global variables window shows '(globals)'. The project list shows 'WEEK 6 Q5.cpp'. The code editor displays the following C++ code:

```
1 #include<iostream>
2 #include<string.h>
3 using namespace std;
4 int main()
5 {
6     char *str="BILAL AHMAD";
7     cout<<"original string::"<<str;
8     cout<<endl<<"String after reverse::";
9     for(int i=(strlen(str)-1);i>=0;i--){
10         cout<<str[i];
11     }
12 }
13 }
```

And this is its result:

The terminal window shows the execution of the program 'WEEK 6 Q5.exe'. The output is:

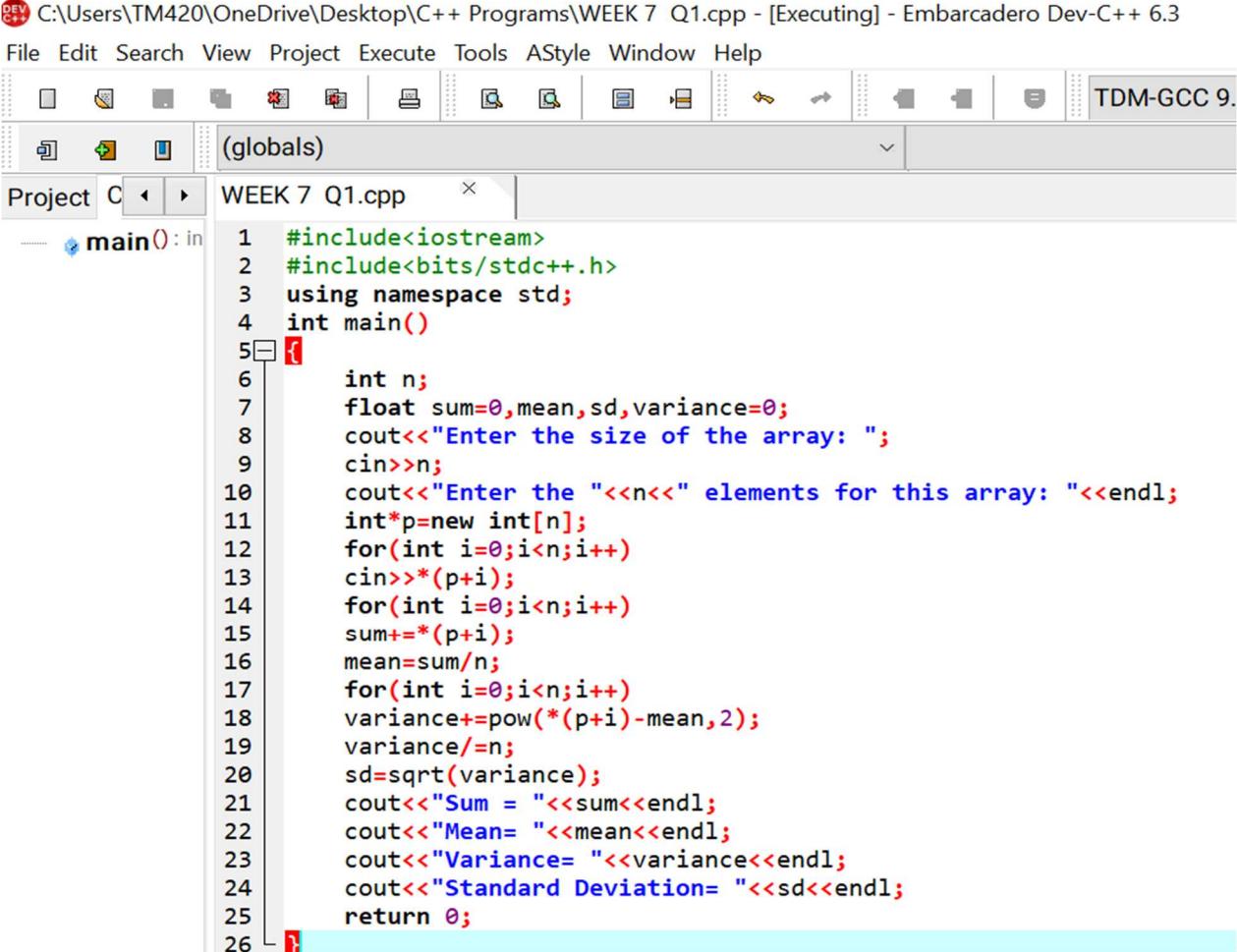
```
C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 6 Q5.exe
original string::BILAL AHMAD
String after reverse::DAMHA LALIB
-----
Process exited after 0.6865 seconds with return value 0
Press any key to continue . . .
```

# WEEK 7

# WEEK 7

**#1** Write a C++ program using pointers to compute the sum, mean and standard deviation of all elements stored in an array of n real numbers.

This is the required code for this question:



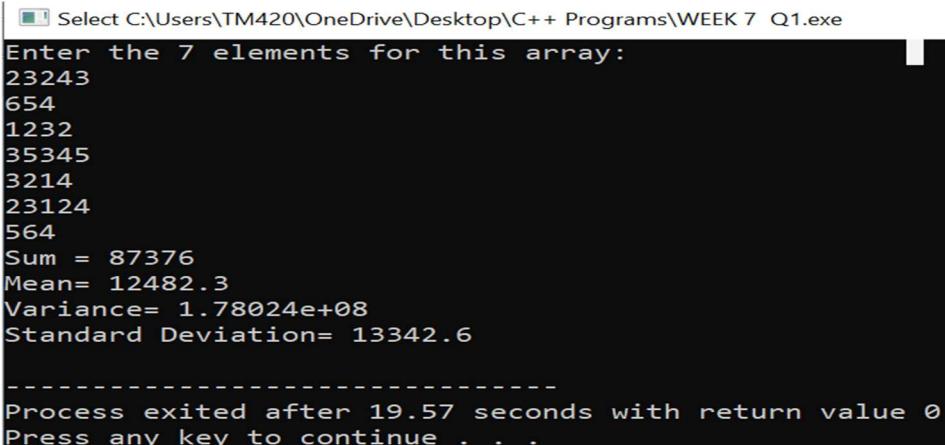
The screenshot shows the Dev-C++ IDE interface. The title bar reads "C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 7 Q1.cpp - [Executing] - Embarcadero Dev-C++ 6.3". The menu bar includes File, Edit, Search, View, Project, Execute, Tools, AStyle, Window, and Help. Below the menu is a toolbar with various icons. The main window shows a project named "WEEK 7 Q1.cpp" with a single file "main()". The code editor contains the following C++ code:

```

1 #include<iostream>
2 #include<bits/stdc++.h>
3 using namespace std;
4 int main()
5 {
6     int n;
7     float sum=0,mean,sd,variance=0;
8     cout<<"Enter the size of the array: ";
9     cin>>n;
10    cout<<"Enter the "<<n<<" elements for this array: "<<endl;
11    int*p=new int[n];
12    for(int i=0;i<n;i++)
13        cin>>*(p+i);
14    for(int i=0;i<n;i++)
15        sum+=*(p+i);
16    mean=sum/n;
17    for(int i=0;i<n;i++)
18        variance+=pow(*(p+i)-mean,2);
19    variance/=n;
20    sd=sqrt(variance);
21    cout<<"Sum = "<<sum<<endl;
22    cout<<"Mean= "<<mean<<endl;
23    cout<<"Variance= "<<variance<<endl;
24    cout<<"Standard Deviation= "<<sd<<endl;
25    return 0;
26 }

```

And this is its result:



The terminal window displays the output of the program. It asks for the size of the array (7) and then prompts for 7 elements. The elements entered are 23243, 654, 1232, 35345, 3214, 23124, and 564. The program then calculates and prints the Sum (87376), Mean (12482.3), Variance (1.78024e+08), and Standard Deviation (13342.6). Finally, it exits with a return value of 0.

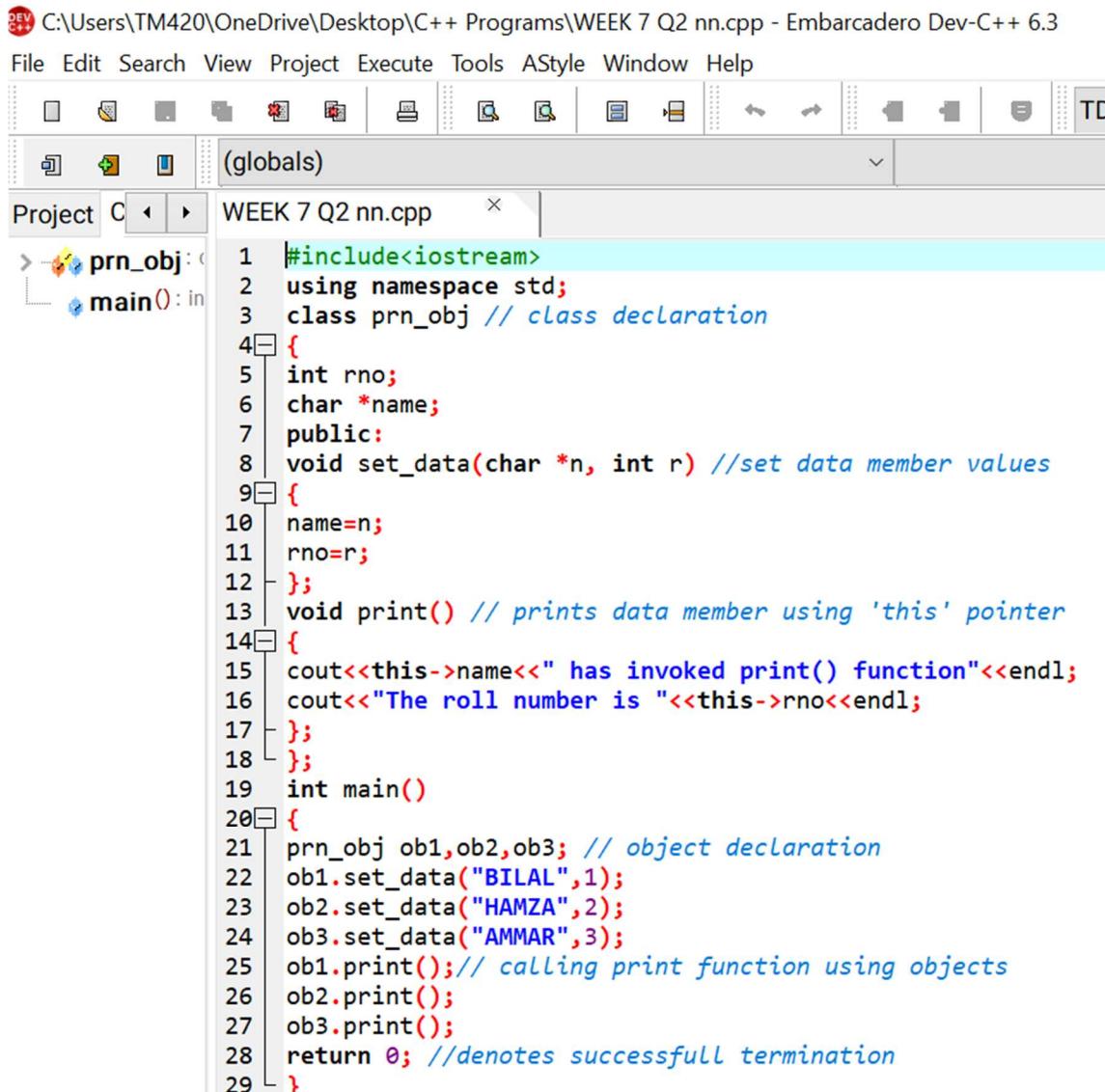
```

Select C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 7 Q1.exe
Enter the 7 elements for this array:
23243
654
1232
35345
3214
23124
564
Sum = 87376
Mean= 12482.3
Variance= 1.78024e+08
Standard Deviation= 13342.6
-----
Process exited after 19.57 seconds with return value 0
Press any key to continue . . .

```

**#2** Write a C++ program to create three objects for a class named pntr\_obj with data members such as roll\_no & name. Create a member function set\_data() for setting the data values and print() member function to print which object has invoked it using ‘this’ pointer.

This is its required code:



```

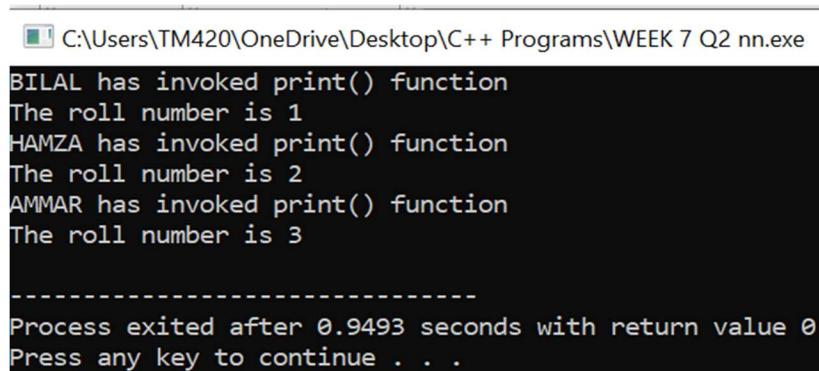
C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 7 Q2 nn.cpp - Embarcadero Dev-C++ 6.3

File Edit Search View Project Execute Tools AStyle Window Help
Project C WEEK 7 Q2 nn.cpp ×
prn_obj.h
main() in

1 #include<iostream>
2 using namespace std;
3 class prn_obj // class declaration
4 {
5     int rno;
6     char *name;
7     public:
8     void set_data(char *n, int r) //set data member values
9     {
10         name=n;
11         rno=r;
12     };
13     void print() // prints data member using 'this' pointer
14     {
15         cout<<this->name<<" has invoked print() function" << endl;
16         cout<<"The roll number is "<<this->rno<< endl;
17     };
18 };
19 int main()
20 {
21     prn_obj ob1,ob2,ob3; // object declaration
22     ob1.set_data("BILAL",1);
23     ob2.set_data("HAMZA",2);
24     ob3.set_data("AMMAR",3);
25     ob1.print(); // calling print function using objects
26     ob2.print();
27     ob3.print();
28     return 0; //denotes successfull termination
29 }

```

And this is its result:



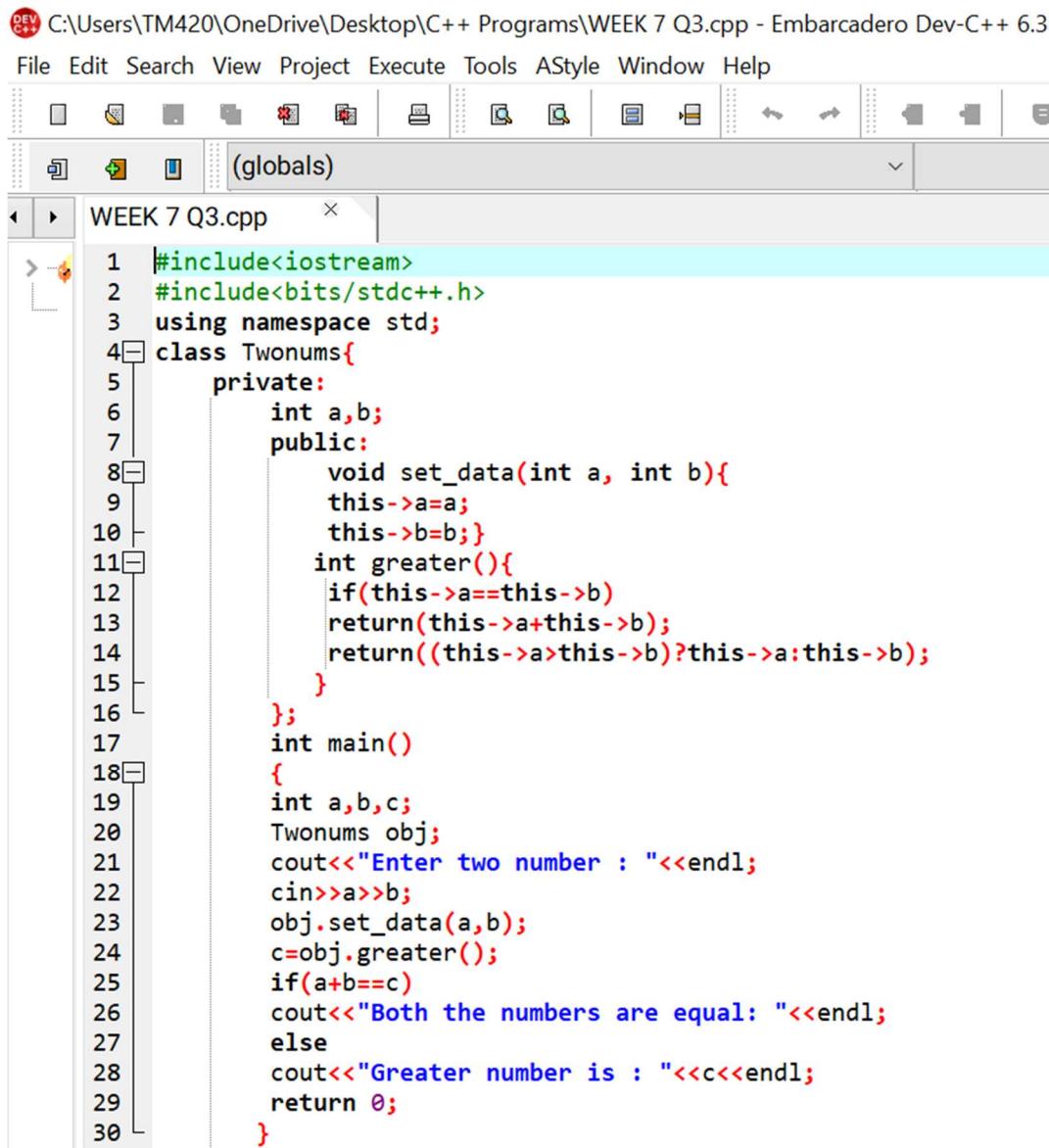
```

C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 7 Q2 nn.exe
BILAL has invoked print() function
The roll number is 1
HAMZA has invoked print() function
The roll number is 2
AMMAR has invoked print() function
The roll number is 3
-----
Process exited after 0.9493 seconds with return value 0
Press any key to continue . . .

```

### #3 Develop a C++ program to find the greatest of two numbers using this pointer which returns the member variable.

This is the required code:

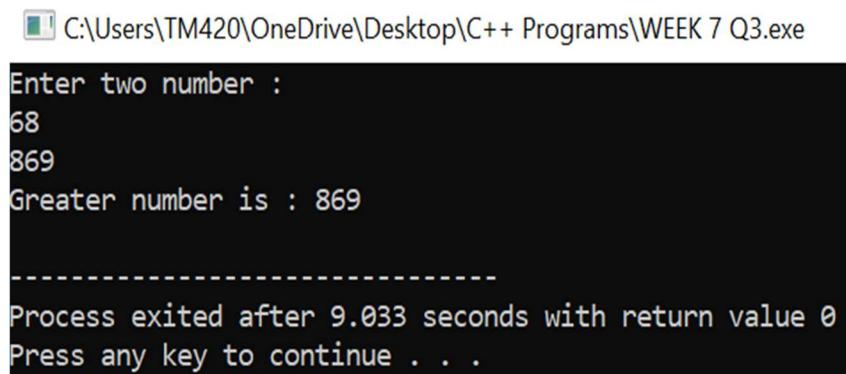


```

DEV C++ C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 7 Q3.cpp - Embarcadero Dev-C++ 6.3
File Edit Search View Project Execute Tools AStyle Window Help
(globals)
WEEK 7 Q3.cpp x
1 #include<iostream>
2 #include<bits/stdc++.h>
3 using namespace std;
4 class Twonums{
5     private:
6         int a,b;
7     public:
8         void set_data(int a, int b){
9             this->a=a;
10            this->b=b;}
11         int greater(){
12             if(this->a==this->b)
13                 return(this->a+this->b);
14             return((this->a>this->b)?this->a:this->b);
15         }
16     };
17     int main()
18     {
19         int a,b,c;
20         Twonums obj;
21         cout<<"Enter two number : "<<endl;
22         cin>>a>>b;
23         obj.set_data(a,b);
24         c=obj.greater();
25         if(a+b==c)
26             cout<<"Both the numbers are equal: "<<endl;
27         else
28             cout<<"Greater number is : "<<c<<endl;
29         return 0;
30     }

```

And this is its result:



```

C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 7 Q3.exe
Enter two number :
68
869
Greater number is : 869

-----
Process exited after 9.033 seconds with return value 0
Press any key to continue . . .

```

**#4 Write a C++ program to implement flight class with data member as flight\_no., source destination and fare. Write a member function to display the flight information using this pointer.**

The required code is given below:

C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 7 Q4.cpp - Embarcadero Dev-C++ 6.3

File Edit Search View Project Execute Tools AStyle Window Help

TDM-GCC 9.2.0 64-bit Rel

(globals)

WEEK 7 Q4.cpp

```

1 #include<bits/stdc++.h>
2 using namespace std;
3 class Flight{
4     private:
5         int flight_no;
6         float fare;
7         string source,destination;
8     public:
9         void set_data(int flight_no,string source , string destination,float fare)
10        {
11            this->flight_no=flight_no;
12            this->source=source;
13            this->destination=destination;
14            this->fare=fare;
15
16        }
17        void print_info(){
18
19            cout<<"Flight no: "<<this->flight_no<<endl;
20            cout<<"From: "<<this->destination<<endl;
21            cout<<"Fare: "<<this->fare<<endl;
22        }
23    int main(){
24        Flight f1,f2;
25        f1.set_data(12345,"Delhi","Mumbai",3500);
26        f2.set_data(6789,"Mumbai","New York",8800);
27        f1.print_info();
28        cout<<endl;
29        f2.print_info();
30        return 0;
31    }

```

And this its result:

C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 7 Q4.exe

```

Flight no: 12345
From: Mumbai
Fare: 3500

Flight no: 6789
From: New York
Fare: 8800

-----
Process exited after 0.9608 seconds with return value 0
Press any key to continue . . .

```

## #5 Write a C++ program to use *this* pointer and return pointer reference.

This is the required code:

C:\Users\TM420\OneDrive\Desktop\C++ Programs\week 7 q5.cpp - Embarcadero Dev-C++ 6.3

File Edit Search View Project Execute Tools AStyle Window Help

TDM-GCC 9.2.0 64-bit Release

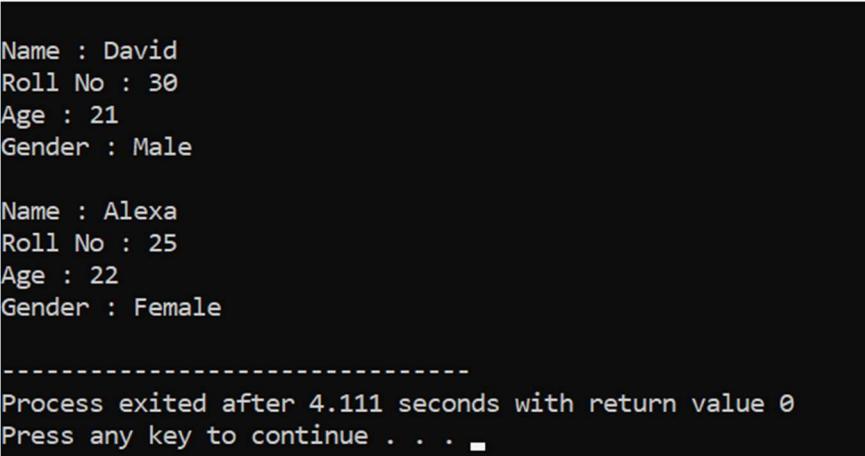
(globals)

week 7 q5.cpp

```

1 #include <bits/stdc++.h>
2 using namespace std;
3 class Student {
4 private:
5     int roll_no, age, gender;
6     string name;
7 public:
8     Student &setName(string name)
9     {
10         this->name=name;
11         return *this;
12     }
13     Student &setRollNo(int roll_no)
14     {
15         this->roll_no = roll_no;
16         return *this;
17     }
18     Student &setAge(int age)
19     {
20         this->age = age;
21         return *this;
22     }
23     Student &setGender(int gender)
24     {
25         this->gender = gender;
26         return *this;
27     }
28     Student &print_info()
29     {
30         cout << "\nName : " << this->name;
31         cout << "\nRoll No : " << this->roll_no;
32         cout << "\nAge : " << this->age;
33         cout << "\nGender : " << ((this->gender == 0) ? "Male" : "Female") << endl;
34     }
35 }
36 };
37 int main()
38 {
39     Student s1, s2;
40     // Each member function is returning the same object reference
41     s1.setName("David").setRollNo(30).setAge(21).setGender(0);
42     s1.print_info();
43     s2.setName("Alexa").setRollNo(25).setAge(22).setGender(1);
44     s2.print_info();
45     return 0;
46 }
```

And this is its result:



```
C:\Users\TM420\OneDrive\Desktop\C++ Programs\week 7 q5.exe

Name : David
Roll No : 30
Age : 21
Gender : Male

Name : Alexa
Roll No : 25
Age : 22
Gender : Female

-----
Process exited after 4.111 seconds with return value 0
Press any key to continue . . .
```

# WEEK 8

# WEEK 8

**#1 Write a C++ program that uses functions to perform the following operations:**

- i. To insert a sub string into a given main string from a given position.
- ii. To delete n characters from a given position in a given string.

This is the required code:

```

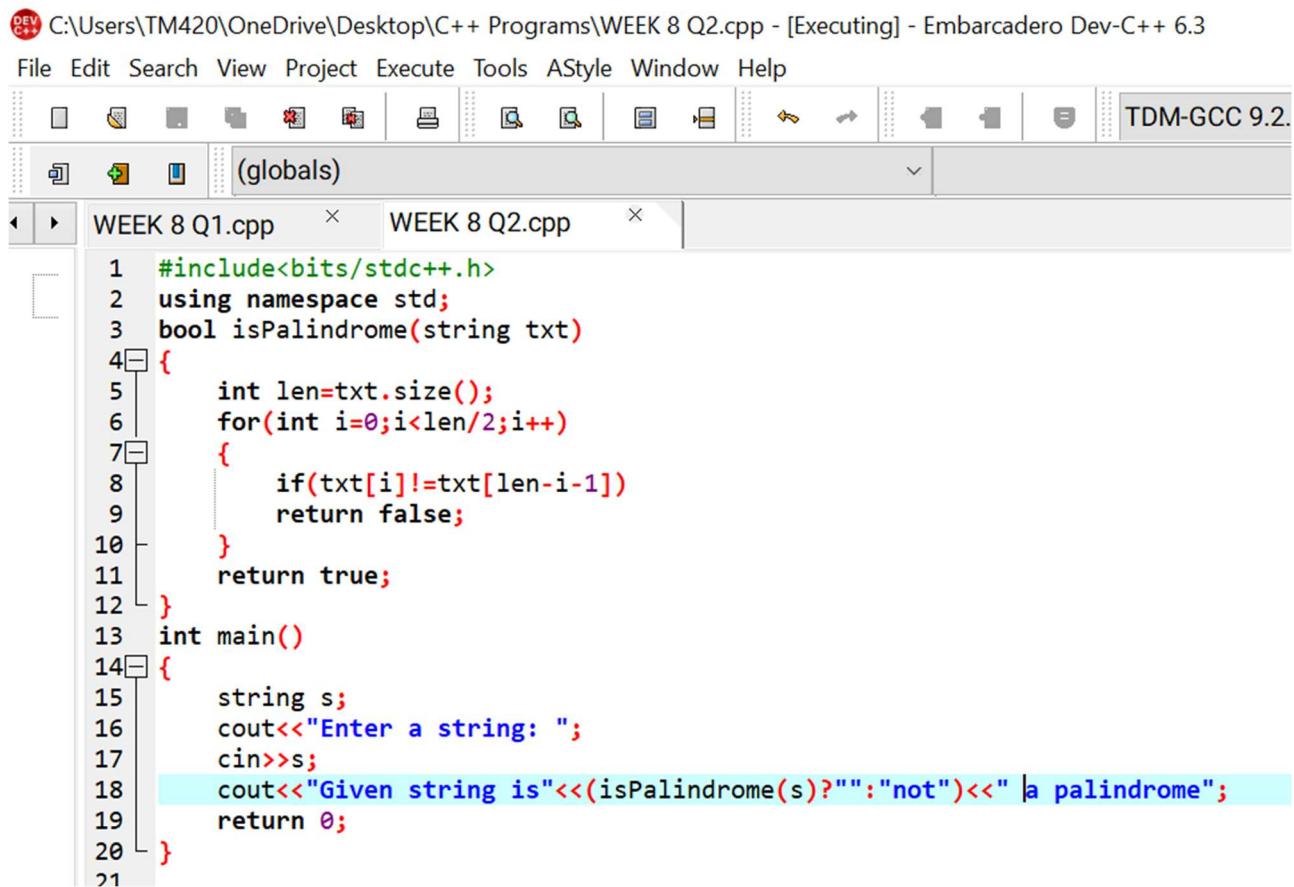
1 #include<bits/stdc++.h>
2 using namespace std;
3 string insertStringAt(string toString, string strToInsert, int atIndex)
4 {
5     if(atIndex<0)
6         return strToInsert + toString;
7     else if(atIndex<=toString.size())
8         return toString.insert(atIndex,strToInsert);
9     return toString+strToInsert;
10 }
11 string removeCharacterAt(string fromString, int fromIndex, int charCount)
12 {
13     if(fromIndex<0||fromIndex>fromString.size()){
14
15         cout<<"Index cannot be negative";
16         return NULL;
17     }
18     return fromString.erase(fromIndex,charCount);
19 }
20 int main(){
21     string os,ss,ans;
22     int i,c;
23     cout<<"Original String: ";
24     cin>>os;
25     cout<<"Sub-string to insert: ";
26     cin>>ss;
27     cout<<"At position: ";
28     cin>>i;
29     ans=insertStringAt(os,ss,i);
30     cout<<"After inserting sub-string:"<<ans;
31     cout<<"\nEnter the number of character to remove from new string:";
32     cin>>c;
33     cout<<"Index from where to remove character: ";
34     cin>>i;
35     cout<<"After removing character:"<<removeCharacterAt(ans,i,c);
36 }
```

And this is its result:

```
C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 8 Q1.exe
Original String: Bilal
Sub-string to insert: AHMAD
At position:5
After inserting sub-string:BilalAHMAD
Enter the number of character to remove from new string:5
Index from where to remove character: 3
After removing character:BILAD
-----
Process exited after 39.66 seconds with return value 0
Press any key to continue . . .
```

## #2 Write a C++ program to determine if the given string is a palindrome or not.

This is the required code:



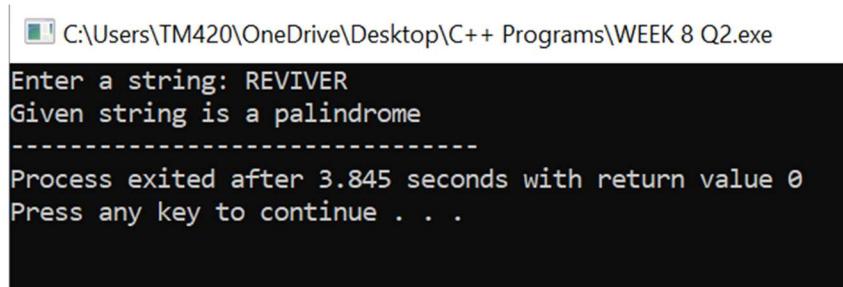
The screenshot shows the Dev-C++ IDE interface. The title bar reads "C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 8 Q2.cpp - [Executing] - Embarcadero Dev-C++ 6.3". The menu bar includes File, Edit, Search, View, Project, Execute, Tools, AStyle, Window, and Help. The toolbar has various icons for file operations. The status bar on the right says "TDM-GCC 9.2.". Below the menu is a toolbar with icons for file operations. The main window shows two tabs: "WEEK 8 Q1.cpp" and "WEEK 8 Q2.cpp". The code editor contains the following C++ code:

```

1 #include<bits/stdc++.h>
2 using namespace std;
3 bool isPalindrome(string txt)
4 {
5     int len=txt.size();
6     for(int i=0;i<len/2;i++)
7     {
8         if(txt[i]!=txt[len-i-1])
9             return false;
10    }
11    return true;
12 }
13 int main()
14 {
15     string s;
16     cout<<"Enter a string: ";
17     cin>>s;
18     cout<<"Given string is "<<(isPalindrome(s))?"":"not"<<" | a palindrome";
19     return 0;
20 }
21

```

And this is its result:

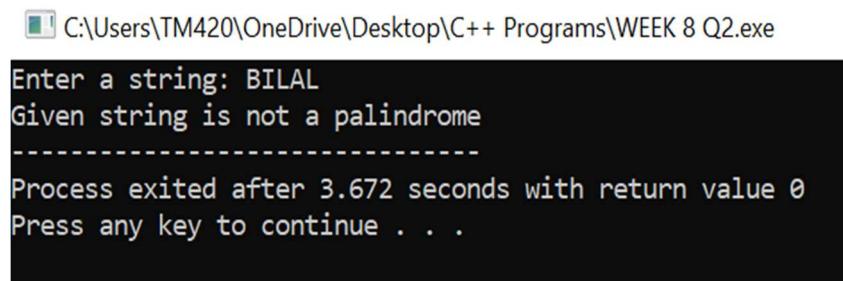


The terminal window shows the execution of the program. It prompts the user to enter a string, which is "REVIVER". The output indicates that the string is a palindrome. The process exits after 3.845 seconds with a return value of 0.

```

C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 8 Q2.exe
Enter a string: REVIVER
Given string is a palindrome
-----
Process exited after 3.845 seconds with return value 0
Press any key to continue . . .

```



The terminal window shows the execution of the program. It prompts the user to enter a string, which is "BILAL". The output indicates that the string is not a palindrome. The process exits after 3.672 seconds with a return value of 0.

```

C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 8 Q2.exe
Enter a string: BILAL
Given string is not a palindrome
-----
Process exited after 3.672 seconds with return value 0
Press any key to continue . . .

```

### #3 Write a C++ program to find a string within a sentence and replace it with another string.

This is the required code:

The screenshot shows the Dev-C++ IDE interface. The menu bar includes File, Edit, Search, View, Project, Execute, Tools, AStyle, Window, and Help. The toolbar has various icons for file operations. The status bar at the top indicates the path: C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 8 Q3.cpp - [Executing] - Embarcadero Dev-C++ 6.3. The status bar also shows "TDM-GCC 9.". Below the menu is a toolbar with icons for file operations. The main window displays three tabs: WEEK 8 Q1.cpp, WEEK 8 Q2.cpp, and WEEK 8 Q3.cpp. The code editor contains the following C++ code:

```
1 #include<bits/stdc++.h>
2 using namespace std;
3 string replaceAll(string sentence, string word, string width)
4 {
5     while(sentence.find(word)!=string::npos)
6         sentence.replace(sentence.find(word),word.length(),width);
7     return sentence;
8 }
9 int main()
10 {
11     char sen[100], word[32], with[32];
12     cout<<"Write a sentence : ";
13     gets(sen);
14     cout<<"Write a word to be replaced : ";
15     gets(word);
16     cout<<"Write a word to replace with: ";
17     gets(with);
18     cout<<"\n New sentence after replacing a word is\n";
19     cout<<replaceAll(sen,word,with);
20 }
```

And this is its result:

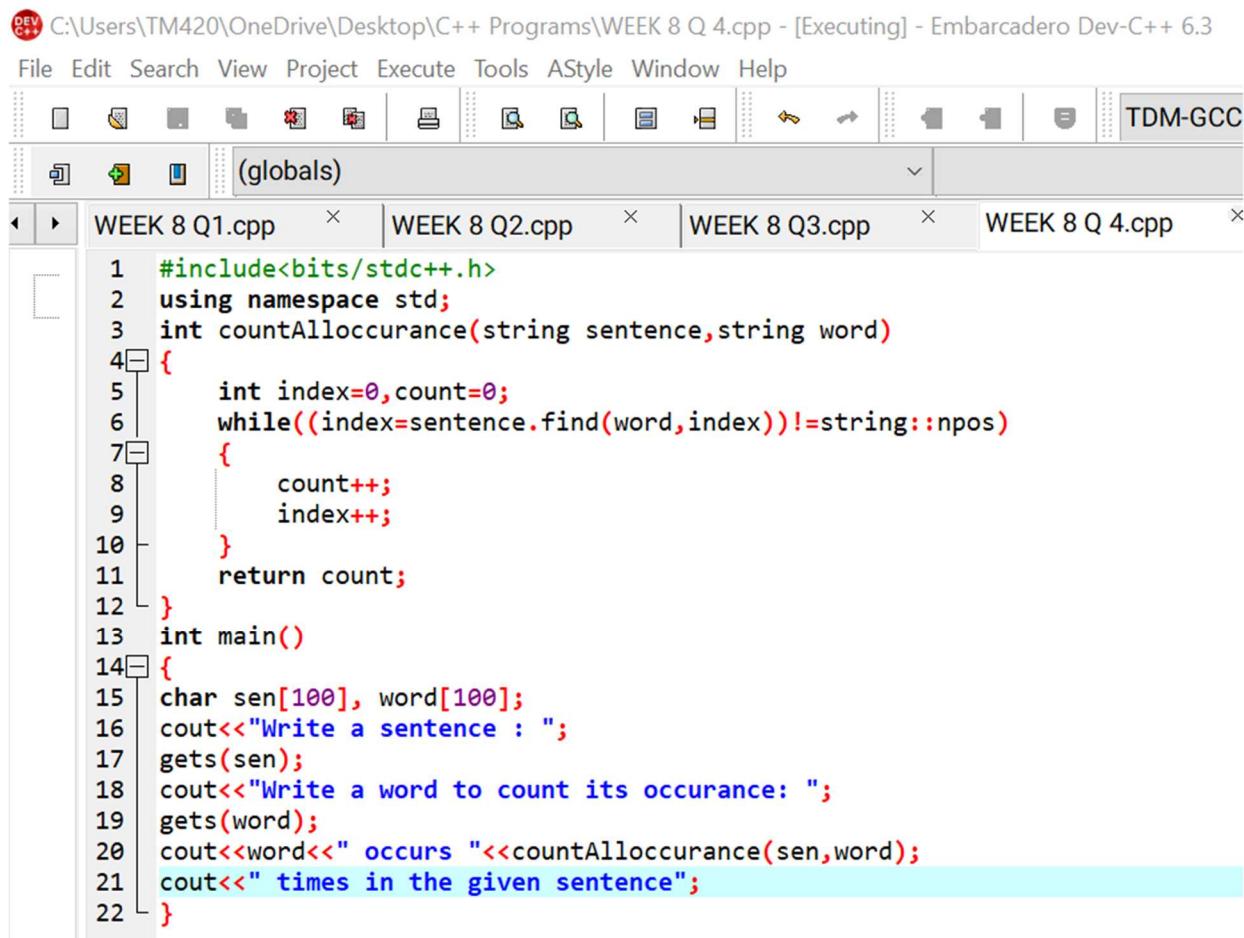
The screenshot shows a terminal window with the title bar "C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 8 Q3.exe". The window displays the following text:

```
Write a sentence : HOW TO ADD TWO NUMBERS
Write a word to be replaced :ADD
Write a word to replace with:SUBTRACT

New sentence after replacing a word is
HOW TO SUBTRACT TWO NUMBERS
-----
Process exited after 48.03 seconds with return value 0
Press any key to continue . . .
```

#### #4 Write a C++ program that reads a line of text and counts all occurrence of a particular word.

This is the required code:



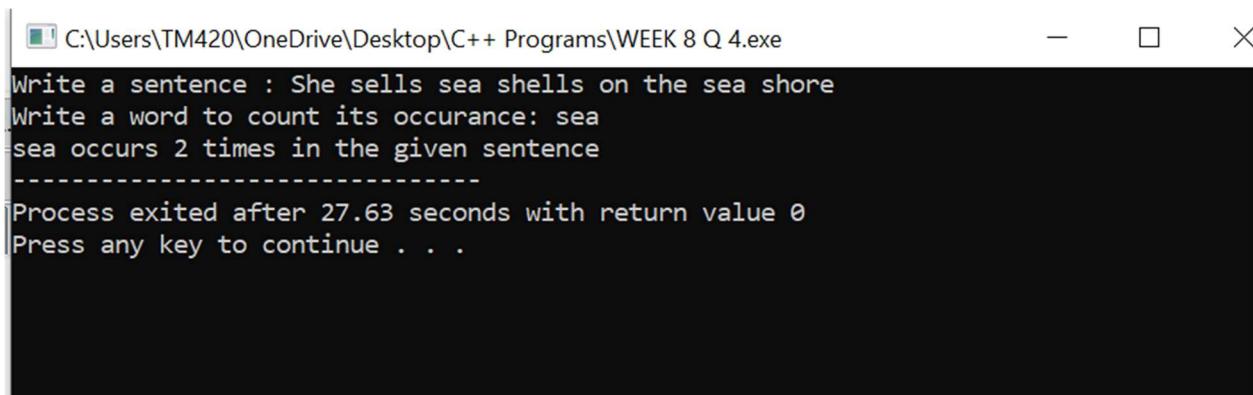
The screenshot shows the Dev-C++ IDE interface. The title bar reads "C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 8 Q 4.cpp - [Executing] - Embarcadero Dev-C++ 6.3". The menu bar includes File, Edit, Search, View, Project, Execute, Tools, AStyle, Window, and Help. The toolbar has various icons for file operations. The project manager shows four files: WEEK 8 Q1.cpp, WEEK 8 Q2.cpp, WEEK 8 Q3.cpp, and WEEK 8 Q 4.cpp. The code editor displays the following C++ code:

```

1 #include<bits/stdc++.h>
2 using namespace std;
3 int countAlloccurance(string sentence,string word)
4 {
5     int index=0,count=0;
6     while((index=sentence.find(word,index))!=string::npos)
7     {
8         count++;
9         index++;
10    }
11    return count;
12 }
13 int main()
14 {
15     char sen[100], word[100];
16     cout<<"Write a sentence : ";
17     gets(sen);
18     cout<<"Write a word to count its occurrence: ";
19     gets(word);
20     cout<<word<<" occurs "<<countAlloccurance(sen,word);
21     cout<<" times in the given sentence";
22 }

```

And this is its result:



The terminal window shows the execution of the program. The user inputs "She sells sea shells on the sea shore" and "sea". The program outputs "sea occurs 2 times in the given sentence". Finally, it shows the process exited after 27.63 seconds and prompts the user to press any key to continue.

```

C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 8 Q 4.exe

Write a sentence : She sells sea shells on the sea shore
Write a word to count its occurrence: sea
sea occurs 2 times in the given sentence
-----
Process exited after 27.63 seconds with return value 0
Press any key to continue . . .

```

**#5 Write a C++ program that displays the position or index in the string S where the string T begins, or 1 if S doesn't contain T.**

This is its required code:

The screenshot shows the Embarcadero Dev-C++ 6 IDE interface. The menu bar includes File, Edit, Search, View, Project, Execute, Tools, AStyle, Window, and Help. The toolbar has various icons for file operations like Open, Save, Print, and Build. The title bar indicates the current file is C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 8 Q5.cpp - [Executing] - Embarcadero Dev-C++ 6. The workspace shows four tabs: WEEK 8 Q1.cpp, WEEK 8 Q2.cpp, WEEK 8 Q3.cpp, and WEEK 8 Q 4.cpp. The code editor window contains the following C++ code:

```
1 #include<bits/stdc++.h>
2 using namespace std;
3 int findIndex(string sentence, string word)
4 {
5     return sentence.find(word);
6 }
7 int main()
8 {
9     string sen,word;
10    cout<<"Write a sentence: ";
11    getline(cin,sen);
12    cout<<"Write a word to find its starting index : ";
13    getline(cin,word);
14    cout<<word<<" is found at index: "<<findIndex(sen,word);
15 }
```

And this is its result:

The screenshot shows a terminal window with the following output:

```
C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 8 Q5.exe
Write a sentence: DEPARTMENT OF COMPUTER SCIENCE
Write a word to find its starting index : OF
OF is found at index: 11
-----
Process exited after 32.68 seconds with return value 0
Press any key to continue . . .
```

# WEEK 9

# WEEK 9

**#1** Write C programs that use both recursive and non-recursive functions to find:

- a) The factorial of a given integer.
- b) To find the greatest common divisor of two given integers.

The required code for both problems is on the next page:

DEV C++ C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 9 Q1.cpp - Embarcadero Dev-C++ 6.3

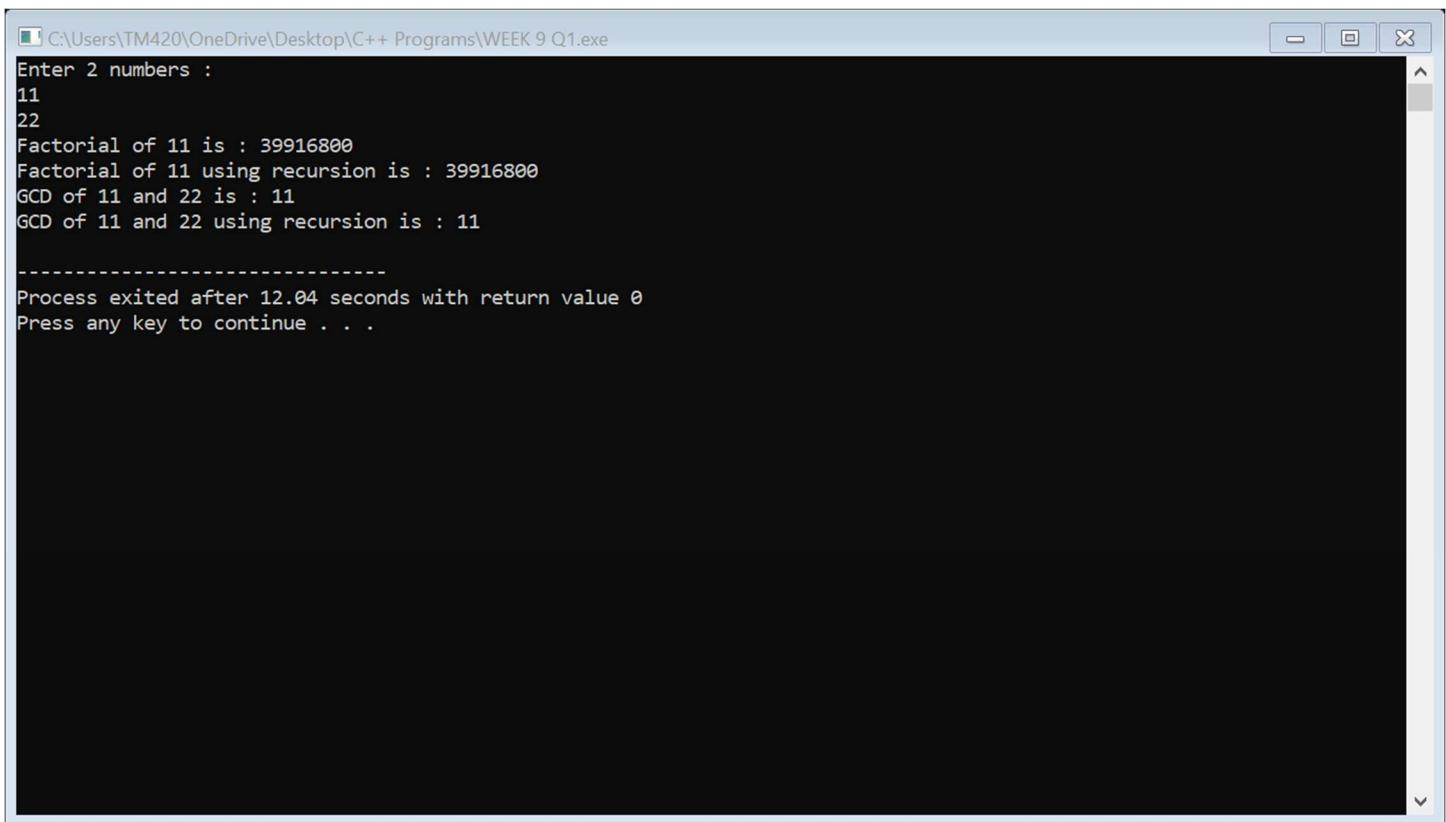
File Edit Search View Project Execute Tools AStyle Window Help

```

File Edit Search View Project Execute Tools AStyle Window Help
TDM-GCC 9.2.0 64-bit
(globals)
WEEK 9 Q1.cpp ×

1 #include <bits/stdc++.h>
2 using namespace std;
3 int factorial(int num)
4 {
5     int ans = 1;
6     for (int i = num; i >= 2; i--)
7         ans *= i;
8     return ans;
9 }
10 int recursiveFactorial(int num)
11 {
12     if (num < 2)
13         return 1;
14     return num * recursiveFactorial(num - 1);
15 }
16 int GCD(int num1, int num2)
17 {
18     int n1 = (num1 > num2) ? num1 : num2; // Larger
19     int n2 = (num1 > num2) ? num2 : num1; // Smaller
20     while (n2 != 0)
21     {
22         int r = n1 % n2;
23         n1 = n2;
24         n2 = r;
25     }
26     return n1;
27 }
28 int main()
29 {
30     cout << "Enter 2 numbers : " << endl;
31     cin >> n >> m;
32     cout << "Factorial of " << n << " is : " << factorial(n) << endl;
33     cout << "Factorial of " << n << " using recursion is : " << recursiveFactorial(n) << endl;
34     cout << "GCD of " << n << " and " << m << " is : " << GCD(n, m) << endl;
35     cout << "GCD of " << n << " and " << m << " using recursion is : " << recursiveGCD(n, m) << endl;
36 }
37 }
```

And this is its result:



```
C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 9 Q1.exe
Enter 2 numbers :
11
22
Factorial of 11 is : 39916800
Factorial of 11 using recursion is : 39916800
GCD of 11 and 22 is : 11
GCD of 11 and 22 using recursion is : 11
-----
Process exited after 12.04 seconds with return value 0
Press any key to continue . . .
```

**#2** Write C programs that use both recursive and non-recursive functions to solve towers of Hanoi problem.

The required code is provided in the next page:

DEV C++ C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 9 Q2.cpp - Embarcadero Dev-C++ 6.3

File Edit Search View Project Execute Tools AStyle Window Help

The screenshot shows the Dev-C++ IDE interface. The title bar reads "DEV C++ C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 9 Q2.cpp - Embarcadero Dev-C++ 6.3". The menu bar includes File, Edit, Search, View, Project, Execute, Tools, AStyle, Window, and Help. The toolbar has various icons for file operations like Open, Save, Print, and Build. The status bar at the bottom right says "TDM-GCC 9.2.0 64-bit Release". The code editor window displays the following C++ code:

```
1 #include<bits/stdc++.h>
2 using namespace std;
3 void towerOfHanoi(int n, char from, char to, char aux)
4 {
5     if (n == 1)
6     {
7         cout << "Move disk 1 from " << from << " to " << to << endl;
8         return;
9     }
10
11    towerOfHanoi(n - 1, from, aux, to);
12    cout << "Move disk " << n << " from " << from << " to " << to << endl;
13    towerOfHanoi(n - 1, aux, to, from);
14
15 }
16 int main()
17 {
18
19     char a = 'A', b = 'B', c = 'C';
20     int n = 3;
21     towerOfHanoi(n, a, c, b);
22     return 0;
23
24 }
```

And this is its result:

The screenshot shows a terminal window titled "C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 9 Q2.exe". The output of the program is displayed, showing the steps of the Tower of Hanoi algorithm:

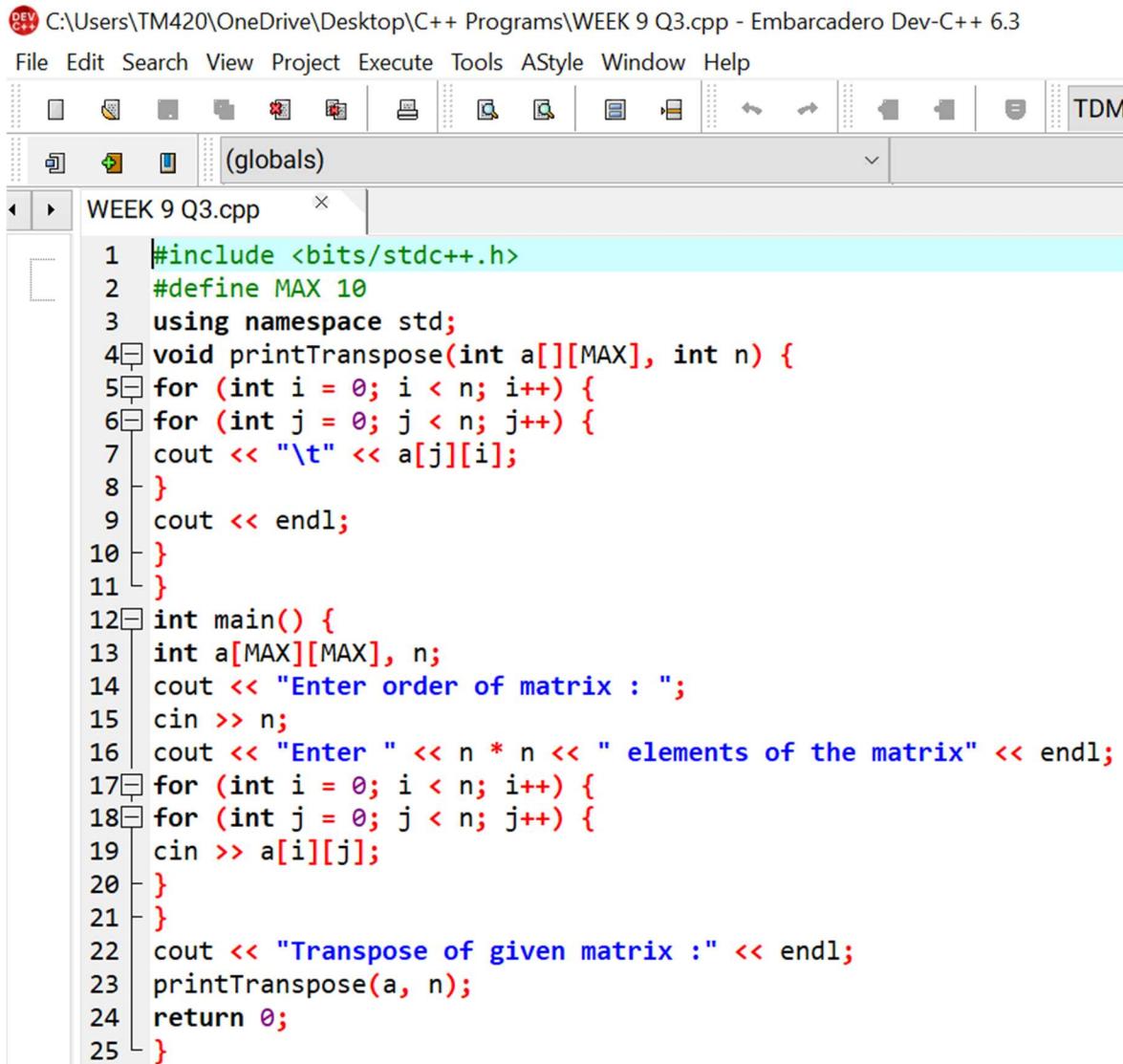
```
Move disk 1 from A to C
Move disk 2 from A to B
Move disk 1 from C to B
Move disk 3 from A to C
Move disk 1 from B to A
Move disk 2 from B to C
Move disk 1 from A to C
```

At the end of the output, there is a dashed line followed by the message:

```
Process exited after 1.17 seconds with return value 0
Press any key to continue . . .
```

### #3 Write a C++ program to print the transpose of a given matrix using a function.

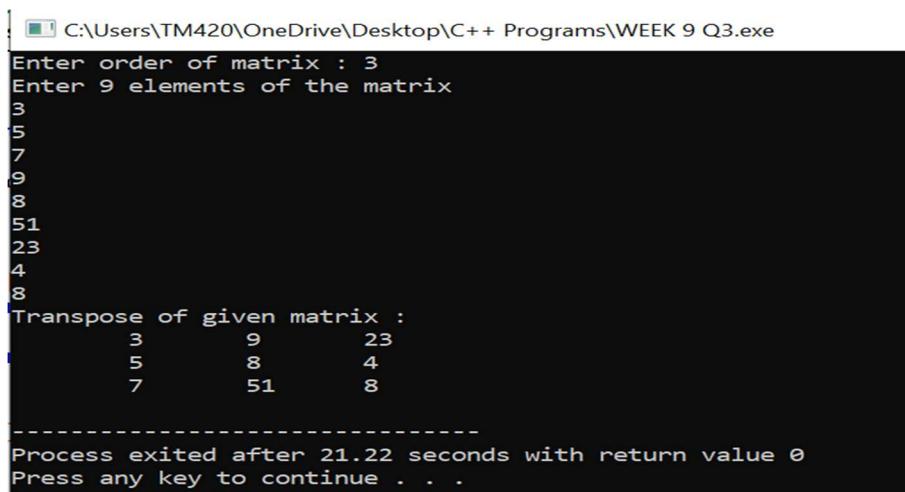
This is the required code:



```

DEV C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 9 Q3.cpp - Embarcadero Dev-C++ 6.3
File Edit Search View Project Execute Tools AStyle Window Help
(globals)
WEEK 9 Q3.cpp ×
1 #include <bits/stdc++.h>
2 #define MAX 10
3 using namespace std;
4 void printTranspose(int a[][MAX], int n) {
5     for (int i = 0; i < n; i++) {
6         for (int j = 0; j < n; j++) {
7             cout << "\t" << a[j][i];
8         }
9         cout << endl;
10    }
11 }
12 int main() {
13     int a[MAX][MAX], n;
14     cout << "Enter order of matrix : ";
15     cin >> n;
16     cout << "Enter " << n * n << " elements of the matrix" << endl;
17     for (int i = 0; i < n; i++) {
18         for (int j = 0; j < n; j++) {
19             cin >> a[i][j];
20         }
21     }
22     cout << "Transpose of given matrix :" << endl;
23     printTranspose(a, n);
24     return 0;
25 }
```

And this is its result:

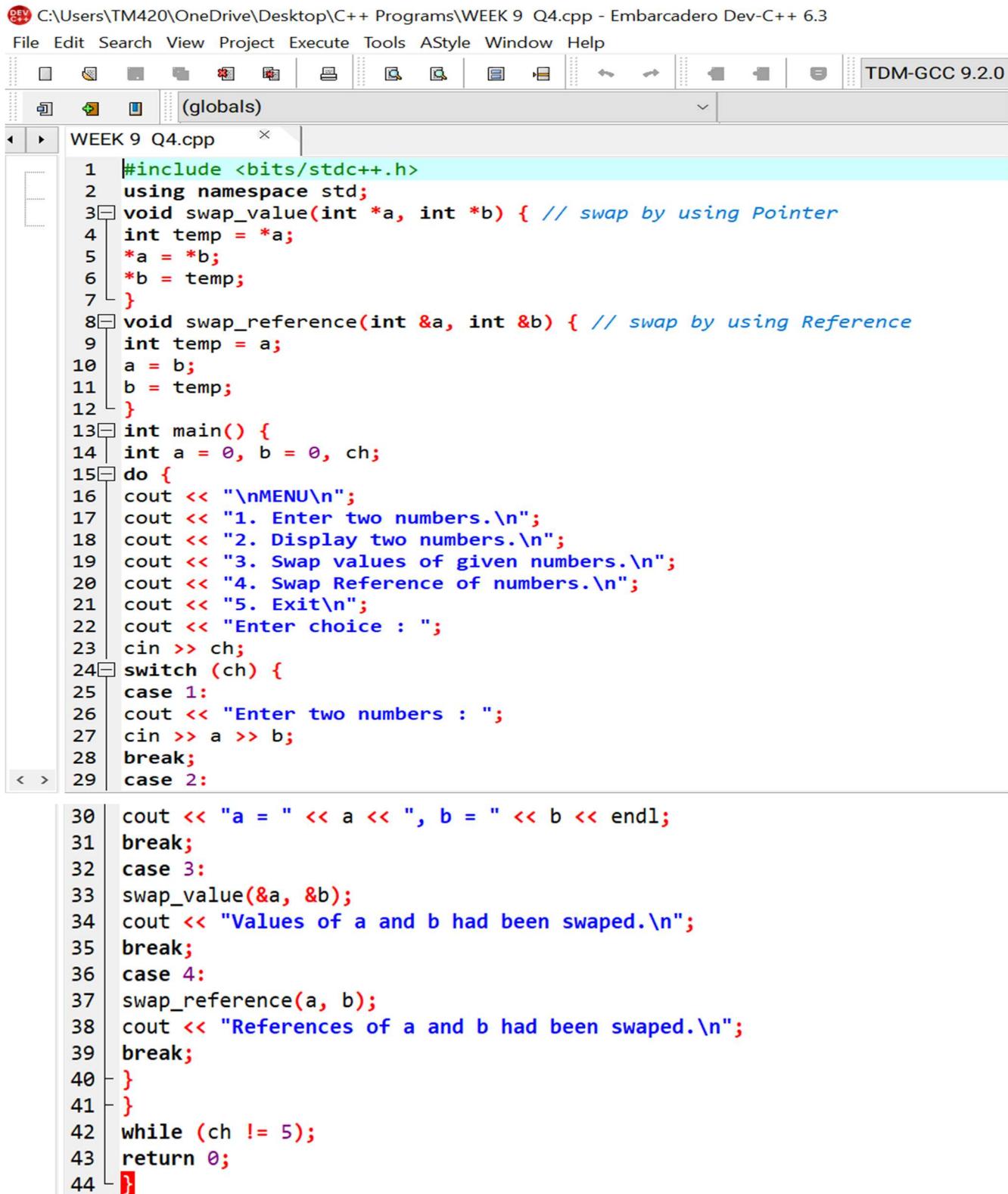


```

C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 9 Q3.exe
Enter order of matrix : 3
Enter 9 elements of the matrix
3
5
7
9
8
51
23
4
8
Transpose of given matrix :
      3      9      23
      5      8      4
      7      51      8
-----
Process exited after 21.22 seconds with return value 0
Press any key to continue . . .
```

**#4** Write a C++ program to swap two number by both call by value and call by reference mechanism, using two functions `swap_value()` and `swap_reference` respectively, by getting the choice from the user and executing the user's choice by switch-case.

This is the required code:



The screenshot shows the Embarcadero Dev-C++ 6.3 IDE interface. The title bar displays "C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 9 Q4.cpp - Embarcadero Dev-C++ 6.3". The menu bar includes File, Edit, Search, View, Project, Execute, Tools, AStyle, Window, and Help. The toolbar contains various icons for file operations. The status bar at the bottom right shows "TDM-GCC 9.2.0". The code editor window displays the following C++ code:

```

1 #include <bits/stdc++.h>
2 using namespace std;
3 void swap_value(int *a, int *b) { // swap by using Pointer
4     int temp = *a;
5     *a = *b;
6     *b = temp;
7 }
8 void swap_reference(int &a, int &b) { // swap by using Reference
9     int temp = a;
10    a = b;
11    b = temp;
12 }
13 int main() {
14     int a = 0, b = 0, ch;
15     do {
16         cout << "\nMENU\n";
17         cout << "1. Enter two numbers.\n";
18         cout << "2. Display two numbers.\n";
19         cout << "3. Swap values of given numbers.\n";
20         cout << "4. Swap Reference of numbers.\n";
21         cout << "5. Exit\n";
22         cout << "Enter choice : ";
23         cin >> ch;
24     switch (ch) {
25         case 1:
26             cout << "Enter two numbers : ";
27             cin >> a >> b;
28             break;
29         case 2:
30             cout << "a = " << a << ", b = " << b << endl;
31             break;
32         case 3:
33             swap_value(&a, &b);
34             cout << "Values of a and b had been swaped.\n";
35             break;
36         case 4:
37             swap_reference(a, b);
38             cout << "References of a and b had been swaped.\n";
39             break;
40     }
41 }
42 while (ch != 5);
43 return 0;
44

```

And this is its result:

```
Select C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 9 Q4.exe

MENU
1. Enter two numbers.
2. Display two numbers.
3. Swap values of given numbers.
4. Swap Reference of numbers.
5. Exit
Enter choice : 1
Enter two numbers : 6
78

MENU
1. Enter two numbers.
2. Display two numbers.
3. Swap values of given numbers.
4. Swap Reference of numbers.
5. Exit
Enter choice : 2
a = 6, b = 78

MENU
1. Enter two numbers.
2. Display two numbers.
3. Swap values of given numbers.
4. Swap Reference of numbers.
5. Exit
Enter choice : 3
Values of a and b had been swaped.

MENU
1. Enter two numbers.
2. Display two numbers.
3. Swap values of given numbers.
4. Swap Reference of numbers.
5. Exit
Enter choice : 4
References of a and b had been swaped.

MENU
1. Enter two numbers.
2. Display two numbers.
3. Swap values of given numbers.
4. Swap Reference of numbers.
5. Exit
Enter choice : 5

-----
Process exited after 25.15 seconds with return value 0
Press any key to continue . . .
```

**#5 Write a C++ program to display all array elements using recursion.**

This is the required code:

The screenshot shows the Embarcadero Dev-C++ 6.3 IDE interface. The title bar indicates the file is executing. The menu bar includes File, Edit, Search, View, Project, Execute, Tools, AStyle, Window, and Help. The toolbar has various icons for file operations. The status bar shows "TDM-GCC 9.". The workspace contains two tabs: "WEEK 9 Q4.cpp" and "WEEK 9 Q5.cpp". The "WEEK 9 Q5.cpp" tab is active, displaying the following C++ code:

```
1 #include <bits/stdc++.h>
2 using namespace std;
3 void printArray(int a[], int n)
4 {
5     if (n > 0)
6     {
7         printArray(a, n - 1);
8         cout << a[n - 1] << " ";
9     }
10 }
11 int main()
12 {
13     int a[10], n;
14     cout << "Enter size of array : ";
15     cin >> n;
16     cout << "Enter " << n << " elements of array : ";
17     for (int i = 0; i < n; i++)
18         cin >> a[i];
19     cout << "\nPrinting array using recursion : ";
20     printArray(a, n);
21     return 0;
22 }
```

And this is its result:

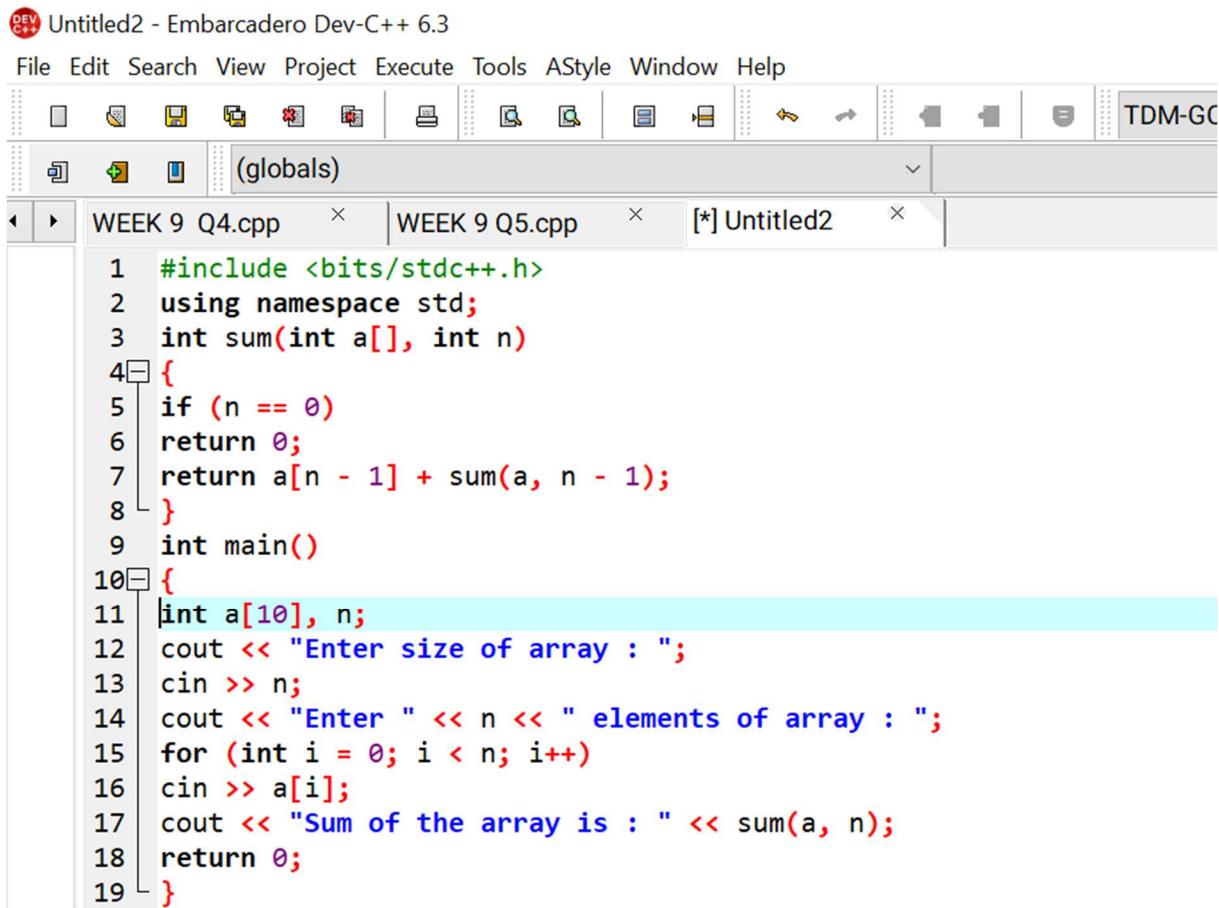
The screenshot shows a terminal window titled "C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 9 Q5.exe". The output shows the program's interaction with the user and its execution results:

```
Enter size of array : 5
Enter 5 elements of array : 86
698
8787
698
4375

Printing array using recursion : 86 698 8787 698 4375
-----
Process exited after 15.77 seconds with return value 0
Press any key to continue . . .
```

## #6 Write a C++ program to find sum of elements of array using recursion.

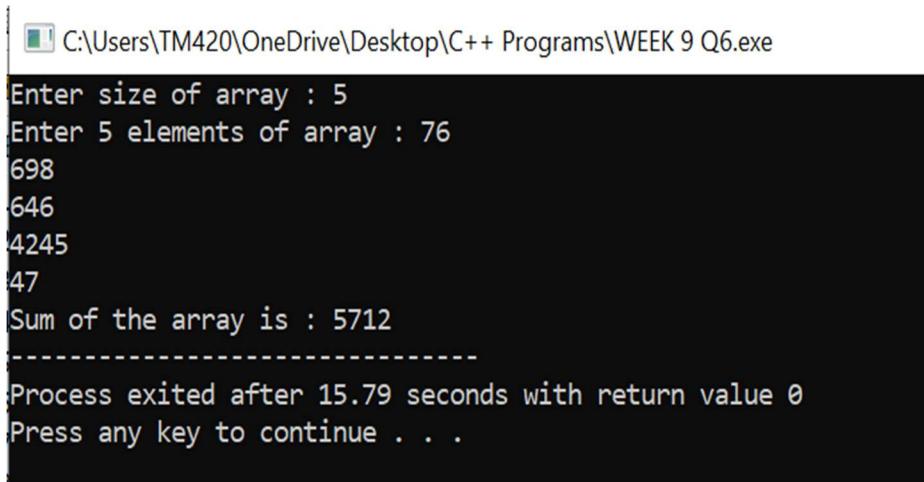
This is the required code:



The screenshot shows the Dev-C++ IDE interface. The menu bar includes File, Edit, Search, View, Project, Execute, Tools, AStyle, Window, and Help. The toolbar has various icons for file operations like Open, Save, Print, and Find. The title bar shows '(globals)' and 'TDM-GCC (MinGW)'. Below the title bar, there are three tabs: 'WEEK 9 Q4.cpp', 'WEEK 9 Q5.cpp', and '[\*] Untitled2'. The code editor contains the following C++ code:

```
1 #include <bits/stdc++.h>
2 using namespace std;
3 int sum(int a[], int n)
4 {
5     if (n == 0)
6         return 0;
7     return a[n - 1] + sum(a, n - 1);
8 }
9 int main()
10 {
11     int a[10], n;
12     cout << "Enter size of array : ";
13     cin >> n;
14     cout << "Enter " << n << " elements of array : ";
15     for (int i = 0; i < n; i++)
16         cin >> a[i];
17     cout << "Sum of the array is : " << sum(a, n);
18     return 0;
19 }
```

And this is its result:

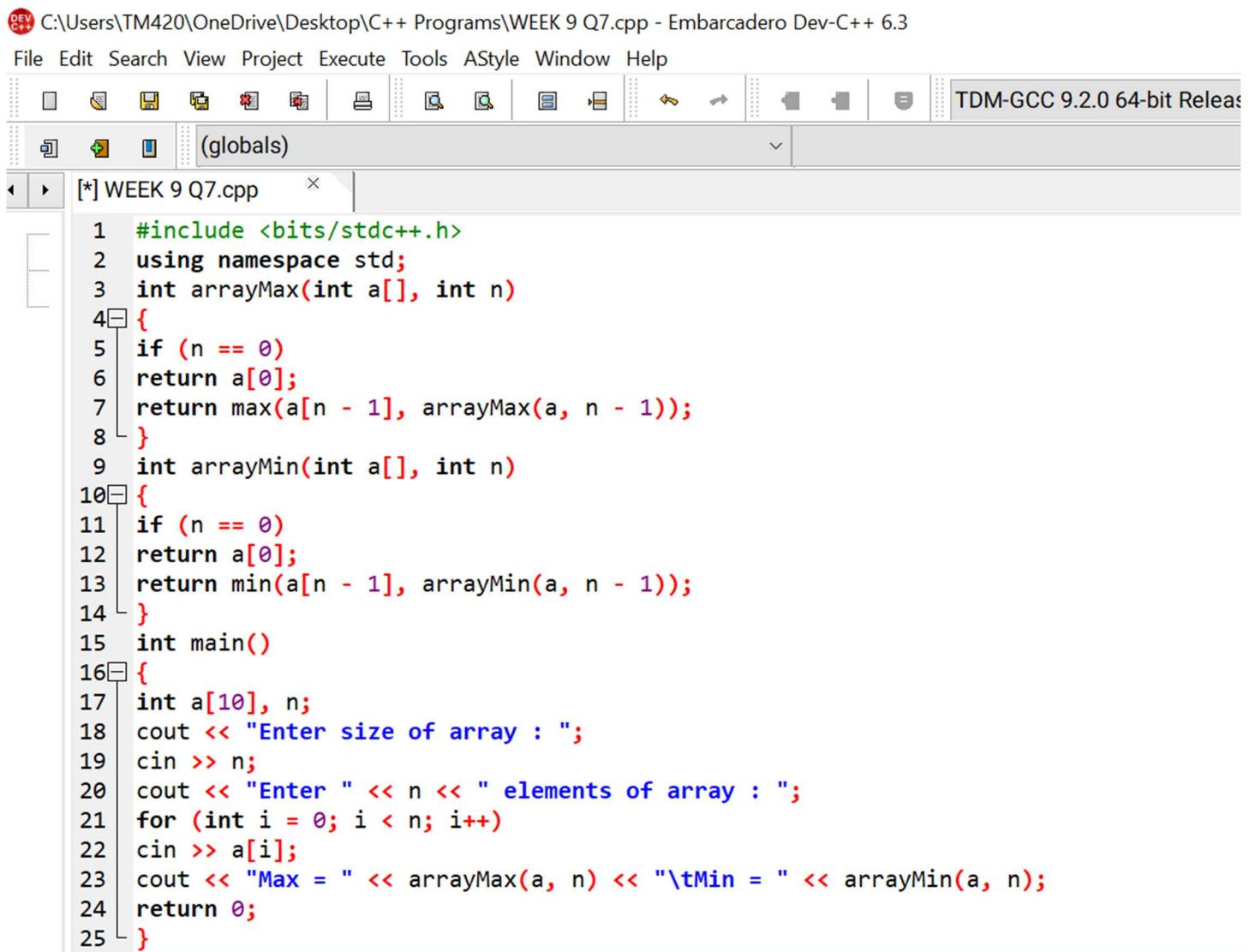


The terminal window shows the execution of the program 'WEEK 9 Q6.exe'. The user enters the size of the array as 5 and then five elements: 698, 646, 4245, 47. The program calculates the sum and outputs it as 5712. Finally, it exits after 15.79 seconds with a return value of 0.

```
C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 9 Q6.exe
Enter size of array : 5
Enter 5 elements of array : 698
646
4245
47
Sum of the array is : 5712
-----
Process exited after 15.79 seconds with return value 0
Press any key to continue . . .
```

## #7 Write a C++ program to find maximum and minimum elements in array using recursion.

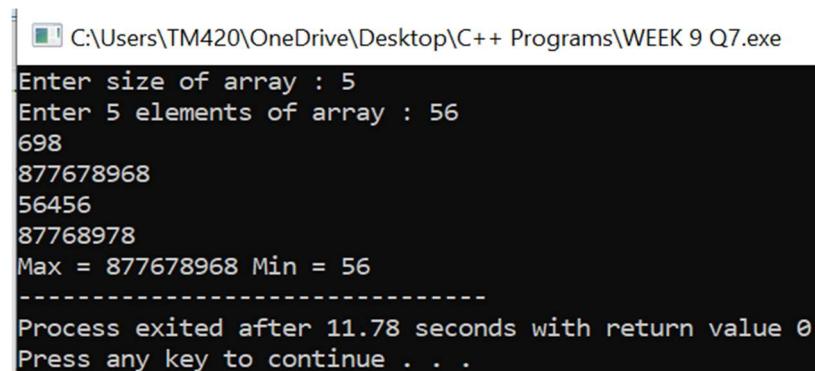
This is the required code:



```

1 #include <bits/stdc++.h>
2 using namespace std;
3 int arrayMax(int a[], int n)
4 {
5     if (n == 0)
6         return a[0];
7     return max(a[n - 1], arrayMax(a, n - 1));
8 }
9 int arrayMin(int a[], int n)
10 {
11    if (n == 0)
12        return a[0];
13    return min(a[n - 1], arrayMin(a, n - 1));
14 }
15 int main()
16 {
17    int a[10], n;
18    cout << "Enter size of array : ";
19    cin >> n;
20    cout << "Enter " << n << " elements of array : ";
21    for (int i = 0; i < n; i++)
22        cin >> a[i];
23    cout << "Max = " << arrayMax(a, n) << "\tMin = " << arrayMin(a, n);
24    return 0;
25 }
```

And this is its result:



```

C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 9 Q7.exe
Enter size of array : 5
Enter 5 elements of array : 698
877678968
56456
87768978
Max = 877678968 Min = 56
-----
Process exited after 11.78 seconds with return value 0
Press any key to continue . . .
```

**#8** Consider the insurance database given below. The primary keys are made bold and the data types are specified.

**PERSON(driver\_id:string , name:string , address:string )**

**CAR(regno:string , model:string , year:int )**

**ACCIDENT(report\_number:int , accd\_date:date , location:string )**

**OWNS(driver\_id:string , regno:string )**

**PARTICIPATED(driver\_id:string , regno:string , report\_number:int , damage\_amount:int).**

- Create the above tables by properly specifying the primary keys and foreign keys.
- Enter at least five tuples for each relation.
- Update the damage amount for the car with specific regno in the accident with report number 12 to 25000.
- Add a new accident to the database.
- Find the total number of people who owned cars that were involved in accidents in the year 2008.
- Find the number of accidents in which cars belonging to a specific model were involved.

Create table person(

Driver\_idvarchar(10),

Name varchar(10),

Address varchar(10),

Primary key(driver\_id));

Create table car(

Regnovarchar(10),

Model varchar(10),

Year int,

Primary key(regno));

- Create table Accident(
  - Report\_numberint,
  - Accd\_date date,
  - Location varchar(10),
  - Primary key(report\_number));
  
- Create table owns(
  - Driver\_idvarchar(10),
  - Regnovarchar(10),
  - Primary key(driver\_id,regno),
  - Foreign key(driver\_id) references person(driver\_id),
  - Foreign key(regno) references car(regno));
  
- Create table participated(
  - Driver\_idvarchar(10),
  - Regnovarchar(10),
  - Report\_numberint,
  - Damage\_amountint,
  - Primary key(driver\_id,regno,report\_number),
  - Foreign key(driver\_id) references person(driver\_id),
  - Foreign key(regno) references car(regno),
  - Foreign key(report\_number) references accident(report\_number));
  
- Insert into person values('D00001','Arjun','Aligarh');
- Insert into person values('D00002','Mohsin','Mumbai');
- Insert into person values('D00003','Abdullah','Delhi');
- Insert into person values('D00004','Danish','Aligarh');

- Insert into person values('D00005','Faizan','Delhi');
  
- Insert into car values('RGN2504','BMWV8X6','2019');
- Insert into car values('RGN3324','AUDI R8','2018');
- Insert into car values('RGN4598','HONDA NSX','2008');
- Insert into car values('RGN2254','MAYBATCH','2008');
- Insert into car values('RGN8723','AUDIQ7','2017');
  
- Insert into accident values('9','2008-07-28','Mumbai');
- Insert into accident values('12','2009-08-21','Aligarh');
- Insert into accident values('13','2018-11-12','Gwalior');
- Insert into accident values('25','2014-01-25','Meerut');
- Insert into accident values('33','2008-03-31','Delhi');
  
- Insert into owns values('D00001','RGN2504');
- Insert into owns values('D00002','RGN3324');
- Insert into owns values('D00003','RGN4598');
- Insert into owns values('D00004','RGN2254');
- Insert into owns values('D00005','RGN8723');
  
- Insert into participated values('D00001','RGN2504','9','25769');
- Insert into participated values('D00004','RGN2254','25','60000');
- Insert into participated values('D00005','RGN8723','33','73000');
- Insert into participated values('D00002','RGN3324','12','30000');
- Insert into participated values('D00003','RGN4598','13','10000');

CPU Time: 0.00 sec(s), Memory: 4348 kilobyte(s)

```
D00001|RGN2504|9|25769  
D00004|RGN2254|25|60000  
D00005|RGN8723|33|73000  
D00002|RGN3324|12|25000  
D00003|RGN4598|13|10000
```

CPU Time: 0.00 sec(s), Memory: 4244 kilobyte(s)

executed in 0.584 sec(s)

```
2
```

### Result

CPU Time: 0.00 sec(s), Memory: 4352 kilobyte(s)

```
9|2008-07-28|Mumbai  
12|2009-08-21|Aligarh  
13|2018-11-12|Gwalior  
25|2014-01-25|Meerut  
33|2008-03-31|Delhi  
110|sindhanur|1993
```

CPU Time: 0.00 sec(s), Memory: 4260 kilobyte(s)

```
AUDI R8|1  
AUDIQ7|1  
BMW8X6|1  
HONDA NSX|1  
MAYBATCH|1
```

# WEEK 10

# WEEK 10

**#1** Write a C++ program that uses functions to perform the following operations:

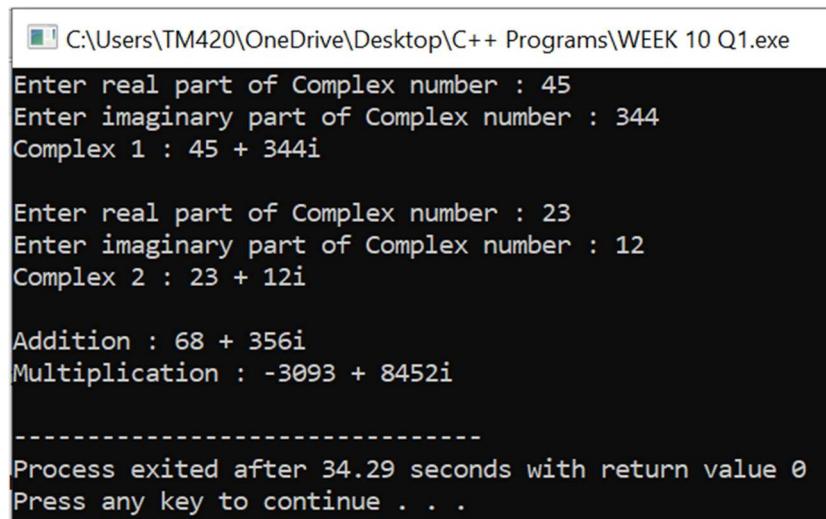
- i. Reading a complex number
- ii. Writing a complex number
- iii. Addition and subtraction of two complex numbers
- iv. Multiplication of two complex numbers. Note: represent complex number using a structure.

This is the required code:

```

1 #include <bits/stdc++.h>
2 using namespace std;
3 struct Complex {
4     float real, imaginary;
5 };
6 void writeC(Complex c) {
7     cout << c.real << " + " << c.imaginary << "i";
8 }
9 Complex readC() {
10    Complex c;
11    cout << "Enter real part of Complex number : ";
12    cin >> c.real;
13    cout << "Enter imaginary part of Complex number : ";
14    cin >> c.imaginary;
15    return c;
16 }
17 Complex addC(Complex c1, Complex c2) {
18    Complex c;
19    c.real = c1.real + c2.real;
20    c.imaginary = c1.imaginary + c2.imaginary;
21    return c;
22 }
23 Complex multiplyC(Complex c1, Complex c2) {
24    Complex c;
25    c.real = (c1.real * c2.real) - (c1.imaginary * c2.imaginary);
26    c.imaginary = (c1.real * c2.imaginary) + (c1.imaginary * c2.real);
27    return c;
28 }
29 int main() {
30    Complex c1, c2, c3, c4;
31    c1 = readC();
32    cout << "Complex 1 : "; writeC(c1); cout << "\n\n";
33    c2 = readC();
34    cout << "Complex 2 : "; writeC(c2); cout << "\n\n";
35    c3 = addC(c1, c2);
36    cout << "Addition : "; writeC(c3); cout << "\n";
37    c4 = multiplyC(c1, c2);
38    cout << "Multiplication : "; writeC(c4); cout << "\n";
39    return 0;
40 }
```

And this is its result:



```
C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 10 Q1.exe
Enter real part of Complex number : 45
Enter imaginary part of Complex number : 344
Complex 1 : 45 + 344i

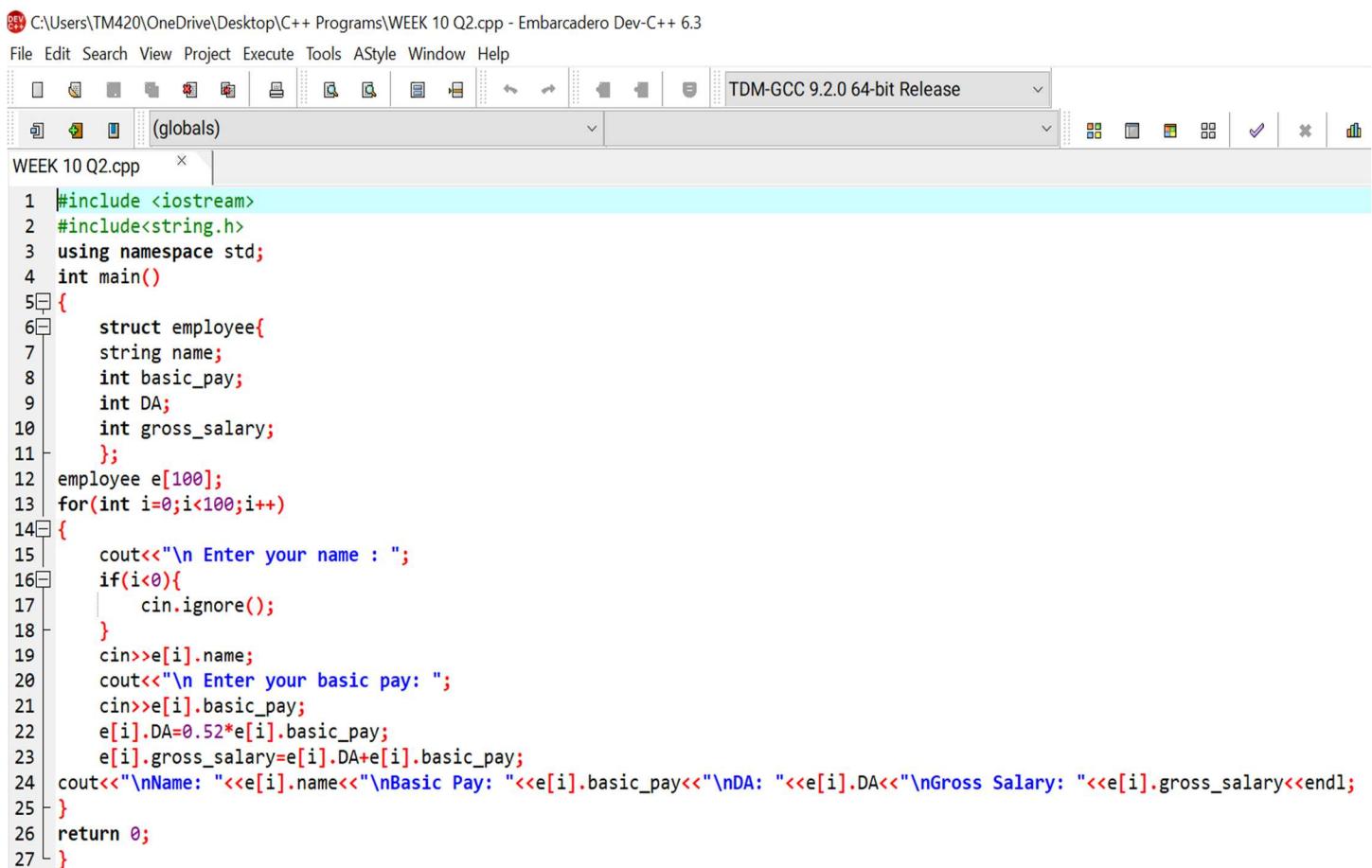
Enter real part of Complex number : 23
Enter imaginary part of Complex number : 12
Complex 2 : 23 + 12i

Addition : 68 + 356i
Multiplication : -3093 + 8452i

-----
Process exited after 34.29 seconds with return value 0
Press any key to continue . . .
```

**#2** Write a C++ program to compute the monthly pay of 100 employees using each employee's name, basic pay. The DA is computed as 52% of the basic pay. Gross-salary (basic pay + DA). Print the employees name and gross salary.

This is the required code:



```
C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 10 Q2.cpp - Embarcadero Dev-C++ 6.3
File Edit Search View Project Execute Tools AStyle Window Help
TDM-GCC 9.2.0 64-bit Release
(globals)
WEEK 10 Q2.cpp

1 #include <iostream>
2 #include<string.h>
3 using namespace std;
4 int main()
5 {
6     struct employee{
7         string name;
8         int basic_pay;
9         int DA;
10        int gross_salary;
11    };
12    employee e[100];
13    for(int i=0;i<100;i++)
14    {
15        cout<<"\n Enter your name : ";
16        if(i<0){
17            cin.ignore();
18        }
19        cin>>e[i].name;
20        cout<<"\n Enter your basic pay: ";
21        cin>>e[i].basic_pay;
22        e[i].DA=0.52*e[i].basic_pay;
23        e[i].gross_salary=e[i].DA+e[i].basic_pay;
24        cout<<"\nName: "<<e[i].name<<"\nBasic Pay: "<<e[i].basic_pay<<"\nDA: "<<e[i].DA<<"\nGross Salary: "<<e[i].gross_salary<<endl;
25    }
26    return 0;
27 }
```

And this is the result:

```
C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 10 Q2.exe

Enter your name : BILAL
Enter your basic pay: 5000
Name: BILAL
Basic Pay: 5000
DA: 2600
Gross Salary: 7600

Enter your name : AHMAD
Enter your basic pay: 3000
Name: AHMAD
Basic Pay: 3000
DA: 1560
Gross Salary: 4560

Enter your name : ADNAN
Enter your basic pay: 2500
Name: ADNAN
Basic Pay: 2500
DA: 1300
Gross Salary: 3800
```

It is for three employees only. Although the result can print up to 100 employees I won't be providing it here because it will become too long.

**#3 Create a Book structure containing book\_id, title, author name and price. Write a C++ program to pass a structure as a function argument and print the book details.**

The required code is given on the next page:

C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 10 Q3.cpp - Embarcadero Dev-C++ 6.3

File Edit Search View Project Execute Tools AStyle Window Help

TDM-GCC 9.2.0 64-bit Release

(globals)

WEEK 10 Q3.cpp

```
1 #include <bits/stdc++.h>
2 using namespace std;
3 struct Book {
4     int book_id;
5     string title, author;
6     float price;
7 }
8 void printBookInfo(Book &b) {
9     cout << "\nBook Info:" ;
10    cout << "\nBook ID : " << b.book_id;
11    cout << "\nTitle : " << b.title;
12    cout << "\nAuthor : " << b.author;
13    cout << "\nPrice : " << b.price << endl;
14 }
15 int main() {
16     Book book1, book2;
17     book1.book_id = 10001;
18     book1.title = "Object Oriented Programming in C++";
19     book1.author = "Pearson";
20     book1.price = 830;
21     book2.book_id = 10002;
22     book2.title = "C++ - A Complete Reference";
23     book2.author = "McGraw Hill";
24     book2.price = 780;
25     printBookInfo(book1);
26     printBookInfo(book2);
27 }
```

And this is its result:

```
C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 10 Q3.exe

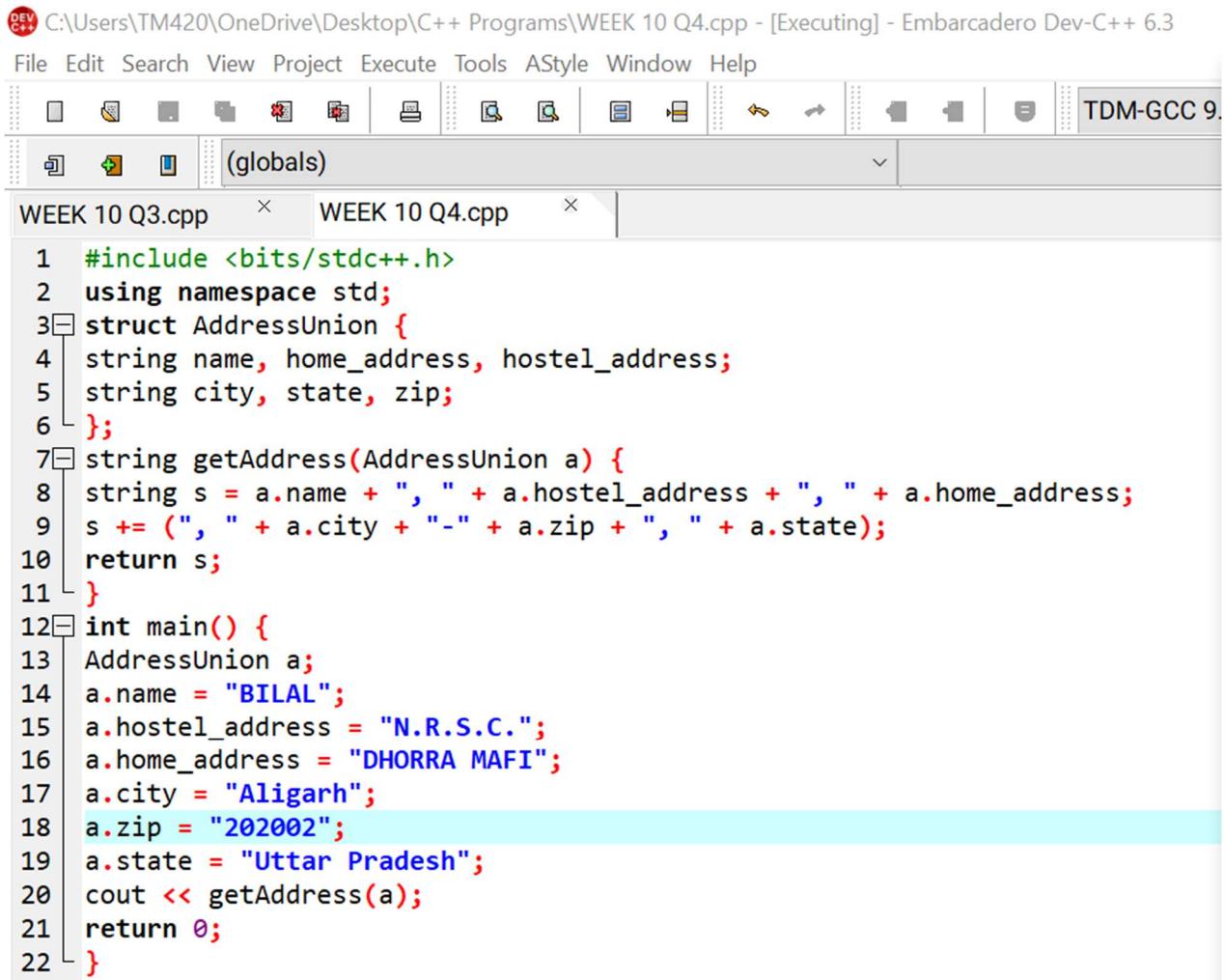
Book Info:
Book ID : 10001
Title : Object Oriented Programming in C++
Author : Pearson
Price : 830

Book Info:
Book ID : 10002
Title : C++ - A Complete Reference
Author : McGraw Hill
Price : 780

Process exited after 4.201 seconds with return value 0
Press any key to continue . . .
```

#4 Create a union containing 6 strings: name, home\_address, hostel\_address, city, state and zip. Write a C++ program to display your present address.

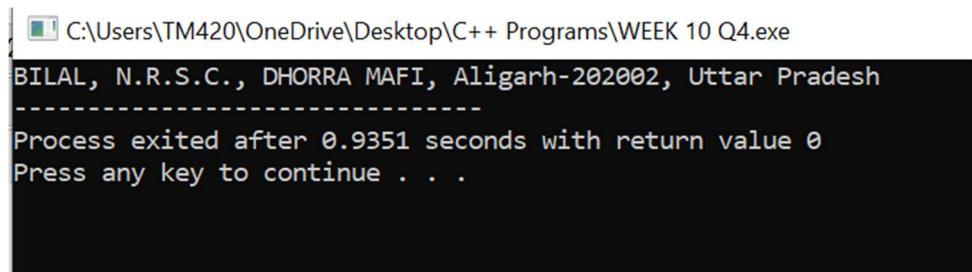
This is the required code:



The screenshot shows the Dev-C++ IDE interface. The title bar reads "C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 10 Q4.cpp - [Executing] - Embarcadero Dev-C++ 6.3". The menu bar includes File, Edit, Search, View, Project, Execute, Tools, AStyle, Window, and Help. Below the menu is a toolbar with various icons. The main window shows two tabs: "WEEK 10 Q3.cpp" and "WEEK 10 Q4.cpp". The code editor contains the following C++ code:

```
1 #include <bits/stdc++.h>
2 using namespace std;
3 struct AddressUnion {
4     string name, home_address, hostel_address;
5     string city, state, zip;
6 };
7 string getAddress(AddressUnion a) {
8     string s = a.name + ", " + a.hostel_address + ", " + a.home_address;
9     s += (", " + a.city + "-" + a.zip + ", " + a.state);
10    return s;
11 }
12 int main() {
13     AddressUnion a;
14     a.name = "BILAL";
15     a.hostel_address = "N.R.S.C.";
16     a.home_address = "DHORRA MAFI";
17     a.city = "Aligarh";
18     a.zip = "202002";
19     a.state = "Uttar Pradesh";
20     cout << getAddress(a);
21     return 0;
22 }
```

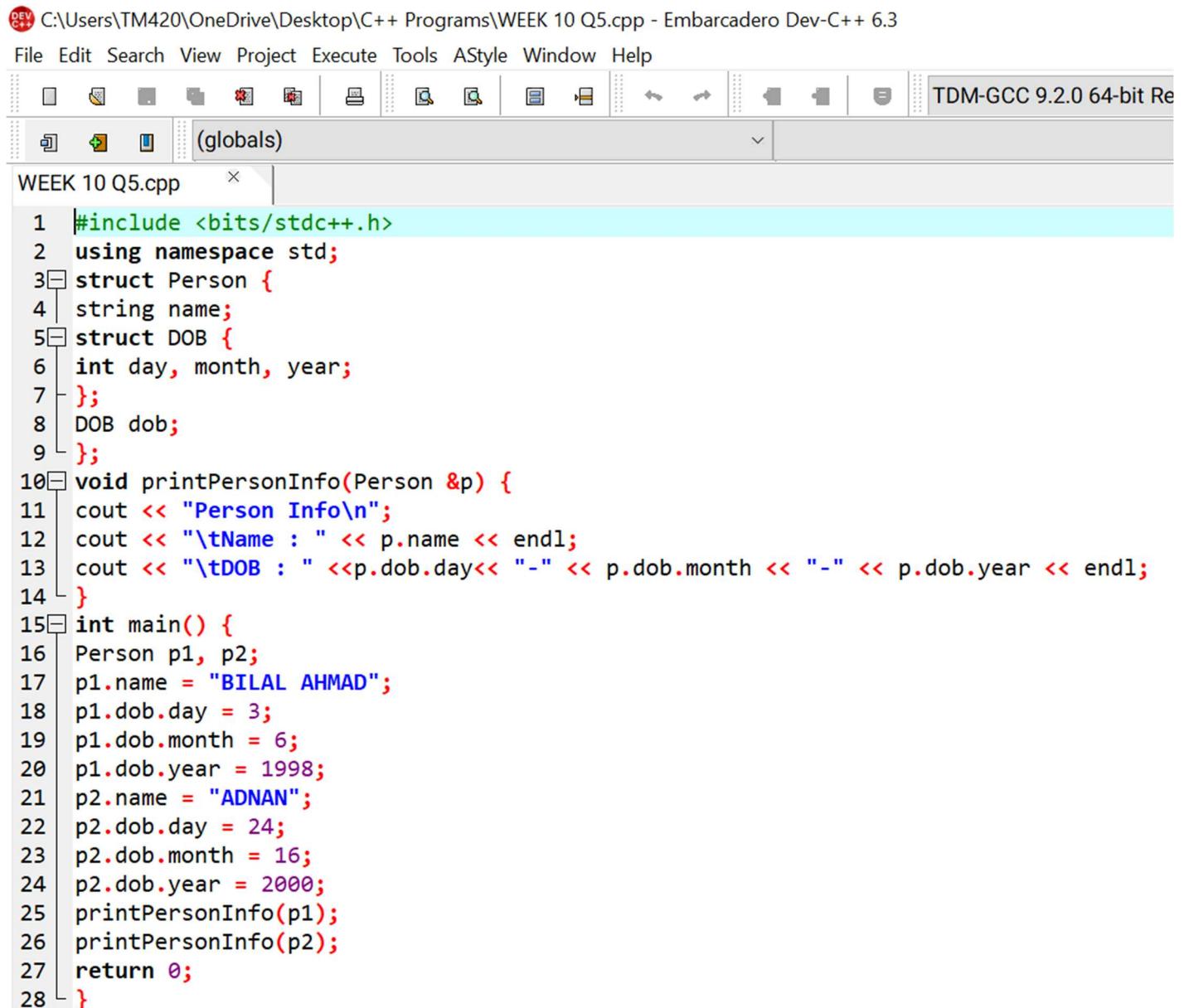
And this is its result:



The terminal window displays the output of the program. It starts with the path "C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 10 Q4.exe". The output text is:  
BILAL, N.R.S.C., DHORRA MAFI, Aligarh-202002, Uttar Pradesh  
-----  
Process exited after 0.9351 seconds with return value 0  
Press any key to continue . . .

**#5 Write a C++ program to define a structure named DOB, which contains name, day, month and year. Using the concept of nested structures display your name and date of birth.**

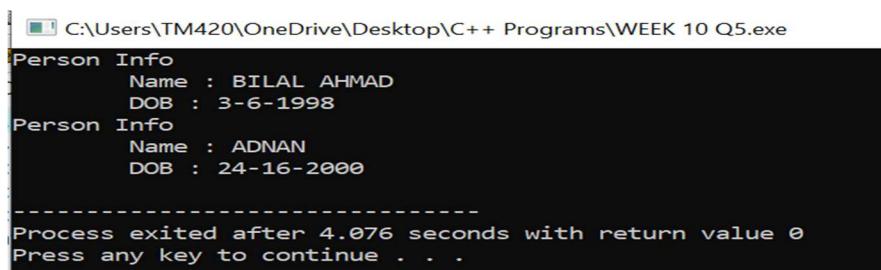
This is the required code:



The screenshot shows the Embarcadero Dev-C++ IDE interface. The title bar reads "C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 10 Q5.cpp - Embarcadero Dev-C++ 6.3". The menu bar includes File, Edit, Search, View, Project, Execute, Tools, AStyle, Window, and Help. Below the menu is a toolbar with various icons. The main window displays the code for "WEEK 10 Q5.cpp". The code defines a nested structure "DOB" within a "Person" structure, prints person information, and creates two instances of "Person" with specific names and dates of birth.

```
1 #include <bits/stdc++.h>
2 using namespace std;
3 struct Person {
4     string name;
5     struct DOB {
6         int day, month, year;
7     };
8     DOB dob;
9 };
10 void printPersonInfo(Person &p) {
11     cout << "Person Info\n";
12     cout << "\tName : " << p.name << endl;
13     cout << "\tDOB : " << p.dob.day << "-" << p.dob.month << "-" << p.dob.year << endl;
14 }
15 int main() {
16     Person p1, p2;
17     p1.name = "BILAL AHMAD";
18     p1.dob.day = 3;
19     p1.dob.month = 6;
20     p1.dob.year = 1998;
21     p2.name = "ADNAN";
22     p2.dob.day = 24;
23     p2.dob.month = 16;
24     p2.dob.year = 2000;
25     printPersonInfo(p1);
26     printPersonInfo(p2);
27     return 0;
28 }
```

And this is its result:



The screenshot shows a terminal window displaying the output of the program. It shows two sets of person information: one for "BILAL AHMAD" born on 3-6-1998 and another for "ADNAN" born on 24-16-2000. The program ends with a message indicating it exited after 4.076 seconds.

```
C:\Users\TM420\OneDrive\Desktop\C++ Programs\WEEK 10 Q5.exe
Person Info
    Name : BILAL AHMAD
    DOB : 3-6-1998
Person Info
    Name : ADNAN
    DOB : 24-16-2000

Process exited after 4.076 seconds with return value 0
Press any key to continue . . .
```

**#6 Consider the following database for a banking enterprise.**

**BRANCH( branch\_name:string , branch\_city:string , assets:real )**

**ACCOUNT( accno:int , branch\_name:string , balance:real )**

**DEPOSITOR( customer\_name:string , accno:int )**

**CUSTOMER( customer\_name:string, customer\_street:string , customer\_city: string )**

**LOAN( loan\_number:int , branch\_name:string , amount:real )**

**BORROWER( customer\_name:string , loan\_number:int )**

**a) Create the above tables by properly specifying the primary keys and foreign keys.**

**b) Enter at least five tuples for each relation.**

**c) Find all the customers who have at least two accounts at the main branch.**

**d) Find all the customers who have an account at all the branches located in a specific city.**

**e) Demonstrate how you delete all account tuples at every branch located in a specific city.**

This is the required code:

```
CREATE TABLE BRANCH (
    BNAME VARCHAR(20) PRIMARY KEY,
    CITY VARCHAR(20) NOT NULL,
    ASSETS REAL
);
CREATE TABLE ACCOUNT (
    ACCNO INT PRIMARY KEY,
    BNAME VARCHAR(20) NOT NULL,
    BALANCE REAL,
```

```
FOREIGN KEY (BNAME) REFERENCES BRANCH(BNAME) /* SPECIFY
TRIGGER IF YOU WANT ! ON DELETE ON UPDATE ! */
);

CREATE TABLE CUSTOMER (
    CNAME VARCHAR(20) PRIMARY KEY,
    CSTREE VARCHAR(20) NOT NULL,
    CITY VARCHAR(20) NOT NULL
);

CREATE TABLE DEPOSITOR (
    CNAME VARCHAR(20) NOT NULL,
    ACCNO INT,
    PRIMARY KEY (CNAME, ACCNO),
    FOREIGN KEY (ACCNO) REFERENCES ACCOUNT (ACCNO) ON DELETE
    CASCADE,
    FOREIGN KEY (CNAME) REFERENCES CUSTOMER (CNAME) ON DELETE
    CASCADE
);

CREATE TABLE LOAN (
    INO INT PRIMARY KEY,
    BNAME VARCHAR(20) NOT NULL,
    AMOUNT REAL,
    FOREIGN KEY (BNAME) REFERENCES BRANCH (BNAME) ON DELETE
    CASCADE
);

CREATE TABLE BORROWER (
    CNAME VARCHAR(10),
    INO INT,
    PRIMARY KEY (CNAME, INO),
    FOREIGN KEY (CNAME) REFERENCES CUSTOMER (CNAME) ON DELETE
    CASCADE,
    FOREIGN KEY (INO) REFERENCES LOAN (INO) ON DELETE CASCADE
);
```

```
/*
QUESTION - ENTER ATLEAST FIVE TUPLES FOR EACH RELATION !
*/
INSERT INTO BRANCH VALUES ('ABC', 'BANGALORE', 1200000);
INSERT INTO BRANCH VALUES ('DEF', 'CHENNAI', 2000000);
INSERT INTO BRANCH VALUES ('ABN', 'MUMBAI', 3300000);
INSERT INTO BRANCH VALUES ('XYZ', 'HYDERABAD', 555555);
INSERT INTO BRANCH VALUES ('MNO', 'BANGALORE', 9999999);
/* ACCOUNT APPEARS TO BE AN SQL KEYWORD ! HOWEVER IT WILL WORK
HERE ... */
INSERT INTO ACCOUNT VALUES (1, 'ABC', 25000);
INSERT INTO ACCOUNT VALUES (2, 'DEF', 12000);
INSERT INTO ACCOUNT VALUES (3, 'DEF', 1000);
INSERT INTO ACCOUNT VALUES (4, 'ABN', 10000);
INSERT INTO ACCOUNT VALUES (5, 'MNO', 60000);
INSERT INTO ACCOUNT VALUES (6, 'XYZ', 50000);
INSERT INTO CUSTOMER VALUES ('MIK', 'AB', 'BANGALORE');
INSERT INTO CUSTOMER VALUES ('MUJ', 'CD', 'BANGALORE');
INSERT INTO CUSTOMER VALUES ('MAJ', 'EF', 'CHENNAI');
INSERT INTO CUSTOMER VALUES ('WAJ', 'XY', 'DELHI');
INSERT INTO CUSTOMER VALUES ('PRAD', 'LM', 'MUMBAI');
INSERT INTO CUSTOMER VALUES ('NOW', 'OP', 'HYDERABAD');
INSERT INTO DEPOSITOR VALUES ('MIK', 2);
INSERT INTO DEPOSITOR VALUES ('MUJ', 1);
INSERT INTO DEPOSITOR VALUES ('MUJ', 5);
INSERT INTO DEPOSITOR VALUES ('PRAD', 4);
INSERT INTO DEPOSITOR VALUES ('MAJ', 3);
INSERT INTO DEPOSITOR VALUES ('WAJ', 6);
INSERT INTO DEPOSITOR VALUES ('MIK', 3);
INSERT INTO LOAN VALUES (1, 'ABC', 5000);
INSERT INTO LOAN VALUES (2, 'DEF', 1500);
INSERT INTO LOAN VALUES (3, 'ABN', 100000);
```

```
INSERT INTO LOAN VALUES (4, 'XYZ', 3500);
INSERT INTO LOAN VALUES (5, 'MNO', 200000);
/*
```

QUESTION - FIND ALL THE CUSTOMERS WHO HAVE ATLEAST 2 ACCOUNTS IN THE MAIN BRANCH

```
*/
```

```
SELECT CNAME
FROM ACCOUNT, DEPOSITOR
WHERE ACCOUNT.ACCNO = DEPOSITOR.ACCNO AND BNAME = 'DEF'
GROUP BY CNAME
HAVING COUNT(*) > 1 ;
```

```
/*
```

QUESTION - FIND ALL THE CUSTOMERS WHO HAVE AN ACCOUNT AT ALL THE BRANCHES LOCATED IN A SPECIFIC CITY.

YOU CAN TAKE ANY CITY NAME HERE !

LET'S TAKE IT TO BE BANGALORE HERE !

```
/*
SELECT CNAME
FROM BRANCH B, ACCOUNT A, DEPOSITOR D
WHERE B.BNAME = A.BNAME AND
A.ACCNO = D.ACCNO AND
B.CITY = 'BANGALORE'
GROUP BY CNAME HAVING COUNT( DISTINCT(B.BNAME)) = ( SELECT
COUNT(BNAME)
FROM BRANCH WHERE
CITY =
'BANGALORE' );
```

```
/*
```

QUESTION - DEMONSTRATE HOW YOU DELETE ALL ACCOUNT TUPLES AT EVERY BRANCH LOCATED IN SPECIFIC CITY.

```
*/
```

```
/* CHECK THE ENTRIES OF THE ACCOUNT TABLE */SELECT * FROM ACCOUNT ;
```

```
/* DELETE THE ACCOUNT ENTRY WITH CERTAIN CONDITIONS */
DELETE FROM ACCOUNT
WHERE BNAME IN (SELECT BNAME FROM BRANCH WHERE CITY =
'BANGALORE');
/* CHECK THE ACCOUNT TABLE AGAIN TO CHECK WHETHER THE ENTRY IS
DELETED OR NOT !! */
SELECT * FROM ACCOUNT ;
SELECT * FROM ACCOUNT ;
/* DELETE THE ACCOUNT ENTRY WITH CERTAIN CONDITIONS */
DELETE FROM ACCOUNT
WHERE BNAME IN (SELECT BNAME FROM BRANCH WHERE CITY =
'BANGALORE');
/* CHECK THE ACCOUNT TABLE AGAIN TO CHECK WHETHER THE ENTRY IS
DELETED OR NOT !! */
SELECT * FROM ACCOUNT ;
```

## OUTPUT:

```
MIK
MUJ
1 | ABC | 25000.0
2 | DEF | 12000.0
3 | DEF | 1000.0
4 | ABN | 10000.0
5 | MNO | 60000.0
6 | XYZ | 50000.0
2 | DEF | 12000.0
3 | DEF | 1000.0
4 | ABN | 10000.0
6 | XYZ | 50000.0
```

```
[Execution complete with exit code 0]
```