Department of Computer Science and Engineering,
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CS23101– COMPUTATION THINKING

Practical

Aug-Dec 2026

Year/Sem/Batch: I/I/P

Exercise: 1	Introduction to Computational thinking	11- 09- 2026

Question 1: Binary, ASCII & Unicode

Objective: use Excel formulas to see how text is actually stored as numbers, and then as binary, without doing any manual conversion by hand.

Steps

1. Open a new Excel sheet. In column A, type your name, one letter per cell (A1, A2, A3, ...).
2. In column B, next to each letter, use the formula =CODE(A1) to get its ASCII value.
3. In column C, use the formula =DEC2BIN(B1) to convert that ASCII number into binary.
4. Copy the formulas down for every letter of your name. You now have your full name represented as ASCII codes and as binary, generated automatically.

	A	B	C
1	LETTER	ASCII	BINARY
2	N	78	1001110
3	I	73	1001001

Record your results

Letter	ASCII Code (CODE)	Binary (DEC2BIN)

Question 2: Text, Image, Audio & Video Formats

Objective: explore how the same content can be stored in different file formats, and compare what changes between them.

Steps

1. Save the same short piece of text as both a .txt file and a .docx file. Check the file size of each in File Explorer.
2. Save the same photo as .png and .jpg (use MS Paint or take a screenshot). Compare the two file sizes.
3. Right-click a sample image, audio, and video file on your computer and open Properties (Windows). Note the format, file size, and duration (for audio/video) of each.
4. Try opening a .docx file in Notepad, and a .png file in a plain text editor. Observe what happens.

Note: A file format is simply an agreed set of rules for storing data. A program only shows the content correctly if it follows the same rules the file was saved with, that is why opening a .docx in Notepad shows garbled text instead of a proper document.

Record your results

File / Content	Format	File Size	Observation

Notes: Excel Formulas and Functions

There are plenty of Excel formulas and functions depending on what kind of operation you want to perform on the dataset. We will look into the formulas and functions on mathematical operations, character-text functions, data and time, sumif-countif, and few lookup functions.
Let's now look at the top 25 Excel formulas you must know. In this article, we have categorized 25 Excel formulas based on their operations. Let's start with the first Excel formula on our list.

1. SUM

The SUM() function, as the name suggests, gives the total of the selected range of cell values. It performs the mathematical operation which is addition.

2. AVERAGE

The AVERAGE() function focuses on calculating the average of the selected range of cell values.
EX: "=AVERAGE(C2, C3, C4)".
It automatically calculates the average, and you can store the result in your desired location.

3. COUNT

The function COUNT() counts the total number of cells in a range that contains a number. It does not include the cell, which is blank, and the ones that hold data in any other format apart from numeric.
If you are required to count all the cells with numerical values, text, and any other data format, you must use the function 'COUNTA()'. However, COUNTA() does not count any blank cells.
To count the number of blank cells present in a range of cells, COUNTBLANK() is used.

4. MODULUS

The MOD() function works on returning the remainder when a particular number is divided by a divisor. Let's now have a look at the examples below for better understanding.

- In the first example, we have divided 10 by 3. The remainder is calculated using the function "=MOD(A2,3)". The result is stored in B2. We can also directly type "=MOD(10,3)" as it will give the same answer.

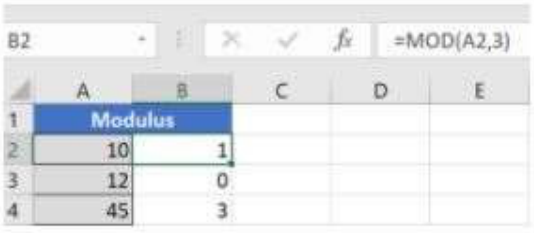


Fig: Modulus function in Excel

- Similarly, here, we have divided 12 by 4. The remainder is 0 is, which is stored in B3.

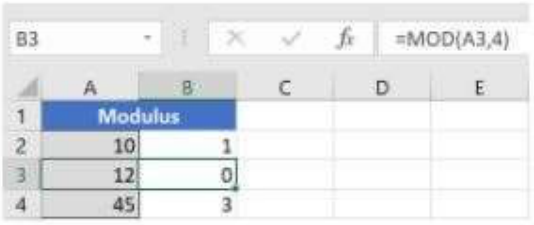


Fig: Modulus function in Excel

5. POWER

The function "Power()" returns the result of a number raised to a certain power. Let's have a look at the examples shown below:

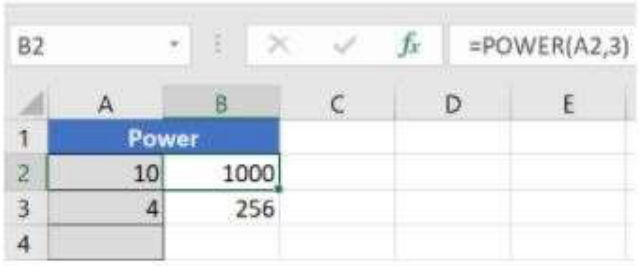


Fig: Power function in Excel

As you can see above, to find the power of 10 stored in A2 raised to 3, we have to type "= POWER (A2,3)". This is how power function works in Excel.

6. CEILING

Next, we have the ceiling function. The CEILING() function rounds a number up to its nearest multiple of significance.

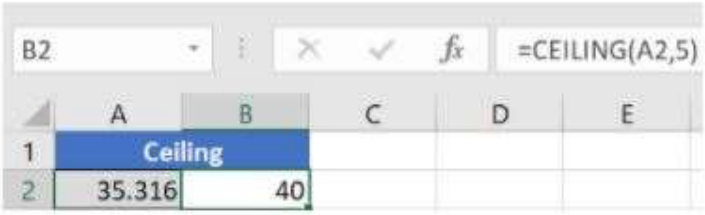


Fig: Ceiling function in Excel

The nearest highest multiple of 5 for 35.316 is 40.

7. FLOOR

Contrary to the Ceiling function, the floor function rounds a number down to the nearest multiple of significance.

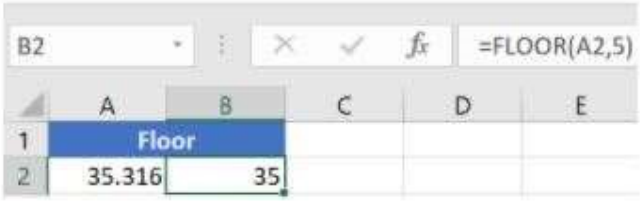


Fig: Floor function in Excel

The nearest lowest multiple of 5 for 35.316 is 35.

8. CONCATENATE

This function merges or joins several text strings into one text string. Given below are the different ways to perform this function.

- In this example, we have operated with the syntax =CONCATENATE(A25, " ", B25)



Fig: Concatenate function in Excel

- In this example, we have operated with the syntax =CONCATENATE(A27&" "&B27)

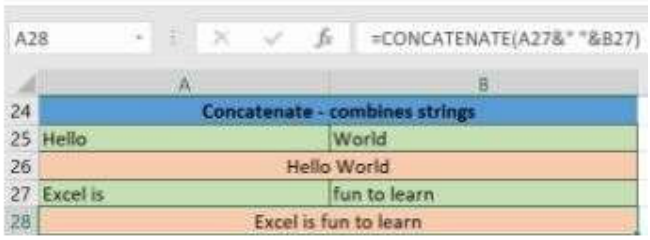


Fig: Concatenate function in Excel

Those were the two ways to implement the concatenation operation in Excel.

9. LEN

The function LEN() returns the total number of characters in a string. So, it will count the overall characters, including spaces and special characters. Given below is an example of the Len function.

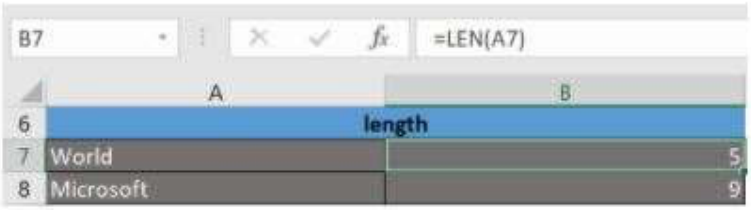


Fig: Len function in Excel

Let's now move onto the next Excel function on our list of this article.

10. UPPER, LOWER, PROPER

The UPPER() function converts any text string to uppercase. In contrast, the LOWER() function converts any text string to lowercase. The PROPER() function converts any text string to proper case, i.e., the first letter in each word will be in uppercase, and all the other will be in lowercase.

Let's understand this better with the following examples:

- Here, we have converted the text in A6 to a full uppercase one in A7.

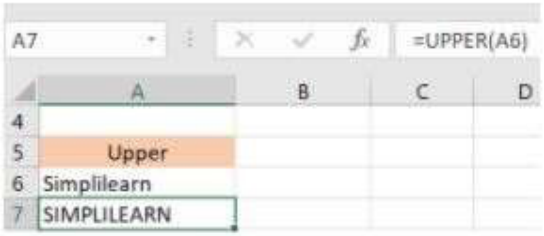


Fig: Upper function in Excel

- Now, we have converted the text in A6 to a full lowercase one, as seen in A7.

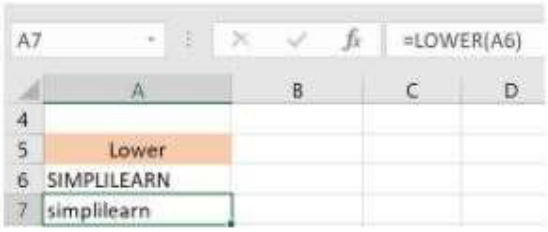


Fig: Lower function in Excel

- Finally, we have converted the improper text in A6 to a clean and proper format in A7.

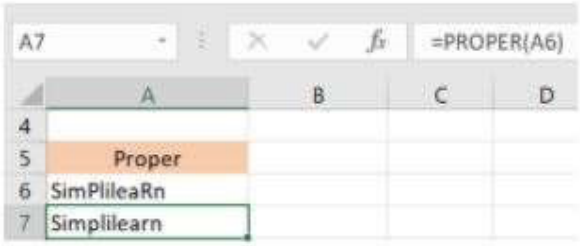


Fig: Proper function in Excel

11. <u>TODAY()</u>

The TODAY() function in Excel provides the current system date.



Fig: Today function in Excel

The function DAY() is used to return the day of the month. It will be a number between 1 to 31. 1 is the first day of the month, 31 is the last day of the month.

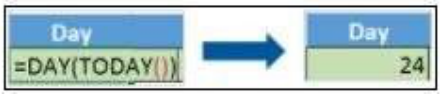


Fig: Day function in Excel

The MONTH() function returns the month, a number from 1 to 12, where 1 is January and 12 is December.



Fig: Month function in Excel

The YEAR() function, as the name suggests, returns the year from a date value.

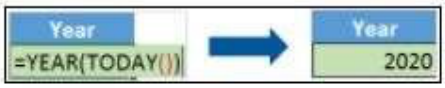


Fig: Year function in Excel

12. HOUR, MINUTE, SECOND

The HOUR() function generates the hour from a time value as a number from 0 to 23. Here, 0 means 12 AM and 23 is 11 PM.

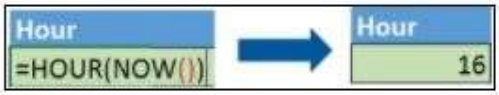


Fig: Hour function in Excel

The function MINUTE(), returns the minute from a time value as a number from 0 to 59.



Fig: Minute function in Excel

The SECOND() function returns the second from a time value as a number from 0 to 59.

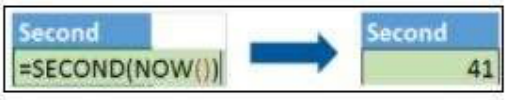


Fig: Second function in Excel

13. DATEDIF

The DATEDIF() function provides the difference between two dates in terms of years, months, or days.
Below is an example of a DATEDIF function where we calculate the current age of a person based on two given dates, the date of birth and today's date.

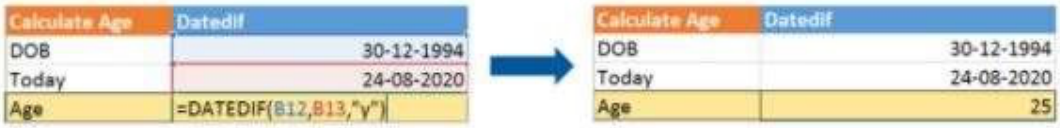


Fig: Datedif function in Excel

Now, let's skin through a few critical advanced functions in Excel that are popularly used to analyze data and create reports.

14. VLOOKUP

Next up in this article is the VLOOKUP() function. This stands for the vertical lookup that is responsible for looking for a particular value in the leftmost column of a table. It then returns a value in the same row from a column you specify.
Below are the arguments for the VLOOKUP function:
lookup_value - This is the value that you have to look for in the first column of

a table. table - This indicates the table from which the value is retrieved.

col_index - The column in the table from the value is to be retrieved.

range_lookup - [optional] TRUE = approximate match (default). FALSE = exact match.
We will use the below table to learn how the VLOOKUP function works.
If you wanted to find the department to which Stuart belongs, you could use the VLOOKUP function as shown below:

	A	B	C	D	E
1	First Name	Last Name	Department	City	Date Hired
2	Ben	Zampa	HR	Chicago	10-11-2001
3	Stuart	Carry	Marketing	Kansas	20-06-2002
4	Jenson	Button	Operations	New York	01-12-2004
5	Lucy	Davis	Sales	Los Angeles	25-02-2011
6	Trent	Patinson	IT	Boston	17-08-2015
7	Jhonny	Evans	Sales	Houston	10-01-2018

Fig: Vlookup function in Excel

Here, A11 cell has the lookup value, A2: E7 is the table array, 3 is the column index number with information about departments, and 0 is the range lookup.

9	Vlookup				
10	First Name	Last Name	Department	City	Date Hired
11	Stuart		=VLOOKUP(A11,A2:E7,3,0)		

If you hit enter, it will return “Marketing”, indicating that Stuart is from the marketing department.

9	Vlookup				
10	First Name	Last Name	Department	City	Date Hired
11	Stuart		Marketing		

15. HLOOKUP

Similar to VLOOKUP, we have another function called HLOOKUP() or horizontal lookup. The function HLOOKUP looks for a value in the top row of a table or array of benefits. It gives the value in the same column from a row you specify.
Below are the arguments for the HLOOKUP function:

- lookup_value - This indicates the value to lookup.
- table - This is the table from which you have to retrieve data.
- row_index - This is the row number from which to retrieve data.
- range_lookup[optional] -This is a boolean to indicate an exact match or approximate match. The default value is TRUE, meaning an approximate match.

Given the below table, let’s see how you can find the city of Jenson using HLOOKUP.

G	H	I	J	K	L	M
First Name	Ben	Stuart	Jenson	Lucy	Trent	Jhonny
Last Name	Zampa	Carry	Button	Davis	Patinson	Evans
Department	HR	Marketing	Operations	Sales	IT	Sales
City	Chicago	Kansas	New York	Los Angeles	Boston	Houston
Date Hired	10-11-2001	20-06-2002	01-12-2004	25-02-2011	17-08-2015	10-01-2018

Hlookup	
First Name	Jenson
City	=HLOOKUP(H23,G1:M5,4,0)

Fig: Hlookup function in Excel

Here, H23 has the lookup value, i.e., Jenson, G1:M5 is the table array, 4 is the row index number, 0 is for an approximate match.
Once you hit enter, it will return “New York”.

Hlookup	
First Name	Jenson
City	New York

16. <u>IF</u>

The IF() function checks a given condition and returns a particular value if it is TRUE. It will return another value if the condition is FALSE.
In the below example, we want to check if the value in cell A2 is greater than 5. If it’s greater than 5, the function will return “Yes 4 is greater”, else it will return “No”.

	A	B	C	D
1	IF			
2	4	=IF(A2>5, "Yes 4 is greater", "No")		

Fig: If function in Excel

In this case, it will return ‘No’ since 4 is not greater than 5.
‘IFERROR’ is another function that is popularly used. This function returns a value if an expression evaluates to an error, or else it will return the value of the expression. Suppose you want to divide 10 by 0. This is an invalid expression, as you can’t divide a number by zero. It will result in an error.

	A	B
1	Iferror	
2	10	Cannot divide
3	0	

The above function will return “Cannot divide”.

17. COUNTIF

The function COUNTIF() is used to count the total number of cells within a range that meet the given condition.

Below is a coronavirus sample dataset with information regarding the coronavirus cases and deaths in each country and region.

Let’s find the number of times Afghanistan is present in the table.

	A	B	C	D	E	F	G	H	I	J	K
1	dateRep	day	month	year	cases	deaths	countriesAndTerritories	geoId	countryterritoryCode	popData2018	continentExp
2	03-06-2020	3	6	2020	759	5	Afghanistan	AF	AFG	37172386	Asia
3	02-06-2020	2	6	2020	545	8	Afghanistan	AF	AFG	37172386	Asia
4	01-06-2020	1	6	2020	680	8	Afghanistan	AF	AFG	37172386	Asia
5	31-05-2020	31	5	2020	866	3	Afghanistan	AF	AFG	37172386	Asia
6	30-05-2020	30	5	2020	623	11	Afghanistan	AF	AFG	37172386	Asia
7	29-05-2020	29	5	2020	580	8	Afghanistan	AF	AFG	37172386	Asia
8	28-05-2020	28	5	2020	625	7	Afghanistan	AF	AFG	37172386	Asia
9	27-05-2020	27	5	2020	658	1	Afghanistan	AF	AFG	37172386	Asia
10	26-05-2020	26	5	2020	591	1	Afghanistan	AF	AFG	37172386	Asia
11	25-05-2020	25	5	2020	584	2	Afghanistan	AF	AFG	37172386	Asia
12	24-05-2020	24	5	2020	782	11	Afghanistan	AF	AFG	37172386	Asia
13	23-05-2020	23	5	2020	540	12	Afghanistan	AF	AFG	37172386	Asia
14	22-05-2020	22	5	2020	531	6	Afghanistan	AF	AFG	37172386	Asia
15	21-05-2020	21	5	2020	492	9	Afghanistan	AF	AFG	37172386	Asia
16	20-05-2020	20	5	2020	581	5	Afghanistan	AF	AFG	37172386	Asia
17	19-05-2020	19	5	2020	408	4	Afghanistan	AF	AFG	37172386	Asia
18	18-05-2020	18	5	2020	262	1	Afghanistan	AF	AFG	37172386	Asia
19	17-05-2020	17	5	2020	0	0	Afghanistan	AF	AFG	37172386	Asia
20	16-05-2020	16	5	2020	1063	32	Afghanistan	AF	AFG	37172386	Asia
21	15-05-2020	15	5	2020	113	6	Afghanistan	AF	AFG	37172386	Asia
22	14-05-2020	14	5	2020	259	3	Afghanistan	AF	AFG	37172386	Asia
23	13-05-2020	13	5	2020	280	5	Afghanistan	AF	AFG	37172386	Asia



Fig: Countif function in Excel

The COUNTIFS function counts the number of cells specified by a given set of conditions.

If you want to count the number of days in which the cases in India have been greater than 100. Here is how you can use the COUNTIFS function.



18. SUMIF

The SUMIF() function adds the cells specified by a given condition or criteria.
Below is the coronavirus dataset using which we will find the total number of cases in India till 3rd Jun 2020. (Our dataset has information from 31st Dec 2020 to 3rd Jun 2020).

	A	B	C	D	E	F	G	H	I	J	K
9078	31-12-2019	31	12	2019	0	0	India	IS	ISL	353574	Europe
9079	03-06-2020	3	6	2020	8909	217	India	IN	IND	1352617328	Asia
9080	02-06-2020	2	6	2020	8171	204	India	IN	IND	1352617328	Asia
9081	01-06-2020	1	6	2020	8392	230	India	IN	IND	1352617328	Asia
9082	31-05-2020	31	5	2020	8380	193	India	IN	IND	1352617328	Asia
9083	30-05-2020	30	5	2020	7964	265	India	IN	IND	1352617328	Asia
9084	29-05-2020	29	5	2020	7466	175	India	IN	IND	1352617328	Asia
9085	28-05-2020	28	5	2020	6566	194	India	IN	IND	1352617328	Asia
9086	27-05-2020	27	5	2020	6387	170	India	IN	IND	1352617328	Asia
9087	26-05-2020	26	5	2020	6535	146	India	IN	IND	1352617328	Asia
9088	25-05-2020	25	5	2020	6977	154	India	IN	IND	1352617328	Asia
9089	24-05-2020	24	5	2020	6767	147	India	IN	IND	1352617328	Asia
9090	23-05-2020	23	5	2020	6654	137	India	IN	IND	1352617328	Asia
9091	22-05-2020	22	5	2020	6088	148	India	IN	IND	1352617328	Asia
9092	21-05-2020	21	5	2020	5609	132	India	IN	IND	1352617328	Asia
9093	20-05-2020	20	5	2020	5611	140	India	IN	IND	1352617328	Asia
9094	19-05-2020	19	5	2020	4970	134	India	IN	IND	1352617328	Asia
9095	18-05-2020	18	5	2020	5242	157	India	IN	IND	1352617328	Asia
9096	17-05-2020	17	5	2020	4987	120	India	IN	IND	1352617328	Asia
9097	16-05-2020	16	5	2020	3970	103	India	IN	IND	1352617328	Asia
9098	15-05-2020	15	5	2020	3967	100	India	IN	IND	1352617328	Asia
9099	14-05-2020	14	5	2020	3722	134	India	IN	IND	1352617328	Asia
9100	13-05-2020	13	5	2020	3525	122	India	IN	IND	1352617328	Asia



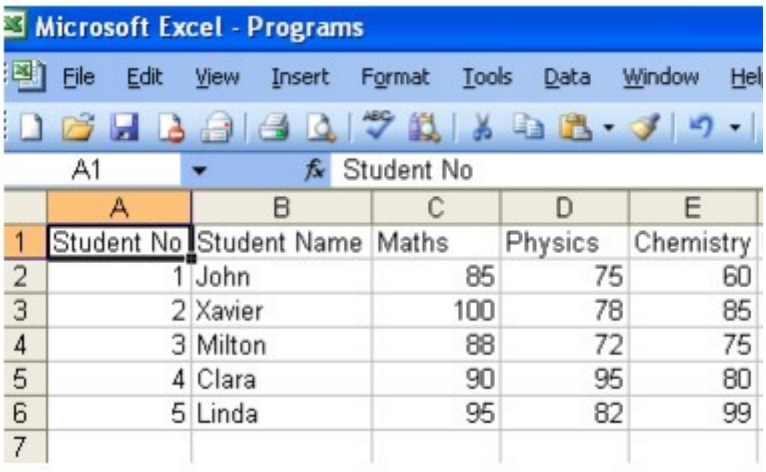
Fig: Sumif function in Excel

The SUMIFS() function adds the cells specified by a given set of conditions or criteria.
Let's find the total cases in France on those days when the deaths have been less than 100.



Question 3: Analyze student performance

Let us consider the problem of finding the total and average of 3 subject marks for five students in a class in the board exam. The data is entered into the spread sheet as shown below:



	A	B	C	D	E
1	Student No	Student Name	Maths	Physics	Chemistry
2	1	John	85	75	60
3	2	Xavier	100	78	85
4	3	Milton	88	72	75
5	4	Clara	90	95	80
6	5	Linda	95	82	99
7					

Calculate the Maximum mark, minimum mark, mean, median, standard deviation and variance for each subject.
Hint: For Maths, =MAX(C2:C6)

Question 4: Calculate the grade

In In this problem, you are given the **name, gender, attendance, assignment marks, and midterm marks** of five students.

Name	Gender	Attendance	Assignment	Midterm
Ananya	Female	92%	48	45
Rahul	Male	85%	42	44
Priya	Female	78%	38	40
Arjun	Male	65%	35	32
Karthik	Male	45%	27	25

Calculate the **Total Score** of each student using the following formula: **Total Score = (50% of Assignment Marks) + (50% of Midterm Marks)**

Students who have a **Total Score greater than or equal to 50** are considered to have passed. Display the word **"Pass"** or **"Fail"** under a column called **Description**. **Attendance should not be considered as a criterion for passing or failing.**

Calculate the grades of the students as per the grade rule table given below:

Marks Range	Grade
Score>=90	A
90>Total Score>=80	B
80>Total Score>=70	C
70>Total Score>=60	D
60>Total Score>=50	E
Total Score < 50	F

The format of the table should be:

A	B	C	D	E	F	G	H
Name	Gender	Attendance	Assignment	Midterm	Total Score	Description	Grade

Question 5: Design a timetable

Create a weekly class timetable from **Monday to Friday** with different subjects and timings. Use **different fonts, font sizes, text styles, and colors** to make the timetable clear and attractive.

Time	Monday	Tuesday	Wednesday	Thursday	Friday
9:00 – 10:00	Mathematics	Programming	Data Structures	Algorithms	Mathematics
10:00 – 11:00	Programming	Mathematics	Database	Web Development	Programming
11:00 – 11:15	**BREAK**	**BREAK**	**BREAK**	**BREAK**	**BREAK**
11:15 – 12:15	Data Structures	Algorithms	Mathematics	Programming	Database
12:15 – 1:15	Database	Web Development	Programming	Data Structures	Algorithms
1:15 – 2:15	**LUNCH BREAK**	**LUNCH BREAK**	**LUNCH BREAK**	**LUNCH BREAK**	**LUNCH BREAK**
2:15 – 3:15	Web Development	Database	Algorithms	Mathematics	Data Structures
3:15 – 4:15	Algorithms	Data Structures	Web Development	Database	Mathematics
4:15 – 5:00	Design	Design	Design	Design	Design

Note: The above timetable is only an example. You may choose your own subjects and timings.

Question 6: Calculation of salary details

To calculate HRA, DA, TA, PF, LIC, Gross salary from the given data in the worksheet and also sort all name in alphabetical order using MS-excel.

HRA = 18% of basic pay

TA = 12% of basic pay

DA = 15% of basic pay

PF = 10% of basic pay

LIC = 7% of basic pay

Gross Salary = basic pay + HRA + DA + TA

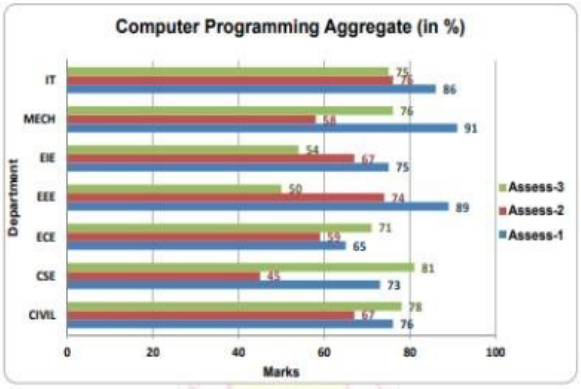
Deduction = PF + LIC

Net Salary = Gross Salary – Deduction

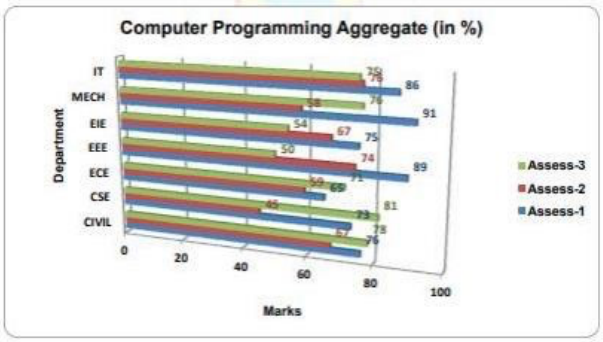
A	B	C
S.No	**Name**	**Basic Pay**
1	Raj	20,000
2	Arun	15,000
3	Prem	12,000
4	Kumar	10,000
5	Siva	13,000
6	Prabhu	11,000
7	Anu	18,000
8	Bala	19,000
9	Jagan	14,000
10	Raji	17,000

Question 7: Create a bar chart

Computer Practice Aggregate (in %)			
Department	**Assess-1**	**Assess-2**	**Assess-3**
EEE	56	67	78
ECE	73	45	81
CIVIL	65	59	71
CSE	89	74	50
MECH	75	67	54



2D Bar Chart



3D Bar Chart

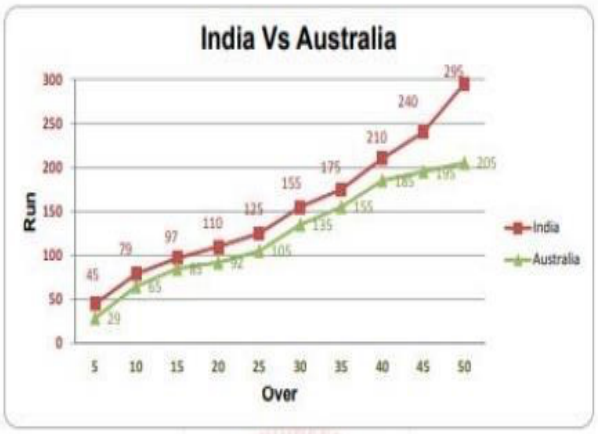
Steps:

1. Enter the above data in an Excel worksheet and select the table.
2. Go to **Insert → Bar Chart → 2-D Bar → Clustered Bar**.
3. Give the chart the title **Computer Practice Aggregate (%)**.
4. Label the axes:
    - **Horizontal Axis:** Marks (%)
    - **Vertical Axis:** Department
5. Customize the chart using different **colors, fonts, and chart styles**.
6. Ensure that **Assess-1, Assess-2, and Assess-3** are clearly distinguishable in the chart.

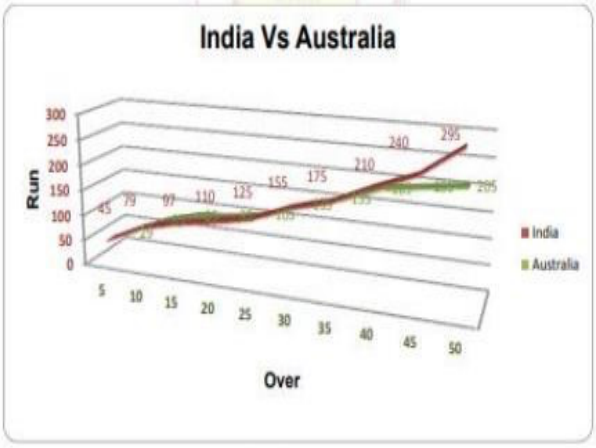
Note: The images shown are for **reference only** and do not represent the bar chart created from the exact data provided above.

Question 8: Create a line chart

Ind vs Aus		
Overs	India	Australia
5	45	29
10	79	62
15	97	80
20	110	100
25	125	115
30	155	140
35	175	165
40	210	200
45	240	230
50	295	275



2D Line Chart



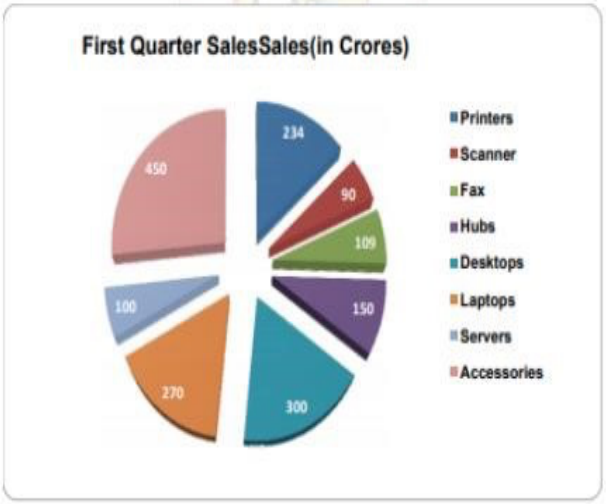
3D Line Chart

Question 9: Create a Pie chart

First Quarter Sales	
Product	**Sales(in Crores)**
Printers	234
Scanner	90
Fax	109
Hubs	150
Desktops	300
Laptops	270
Servers	100
Accessories	450



2D Pie Chart



3D Pie Chart