FARE CALCULATION MODEL
(USING METHODS, METHOD OVERLOADING & CONSTRUCTORS)

1. DTDCA courier company charges for the Courier based on the weight of the parcel Define a class with the following specifications:

Class name : **Courier**

Member variables :

name - Name of the customer
Weight - to hold the weight of the parcel in kilogrammes
AddressTo - address of the recipient
AddressFrom - address of the sender
Bill - amount to be paid
Type (D) - for domestic
(I) - for International.

Member methods:

void Accept() - To accept the parcel details.
void calculate() - to calculate the bill as per the following criteria:

Weight in Kgs	Rate for KG
First 5 kgs	Rs. 800
Next 5 kgs	Rs. 700
Above 10 kgs.	Rs. 500

An additional amount of Rs. 1500 is charged if the type of the courier is international.
void print() - to print the details.
void main() - to create an object for the class and invoke the methods.

2. Define a class with the following specifications:

Class name : **Student**

Member variables :

name - Name of the candidate.
age - to hold the age of candidate.
mks - to hold the marks secured by candidate.
stream - to hold the allotted stream for the candidate.

Member methods:

void Accept() - To accept name, age & marks.
void Allotment() - to allot the Stream as per the following criteria:

Marks	Stream
> 300	Computer science
Between 200 and 300	Commerce and computers
75 to 200	Arts and animation
Below 75	Reattempt the exam

void print() - to print the details necessary.

3. A private cab service company provides services within the city at the following rates:

Range	AC CAB	NON – AC CAB
Up to 5 KM	Rs. 150/-	Rs. 120/-
Beyond 5 KM	Rs. 10/- per KM	Rs. 8/- per KM

Design a class **CabService** with the following descriptions:

Data Members:

String Car_Type - to store the type of cab AC / NON – AC
double KM - to store the kilometres travelled.
double Bill - to calculate and store the bill amount.

Member Methods:

Constructor - to initialize the instance variables with default values.
Void accept() - to accept cab type and the kilometres travelled.
Void cal() - to calculate the bill as per the above given criteria.
Void display() - to display the bill as follows:
CAR TYPE -
KM Travelled -
BILL AMOUNT -

4. Design a class **ShowRoom** with the following descriptions:

Data Members:

String name - to store the name of a customer.
long mob - to store the mobile number of the customer.
double cost - to store the cost of the item purchased
double disc - to store the discount amount
double amount - to store the amount to be paid after discount.

Member methods:

ShowRoom() - default constructor to initialize the data members.
Void input() - to input customer name, mobile number and cost.
Void calculate() - to calculate discount on the cost of purchased item, based on the following criteria.

Cost	Discount in percentage
<=10000	5%
10000 to 20000	10%
20000 to 35000	15%
Above 35000	20%

Void display() - to display customer name, mobile number, cost, discount and amount.

5. Design a class **Railway_Ticket** with the following description:

Data Members:

String name - To store the name of the passenger.
String coach - To store the type of coach passengers want to travel.
Long phno - To store passengers mobile number.
Int amt - To store basic amount of ticket.
Int tot_amt - To store the amount to be paid after updating the original amount.

Member methods:

void accept() - To take input for name coach mobile number and amount.
void update() - To update the amount as per the court selection (Extra amount to be added in the amount as follows)

Type of Coach	Amount
First_AC	700
Second_AC	500
Third_AC	250
Sleeper	150

General	Nil

void display() - To display all details of passenger such as name coach. Total amount and mobile number.

6. Define in class electricitybill with the following specifications:
   Class : **ElectricityBill**
   Data Members:
   String name - to store the name of the customer.
   int units - To store the number of units consumed.
   double bill - To store the amount to be paid.
   Member Methods:
   void Accept() - To accept the name of the customer and the number of units consumed.
   void Calculate() - To calculate the bill as per the following tariff:

Number of units	Rate per unit
First 100	Rs. 2.00
Next 200	Rs. 3.00
Above 300	Rs. 5.00

   The surcharge of 2.5% keys to be charged if the number of units consumed is above 300.
   void Print() - To print the details as follows:
   Customer name: XXXXXXXXXXXXXX
   Units consumed: XXXX
   Bill Amount: XXXXX

7. Define a class named **BookFare** with the following description:
   Data Members:
   String BName - Store the name of the book.
   double price - Stores the price of the book.
   Member Methods:
   BookFare( ) - default constructor to initialize data members.
   void Input( ) - to input and store the name and price of the book.
   void calculate( ) - to calculate the price after discount. Discount is calculated based on the following criteria:

Price	Discount
<= 1000	2%
1000 to 3000	10%
Above 3000	15%

   void display( ) - to display the name and price of the book after discount.

8. Define a class named MovieMagic with the following description:
   Data members:
   int year - to store the year of release of the movie.
   String title - to sore the movie name.
   double rating - to store the rating of a movie.

   Member methods:
   MovieMagic() - to initialize the value for rating as 0.0.
   void Accept() - to read the values for year, title and rating given by audience.

void Display() - to display the movie title, Year of Release and rating awarded to it with the message as specified below.

Rating	Message
0.0 to 2.0	Flop
2.1 to 3.4	Average
3.4 to 4.5	Hit
4.5 to 5.0	Block Buster

9. Define a class with the following specifications:

Class Name - Bank

Data Members:

double p - to store the principal amount.
double n - to store the time period in years.
double r - to store the rate of interest.
double a - to store the amount.

Member Methods:

void Accept() - to read the values for the variables p and n using scanner class.

void Calculate() - calculate the amount based on the following condition:

Time in Years	Rate
Upto 6 – months	9%
6 Months to 1 year	10%
1 to 3	11%
Above 3	12%

$$A = p\left[1 + \frac{r}{100}\right]^n$$

void display() - to display the details in the following format.

Principal Time Rate Amount
XXXX XXX XX XXXXX

10. Define a class to overload a method and perform as follows:

double perform (double R, double h): To calculate and return the value of curved surface area of a cone.
$CSA = \pi\, r\, l$ where l = $\sqrt{r^2 + h^2}$.

void perform (int r, int c): Using nested loop generate the following format:

1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5

void perform (int m, int n, char ch): To print the quotient of the division of m and n. If ch is Q else, print the reminder of the division of m and n. If the ch is R.

11. Define a class to overload the function print as follows:

void print( ) : Using nested loop generate the following format:

1 1 1 1 1
2 2 2 2 2
3 3 3 3 3
4 4 4 4 4

5 5 5 5 5

void print(int n): To check whether the given number is lead number or not.
Elite number is the one whose sum of even digits are equal to some of our digits.
Example:
3669
Odd digits = 3, 9 sum of odd digits = 3+9=12
Even digits = 6, 6 sum of even digits = 6+6=12
So, 3669 is a lead number.

12. Design a class to overload a method number( ) as follows:
    Void number(int num, int d) - to count and display the frequency of a specified digit in a number.
    Void number(int n1) - to find and display the sum of even digits of a number.

13. Design a class to overload a method **check( )** as follows:
    a) Void check(String st, char ch) - to find and print the frequency of the given character in a string.
    b) Void check(String st1) - to display only the vowels from the given string after converting it into lowercase.

14. Define a class called **ParkingLot** with the following description:
    Data Members:
    int vno - to store the vehicle number.
    int hours - to store the number of hours the vehicle is parked in the parking lot.
    double bill - to store the bill amount.
    Member Methods:
    void input() - to input and store the vno and hours.
    void calculate() - to compute the parking chare at rate of Rs. 3 for the first hour of part thereof, and Rs. 1.50 for each additional hour of part thereof.
    void display() - to display the details.
    Write a main method to create an object of the class and call the above methods.

15. Design a class to overload a function **JoyString()** as follows:
    void JoyString(String s, char ch1, char ch2)- replace character ch1 with the character ch2 in the given string.
    void JoyString(String s) - to print the possession of first and last space in the given string.
    void JoyString(String s1, String s2) - to combine & print the given two strings with space between them.

16. Design a class to overload a function **area()** as follows:
    double area(double a, double b, double c) - to return the area of scalene triangle using the formula
    $area = \sqrt{s(s-a)(s-b)(s-c)}$
    Where s = a+b+c/2.
    double area(int a, int b, int height) - to return the area of trapezium using the

formulae:

$$area = \frac{1}{2}\ height\ (a + b)$$

double area(double d1, double d2) - to return the area of rhombus using the formulae:

$$area = \frac{1}{2}\ (d1 * d2)$$

17. Define a class to overload the method that perform as follows:

void Perform(int x[]) - to display the largest element of the array.
Example: Array = {4, 5, 7, 2, 9, 4, 10, 6, 1}
Largest Element = 10

void Perform(String s, char ch)- if ch is 'F' print the first five characters from the given string, if ch is 'L' print the last five characters from the given string.
Example: s = "Malayalam"
If ch = F Output = Malay
If ch = L Output = yalam

void perform(int n) - print the product of first and last digit of the given number n.
Example: n = 45326
Output = 4 x 6 = 24

18. Design a class to overload a function series() as follows:

void series(int x, int n) - to display the sum of the series given below:
$x^1 + x^2 + x^3 + x^4 + x^5 + - - - - + x^n$ terms.

void series(int p) - to display the following series:
0, 7, 26, 63 - - - - - p – terms.

void series( ) - to display the following series:
$\frac{1}{2} + \frac{1}{3} + \frac{1}{4} + - - - - - + \frac{1}{10}$

19. Define a class to overload a method display() as follows:

void display() - To print the following format using nested loops.
1 2 1 2 1
1 2 1 2 1
1 2 1 2 1

void display(int n, int m) - To print the quotient of the division of m and n. If m is greater than n, otherwise print the sum of twice n and thrice m.

double display(double a, double b, double c)
- To print the value of Z where,
Z = p x q
p = $\frac{a+b}{c}$ q = a + b + c

20. Design a class to overload a function VOLUME() as follows:

double volume(double R) - With radius 'R' as an argument, return the volume of sphere using the formula:
V = 4/3 x 22/7 x R^3

double volume(double R , double H)- With height, H and radius R as the

argument, return the volume of a cylinder using the formula:
$V = 22/7 \times R^3 \times H$

double volume(double R , double H , double L) - With length 'L' Breadth 'B' and height 'H' as argument. Return the volume of a cuboid using the formula:
V = L x B x H

21. Design a class to overload a function **SumSeries( )** as follows:
    a) void SumSeries(int n, double x) - to find and display the sum of the given series:
    $S = \frac{x}{1} + \frac{x}{2} + \frac{x}{3} + - - - + n\ terms$
    b) void SumSeries( ) - to display the sum of the following series:
    S = 1 + (1x2) + (1x2x3) - - - 20 terms

22. Define a class to accept a number from user and check if the given number is evenpal number or not (The number is said to be evenpal Number when number is palindrome number (A number is said to be palindrome if it is equal to its reverse) And some of its digits is an even number.)

1D & 2D ARRAY

23. Define a class to accept values into an integer array of order 4 and check whether it is a diagonal array or not. An array is diagonal if the sum of left diagonal elements equals to the sum of right diagonal elements. Print the appropriate message.

24. Define a class to accept 10 characters from a user using bubble sort technique. Arrange them in ascending order. Display the sorted array an original array.

25. Define a class to accept values into an array of double data type of size. 20 accept a double value from user and search in the array using linear search method. If value is found, display message "found" with its position where it is present in the array. Otherwise, display message "not found".

26. Define a class to accept values in integer area of Size 10. Find sum of one-digit numbers and sum of two-digit numbers entered. Display them separately.

27. Define a class to perform binary search on a list of integer given below To search for an element input by the user. If it is found, display the element along with the position. Otherwise, display the message "Search element not found".
    2, 5, 7, 10, 15, 20, 29, 30, 46, 50

28. Display at last two declared a character area of size 10 except the characters into the airline display. The character with highest and lowest as key values.

29. Define a class to declare an array of size 20 of double data type, accept the elements into the array and perform the following:
    a) Calculate and print the product of all the elements.
    b) Print, the square of each element of the array.

30. Define a class to declare a narrative accept and store 10 words display only those words which begin with a letter ‘A’ or ‘a’ and also ends with the letter ‘A’ or ‘a’.

31. Write a program to input and store integer elements in a double dimensional array of size 3 x 3 and find the sum of left and right diagonal elements.

32. Write a programme to accept name and totalmarks of N number of students into single subscript array name[] & totalmarks[]. Calculate and print:
    a) The average of total marks obtained by a number of students.
       [average = sum of total marks of all student / N]
    b) Deviation of each student’s total marks with the average
       [Deviation = Total Marks of a student – average]

33. Write a program to input integer elements into a array of size 20 and perform the following operations:
    a) Display the largest number from the array.
    b) Display the smallest number from the array.
    c) Display the sum of all the elements from the array.

34. Write a program to input 40 words in an array. Arrange these words in descending order of alphabets using selection sort technique. Print the sorted array.

35. Write a program to input and store roll numbers, names and marks of 3 subjects of n number of students in five single dimensional arrays and display the remarks based on average marks as given below: (The maximum marks in the subject are 100)
    Average marks = total marks /3.

Average marks	Remarks
85 – 100	Excellent
75 – 84	Distinction
60 – 74	First Class
40 – 59	Pass
Less than 40	Poor

36. Write a programme to input 20 numbers in an array, arrange these names in descending order of alphabets, using the bubbles or technique.

37. Define a class to accept values into a 3x3 array and check if it is a Losho grid or not.
    A grid is a Losho grid if the sum of each row and column equals 15.
    Print appropriate messages.
    Example: 4 9 2
             3 5 7
             8 1 6

38. A teacher prepares the statistics of under students in ICSE - 2024 on the subject, Computer applications as follows:

Range	No. of Students
Above 90	
89 – 90	
60 – 80	
Below 60	

Define a class to accept the marks of hundred students in an area and print the statistics as mentioned above.

39. Define a class pin code and store the given pin code in a single dimensional array. Sort the pin codes in ascending order using the selection sort technique only. Display the sorted array.

40. Write a program to initialize seven wonders of the world, along with their location in two different arrays. Search for the name of a country input by the user. If found display the name of the country along with its wonder, otherwise display "Sorry..! Not found".

Seven Wonders with countries:

Seven Wonders	Countries
Great Wall of China	China
Petra	Jordan
Christ the Redeemer	Brazil
Machu Picchu	Peru
The Pyramids of Giza	Egypt
Colosseum	Italy
Taj Mahal	India

STRING METHODS

41. Define a class to accept a string and convert the same to uppercase. Create and display the new string by replacing each oval by immediate next character and every consonant by previous character. The other characters remain the same.

42. Define a class to accept Gmail ID and check for its validity A Gmail ID is valid only if it has the following:
@
.
gmail
com

43. Define a class to accept a string and print the number of digits, alphabets and special characters in a string.

44. Define a class to accept a string and print the characters with uppercase and lowercase reversed But all the other characters should remain in the same as before.
Example:
Input: WelCoMe_2025
Output: wELcOmE_2025

45. Define a class to accept two strings of same length and form a new word in such a way that the first character or 1st word is followed by the first character of the 2nd word, and so on.
Example:
Input:
St1 = BALL

St2 = WORD

Output: BWAOLRLD

46. Write a program to input a sentence and convert it into upper case and display each word separate lines.
    Example:
    INPUT: India is my country.
    OUTPUT: INDIA
    IS
    MY
    COUNTRY

47. Write a programme to input a sentence and convert it into upper case and count and display the total number of words starting with a letter 'A'.

48. Write a programme in Java to accept a string in lower case and change the first letter of every word to uppercase. Display the new string and the old string.

49. Write a program to accept a word check and print whether the word is a palindrome or a special word.
    Palindrome - word which read the same from left to right and vice-versa.
    Special Word - words which starts and ends with same letter.

50. Write a program to assign a full path and file name as given below. Using library functions, extract and display the file path, file name and file extension separately as follows.
    Input:
    c:\users\kchai\dropbox\stem\2025-26\programs_for_x.docx
    Output:
    Path = C:\Users\kchai\Dropbox\STEM\2025-26\
    File Name = programs_for_x
    File Extension = docx

51. A student appearing for the ICSE/ISC examination will be given an index number, which is of the following format:
    Number of 7 digits/number of 3 digits.
    The first digit represents ICSE(1) or ISC(2), the next two digits represent the year, the next four digits represent the centre number, the last 3 digits represent the index number.
    Example:
    1244311/204
    Class: 10
    Year: 24
    Centre number: 4311
    Index number: 204
    Example :
    2259856/107
    Class: 12
    Year: 25
    Centre number: 9856
    Index number:107

Define a class to accept the student index number as a String and print his/her details as above.

52. Sam designs a program to check the strength of a password. A strong password should satisfy the following conditions:
    - Length of the password should be at least 12 characters.
    - Should at least have one uppercase letter, one lower case letter, one digit and one special character.

    Define a class to accept the password and check whether the password is strong or not.

SERIES, SUM OF SERIES & PATTERN

53. Write a menu driven program to perform the following operations as per users choice:
    i. To print the value of $c = a^2 + 2ab$ where a varies from 1.0 to 20.0 with increment of 2.0 and b = 3.0 is a constant.
    ii. To print the following pattern using for loop:

    A
    AB
    ABC
    ABCD
    ABCDE

    Display appropriate message for an invalid choice.

54. Using switch case, red emo driven programme to do the following:
    a) Degenerate and print letters from A to Z and their unicode.

ALPHABET	**UNICODE**
A	65
B	66
C	67

    b) Display the following pattern using iterative statements.

    1
    1 2
    1 2 3
    1 2 3 4
    1 2 3 4 5

55. Write a menu driven programme to display the pattern as per users choice:

Pattern – 1	**Pattern – 2**
ABCDE	B
ABCD	LL
ABC	UUU
AB	EEEE
A	

56. Using switch statement write a menu driven program for the following:
    a) To find and display the sum of the given series given below:
    $S = x^1 - x^2 + x^3 - x^4 + x^5 - - - - - - x^{20}$ Where x = 2.

b) To display the following series:
1 11 111 1111 11111

57. Using the switch statement, write a menu driven program for the following:
i. To print the Floyd's triangle:
1
2 3
4 5 6
7 8 9 10
11 12 13 14 15
ii. To display the following pattern:
I
I C
I C S
I C S E
Display an appropriate message for incorrect option.

58. Write 2 separate programs to generate the following patterns using iterative statements:
a)
```
*
* #
* # *
* # * #
* # * # *
```

b)
```
5 4 3 2 1
5 4 3 2
5 4 3
5 4
5
```

59. Complete the following programs separately:
a) Define a class to print the Floyds triangle of given rows using nested loops only.
Example:
A Floyd triangle of 6 rows is
1
2 3
4 5 6
7 8 9 10
11 12 13 14 15
16 17 18 19 20 21
b) Define a class to print the sum of the following series:
1 + (1+2) + (1+2+3) + (1+2+3+4) + ... + (1+2+3+4+5+ . . . +n)

NUMBER PROGRAMS

60. A tech number has even number of digits. If the number of is split into two equal halves. Then the square of sum of these halves is equal to the number of itself. Write a programme to generate and print all four-digit tech numbers.

61. Write a program to input a number and check and print whether the given number is a Pronic number or not. Pronic number is a number which is product of two consecutive integers.

62. Write a programme to accept a number and check and display whether it is a **spy number** or not. (A number is **SPY** if the sum of its digits equal to the product of its digits).

63. Define a class to accept a number and check whether it is super **spy number** or not. A number is called **Super Spy**. If the sum of its digits equal to the number of its digits.
    Example:
    Input: 1021
    Output:
        Sum of Digits = 1 + 0 + 2 + 1 = **4**
        Number of digits = **4**
    Sum of Digits = Number of digits Therefore 1021 is a SUPERSPY Number.

64. Write a program to accept a number and check and display whether it is a **Niven** number or not. (**Niven** number is a number which is divisible by sum of its digits).

65. A special two-digit number is such that when the sum of its digits is added to the product of its digits, the result is equal to the original two digit number.
    Example:
    Given two digit Number = 59
    Sum of digits = 5+9 = 14
    Product of digits = 5 x 9 = 45
    Sum of digits + product of digits = 14 + 45 = 59(given number)
    Write a program to accept a 2 digit number. Add the sum of its digits to the product of its digits. If the value is equal to the given number then display message "*Special 2 – digit number*" else display the message "Not a *Special 2 – digit number*".

66. Define a class to accept a four-digit number and check if it is a USHWA number or not. The number is said to be USHWA
    Accept a four digit number . If:
    Sum of all digits= 2× (sum of first and last)
    Example – 1 : n = 1234
    Sum of first and last = 1+4=5
    Sum of all digits = 1+2+3+4=10
    Example – 2 : n = 354, then an error message should be given as the number has only 3 digits.

67. Using the split statement, write a menu driven program to:
    a) To final display all the factors of a number input by the user, including one and excluding number itself.
    b) Define and display the factors of a network, input by the user.

68. Using the switch statement, write a menu driven program to calculate the maturity amount of a Bank Deposit.
    The user is given the following options:

    i. Term Deposit

    Accept principal (p), rate of interest (r) and time period in years (y). Calculate and print the maturity amount (A) receivable using the formula:

    $$A = p\left[1 + \frac{r}{10}\right]^n$$

    ii. Recurring Deposit

    Accept monthly instalment (p), rate of interest (r) and time period in months (m). Calculate and print the maturity amount (A) receivable using the formula:

    $A = p \times n + p \times n(n+1)^2 \times \frac{r}{100} \times \frac{1}{2}$

    For an incorrect option, an appropriate error message should be displayed.

69. The BHDB company offer EMI (Equated Monthly Instalments) based loans for the purchase of electronic devices based on the purchase amount the rate of interest is offered as follows:

    Purchase amount less than Rs.20000, rate of interest is 12% otherwise the rate of interest is 15%.

    Amount with interest for the specified number of years is calculated using the formula:
    Amount = p(1+r/100)^n

    Where p is the purchase amount, r is the rate of interest, n is the number of years.

    After the amount is calculated it is converted into EMI by dividing the amount by the number of months of the tenure, which has to be a whole number rounded off to the nearest integer.

    Print the details as follows:
    Purchase amount:
    Rate of interest:
    Amount with interest:
    EMI:

    Define a class to accept the purchase amount and the number of years of the tenure, calculate and print the details as per the above specifications.

70. Rahul was asked to create a class with methods to calculate the area of its triangle (½ x b x h), the area of a square (s x s), the area of trapezium (½ x h x (a+b)) and the area of rectangle (l x b) He created a class by giving the same name to all the methods as area. Name the element of Java used in the programme. Define a class with the four methods with the same name.

X - X