1. Write a program contains a class **Base** that has data members: B[30][30] (double), x (double), n (dimension of the marix). It contains a function to read data members(B excep last row), a function to return greatest common divisor btween two given positive integer numbers, a function to return the max greatest commn divisor in specific column (i.e., find the greatest commomn divisor btween each elelement in a given column and x and return max value between them), a function to set elements of last row such that each $B_{n-1,i}$ is the max gretest commom divisior in column i (for i=0,.., n-2), a function to return the verage of last row (virtual function), a function to display the average of last row(not virtual function). Derive a class **Drive** from **Base** that has data members: D[30] (double) . It contains a function to return a factorial of a given positive integer number, a function to set data members such that each $D_i = (B_{n-1,i})!, \quad for\ i = 0,..,n-1,$, a function to return the average of the first and last elements of D. In main function, define objects and pointers from all classes to apply all functions(use display function in Base class to display all averages for two classes).

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2. Write a program contains a class **Base** class that has data member A[30] (double), B[30] (double) x (double), n(number of elements). It contains a function to return $\binom{a}{b}$ for to given positive integer

numbers, a function to read data members: A, x, n, and set the elements of B such that each element B_i is equal to $\binom{A_i}{x}$, a function to reurn max number in B, a function to return min number in B, and a function to return the difference between the max number and the min number in B (virtual function). Drive from **Base** two subclasses **Drive1** and **Drive2**. A class **Drive1** has data member: D1[30] (double), a function to set the elements of D1 ($D1_i$ is equal to $\sum_{j=1}^{i+1}(B_i - A_i)$ if A_i even, or $\sum_{j=1}^{i+1}(B_i - A_i)$ otherwise), a function to return the difference between two middel elements in D_1, A class Drive2 has data member: D2[30] (integer), a function to set the elements of D2 ($D2_i$ is equal to $\prod_{j=1}^{i+1}(B_i + A_i)$ if A_i even, or $\prod_{j=1}^{i+1}(B_i + A_i)$ otherwise), a function to return the difference beteen first and last elements D2, Drive a class **Drive** from two classes **Drive1** and **Drive2**, that has data member: D[30] (integer) , a function to set data member of D such that each element D_i is equal to $(A_i * D1_i) + (B_i * D2_i)$, a function to return the absolute value for the difference between all elements of D. In main function, define objects and pointers from all classes to apply all functions.

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3. Write a program contains a class **Shape** class that has data member L (float), H(float). It contains a function to read data members, a function to return the area (pure virtual function), and

a function to display this area. Drive from Shape two subclasses Square and Triangle. A class Triangle has a function to return the area of triangle . A class Square has a function to return the area of square. Drive from two classes a class Sqpyramid that has a function to return the area of Square Pyramid. In main function, define an array of pointers from all classes to apply all functions (use display function in class shape to display all areas for all shapes).