

day/date

Group 7

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SP22-BCS-030

BCS-6C

PDC Assignment

Q.1) Prime number counter:-

Sol

=> Main functionality:-

- Finds the number of prime number less than or equal to n (1000000).
- Uses the sieve of Eratosthenes algorithm for efficient prime number.

=> Key steps:-

- Initialize a boolean array marked of size $n-1$ with False value.
- Iterate through prime numbers starting from 2.
- Mark multiples of each prime number as True in marked array.
- Count the number False values in the marked array.

=> Code Breakdown:-

- .) find_primes(n):- to find prime numbers.
- .) marked array:- keeps track of composite numbers.
- .) prime variable:- Iterates through prime numbers.
- .) np.sum(~marked):- Count prime numbers.

X ————— X ————— X ————— X

Q2) Floyd-Warshall algorithm:-

Sol

=> Main components:-

- .) A weighted graph represented as an adjacency matrix, stored in input.txt.
- .) read the matrix from the file and replaces -1 with infinity (INF).
- .) Implements the Floyd-Warshall algorithm to find shortest paths.
- .) Prints the matrix in a readable format.

=> Floyd-Warshall Algorithm:-

- .) Iterate through all nodes (k).
- .) For each pair of nodes (i,j), update the shortest path if going through node k is shorter.

⇒ Main Functions:-

-) Read the input matrix.
-) Prints the input matrix.
-) Applies the Floyd-Warshall algorithm.
-) Prints the resulting shortest paths matrix.

