Multiplicative Byurse (AIB) He connot purite it like this. (A | B) 1. M = (A x B-1) 1. M ((A1.M) x (B-'1.M)) B-1.1.M -> MM3 of -, He know

|  | Page No.  |
|--|---|
|  |   |
|  | Then, Bis multiplicative injuries (M?) of A   |
|  | Singelarly.   |
|  | When, (AxB):// M = line   |
| and all and the contract of th | -1 / A : M × B : M ) : M =  |
|  | Then, By MM3 of A. Where, (1 < B < M.)  |
|  | -) How to Find B?   |
| 2.2  | Loop B => 1 -> M-1<br>3) (A x B) / M =-1<br>Found;  |
|  | Time complexity or O(M)   |
| Nos  | coprine ( 9CD(A, M) == 1).  |
|  | This O(M) time complexity is mot good, To to find MM ? optimally, we will use Fermet Priorem. |
|  | use Fermet Missien.   |
|  | And = 1 mod (M) -> Fermet Theorem   |
|  | This states that when we divide An-1 with M, (An-1/M), we will always get I as memainder.     |
|  | get I as rumainder.   |

|  | Date   |
|--|--|
| Guiley What:   | The second secon |
| and it has   | Land of the second of the seco |
| * M is prime<br>* A is not multiple of M.  | to the day and the control of the same of  |
| * A is not multiple of m.  |  |
|  |  |
| -> Muliply this Ference Presum<br>both sides.  | '40  |
| lath sides   | man whi an   |
| 300)   | the second secon |
| :. [Am-1 = A=1 mad (M)]  | The state of the s |
| mod (m)  |  |
|  |  |
| This means:  | The state of the s |
|  |  |
| (B m-2 1 M) = B-1  |  |
| ( A wis 1 M) = 0-1   | 162 12400  |
| The state of the s | and a  |
| the can calculate they optimally   | Wing Bingstu   |
| Exponentiation Junction Luch   | ich we have  |
| Tracks (with) 1. Co. Bruene  | ( C Smile And  |
| Time complexity: O(log(N))   |  |
|  | 4.30   |
| as: 110 born total   | Response   |
| More: He have taken the case where   | M is praint,   |
| and what if He get Man   | on- prime  |
| number, then we have to  | Find inserve   |
| using Extended Euclid Blogaridha   | (433)  |
| which is not bream at he   | 1 + 80   |
| which is not prequently asked  | a. Jo, Le  |
| and and war  | Allahan Jakan  |
| A. L.  |  |
| -> Ouestion on MM ?:   | and the same of th |
| St. M 1 (0 - 0 - 1)  |  |
| There are N eliderun and K to  | Www. K <n< td=""></n<>   |
| Count the number of unit to  | distribute   |
| Count the number of ways to  | that sail  |
| students get 1 toppe only.   | una cach   |
| susenes get tople only.  | And the state of t |
|  |  |

|       | Page No.   |
|-------|--|
|       | Date   |
|       |  |
|       |  |
|       | Constrainty:   |
|       | M= 10° +7  |
| -     | K < N < 106  |
|       | Q < 105  |
|       | 7-lint: He have to calculate nex   |
|       | 7-list: He have  |
|       | nck = nt   |
|       | 7-lint: He race<br>nck = 21<br>(n-K)!** K!   |
|       | CODE   |
|       | The state of the s |
|       | La series  |
|       | CONS7 327 M= 109+7; He values of N, we   |
|       | To precompute all the values of N, we  |
| .15.  | are precomputing because; We have to   |
|       | calculate our solution for O(N) Tours  |
|       | N. Talliau   |
|       | we con't use O(N) complexity in each   |
|       |  |
| 127   | 00.002 7N7 N = 100 T 100   |
| * * * | BUZ EACZENT; 1 to the total  |
| 1     | The indicate with the most of the construction of  |
|       | 2: any exponentiation punction ( Here , to   |
|       | Binpry exponentiation function (Here, to   |
| * 1   | 343 B3HEXP (343 A 343 B): 11 11  |
|       | IN DINEX!  |
|       | On active all services in the first  |
|       | 3N7 RESULT = 1; 5 mp   |
|       | WHILE (B > 0)  |
|       | 2 & affirst and markets to make the  |
|       | 3F ( B & 11)   |
|       | I still he was the beginning the   |
|       | REJULY = (REJULY + ILL * A):/-M;   |
|       |  |
|       |  |

```
A = (A # ILL * A) y. M;
      B >>= \;
   RETURN RESULT;
THE MAIN () CATHE
 FACT[0]=1; trol
   Consuting factorials continued c
   FOR (347 i = 1; i < N; i++) 000 (00 m)
    FACT[i] = (FACT[i-1] * ILL * i
   -> Queries
   MY31E ( B -- )
      C3N >> M >> K;
      -> Numerator
      INT ANS = FACT[m]; sometiment
      -> Denominptory actedice it
     INT DEN = (FACT[M-K] " ILL * FACT[K])YM;
      -> 3 yearse of demoninator, because,
      -> (A|B) 1. M = ((A1.M) * (Bi'1.M)) 1. M
     ANS = ANS " BINEXP ( DEN, M-2);
```

Scanned with CamScanner

|   | Page No         |
|---|-----------------|
|   |                 |
| COUP TO ANS #                                 | BINE OF LDEN    |
| COUR KK ANS;                                  |                 |
| )<br>() () () () () () () () () () () () () ( | Causan Lesticas |
| REZURN O',                                    |                 |