

how i met your mother

OPENSOFT FRESHERS EVENT

Rules of the game:-

- 1) The allowed programming languages are C, C++, Java and Python
- 2) Add these details at the top of every program as comments.

Name:

Department:

Phone Number:

Email Address:

- 3) Naming convention for the source files should be **Q<problem-no.>.c**. Eg: Q1.c, Q2.java

Submit all source files in a zip file.

The zip file is to be named as <roll-no>.zip. Eg: 10ME10001.zip

- 4) The zip file should be emailed to os.freshers@gmail.com. The subject should be **OS Freshers<roll-no>**. You may submit as many times as you want but only use the first sent email to submit the subsequent files. Only the **LAST SUBMITTED** file will be considered for evaluation

- 5) The submission deadline is Sunday the 26th, 2:00 PM

- 6) You are encouraged to **discuss** the problems openly among other contestants, but do not **copy**.

- 7) In case of any queries, directly email them to os.freshers@gmail.com

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Problem 1

One of the smart asses from Lily's kindergarten class challenges her to find prime numbers from 1 to N. Marshall decides to create a program to help Lily. Knowing his own programming skills, he turns to you for help.

Given a number N, count the number of prime numbers upto N (including N)

You may assume that N will be positive and will never exceed 10^9 .

Needless to say, Efficient solutions will be given extra credit

[Marks: 15]

Sample Input:

25

Sample Output:

9

Problem 2

Ted's boss wants to mess with him and asks him to create a spiral staircase with numbered stairs of increasing radius. Help Ted show him who's the Boss!

Print a spiral of the form:-

17	16	15	14	13
18	5	4	3	12
19	6	1	2	11
20	7	8	9	10
21	22	23	24	25

This spiral is output for $n=5$. Your **task** is to print the spiral for any arbitrary n (given as input)

It is guaranteed that n will be **odd** and **less than 20**

[Marks: 20]

Sample Input:

5

Sample Output:

As displayed in the previous page

Problem 3

You all know about Barney's "Hot Crazy Scale" – a girl should only be dated if she's at least as hot as she's crazy. Barney has a list of girls with their hotness and craziness values. But of late, he has got bored of his Scale, and wants you to sort the girls for him, in your own way.

Knowing Barney, you decide to sort the girls first in order of decreasing hotness (hottest girl first), and if there is a tie between two girls' hotness values, the one with smaller craziness value should come first.

Now, Barney has got hold of a rather long list of girls, and he wants the result ASAP. So you turn on your laptop to write a program that EFFICIENTLY sorts the girls.

However, for this particular problem, you are NOT allowed to write the sorting algorithm yourself, as it might be inefficient and cumbersome. We expect you to use library functions to sort the list. Don't worry, there are PLENTY of sites that will help you do that. Simply Google. For the more lazy guys, here's a starting link:

<http://www.fredosaurus.com/notes-cpp/algorithms/sorting/stl-sort-arrays.html>

Remember, only code that **uses** library functions to sort will be corrected.

Input Format: The first line contains N, the number of girls in the list. Following N lines contain 2 space separated integers, indicating the hotness and craziness values respectively.

Output Format: Print the hotness and craziness values of the top 20 girls in the list in order (Barney's list obviously contains more than 20 girls :P)

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Sample Input:

5
9 4
2 6
13 12

Sample Output:

13 12
9 4
8 4
8 2
2 6

Note: In our test cases, we will ensure that the number of girls in the list is at least 20

[Marks: 20]

Problem 4

Robin finally decides to move out of Ted's apartment. Ted and Robin decide that Robin can take R of the N things in the apartment. Robin being confused, wants to visualize all the possible combinations to make the best choice. So she asks you to write a program for her that:-

Given 2 integers N and R , prints out all combinations of R numbers from the set $\{1, 2, 3, \dots, N\}$

Example:- $N=4, R=2 \rightarrow 4 \text{ Choose } 2 = 6$ possible combinations:-

(1,2) (1,3) (1,4) (2,3) (2,4) (3,4)

Input Format: Two integers separated by a space – N and R respectively

Output Format: First line should be an integer denoting the number of combinations

Following Lines should contain the combinations, one on each Line

Sample Input:

4 3

Sample Output:

4

(1,2,3)

(1,2,4)

(1,3,4)

(2,3,4)

[Marks: 35]



Challenge Question

Ted challenges Barney to make this code "LEGENDARY" !

Help Barney fill in the blank so that the code prints "LEGEN.....DARY" (Barney Style ;))

Fill in the blanks so that the program gives the desired output

```
if( _____ )  
{  
    printf("LEGEN...");  
}  
else  
{  
    printf("...DARY\n");  
}
```

Output:-

LEGEN.....DARY

[Marks: 10]