

PRACTICE CONTEST

Computer Science Competition Hands-On Programming Set

I. General Notes

1. Do the problems in any order you like. They do not have to be done in order from 1 to 12.
2. All problems have a value of 60 points.
3. There is no extraneous input. All input is exactly as specified in the problem. Unless specified by the problem, integer inputs will not have leading zeros. Unless otherwise specified, your program should read to the end of file.
4. Your program should not print extraneous output. Follow the form exactly as given in the problem.
5. A penalty of 5 points will be assessed each time that an incorrect solution is submitted. This penalty will only be assessed if a solution is ultimately judged as correct.

II. Point Values and Names of Problems

Number	Name	Point Value
Problem 1	Cell Break	60
Problem 2	Word Step	60
Problem 3	Gamer	60
Problem 4	Get Organized	60
Problem 5	Matters Order	60
Problem 6	Occurs to Me	60
Problem 7	Set Them Up	60
Problem 8	Shifty Mat	60
Problem 9	Just Code	60
Problem 10	Stock Answer	60
Problem 11	Square Math	60
Problem 12	Primer	60
	Total	720

Problem #1
60 Points

Cell Break

Program Name: CellBreak.java

Input File : CellBreak.in

What a deal the local cell phone company has for you! UNLIMITED daily minutes!! All you have to do is pay for them according to the following rate plan: 32 cents a minute if you talk 0 to 4 minutes, 22 cents a minute if you talk over 4 to 8 minutes, 12 cents a minute if you talk over 8 to 20 minutes, 2 cents a minute if you talk over 20 to 100 minutes, 1 cent a minute if you talk over 100 minutes. Of course these rates only apply on weekdays. On the weekends you can use UNLIMITED minutes for only 3 cents a minute. You decide to write a program to calculate just how great a deal this is.

Input

The first line in the data file is an integer that represents the number of data sets to follow. Each data set will contain seven numbers. The first five will represent the number of minutes used for Monday through Friday respectively. The last two will represent the number of minutes used for Saturday and Sunday respectively.

Hint

Charges are calculated daily NOT weekly.

Output

The output will be the words "Your total bill will be " followed by the amount you will owe in dollar and cent format.

Example Input File

```
3
1 2 3 4 5 6 7
4 8 20 100 101 10 10
.5 .5 1 1 1 1 1
```

Example Output To Screen

```
Your total bill will be $4.69
Your total bill will be $9.05
Your total bill will be $1.34
```

Problem #2
60 Points

Word Step

Program Name: WordStep.java

Input File: WordStep.in

The local editor of the newspaper has hired you to do type layout. You are to take a list of given words and lay them out on the page according to their length. However since the pages need to be quite uniform you will lay them out going down the page. Should there be words of the same length in the list you will simply group them together and place them in reverse order that they appeared in the list. You decide it would be better if you had a program to assist you.

Input

Input will be a list of words of various lengths separated by spaces.

Output

Print the words in going down the page starting with the shortest length words. If two or more words have the same length, list them in reverse order as they appeared in the list.

Example Input File

3

```
COMPUTER SCIENCE PROGRAMMING CONTESTS ARE CHALLENGING
THE RAIN IN SPAIN IS WET
THE COW JUMPED OVER THE MOON
```

Example Output To Screen

```
CP
HR
AO
CCLG
SOOLR
CNMEA
ITPNM
EEUGM
ANSTII
RCTENN
EESRGG
```

```
S
RP
WTAA
IIEHII
SNTENN
```

```
J
U
MOM
TCTOVP
HOHOEE
EWENRD
```

Problem #3
60 Points

Gamer

Program Name: Gamer.java

Input File : Gamer.in

What a glorious day it is! You have finally managed to crack the code for your favorite game Bop-the-Mole! By figuring this complex code out you will be able to become the uber overlord of Bop-the-Mole. The code is made up of fourteen characters representing different aspects of each Killer Mole. The first 3 characters are an octal representation of the Killer Mole's level and armor type. You have figured out there are only 10 types of armor and that the last digit, once converted from octal, will be one of those listed in the chart below. The remaining numbers will be the Killer Mole's armor level. So 014 in octal is 12 and that would be a level two Killer Mole armor of type one armor. Similarly the last three digits in the set are the hexadecimal for the weapon level and type, also from the table below. 014 in hex would be 20 and that would be a level two Killer Mole weapon of type zero. This leaves the middle eight digits to tell you the health of the Killer Mole. Simply put the first four digits (digits 4-7) converted from binary multiplied by the next four digits (8-11) also converted from binary gives you the total. So 0001 converts to 1 times to 0010 converted to 2 giving us a grand total of 2 for the Killer Mole's health (what a weakling). A program should be a snap now that we know all this information.

Armor Types		Weapon Types	
0-NONE	5-PLUS ONE	0-NONE	5-PLUS ONE
1-SOME	6-PLUS TWO	1-STICK	6-PLUS TWO
2-SOME MORE	7-PLUS THREE	2-ROCK	7-PLUS THREE
3-GOOD	8-BEST	3-GOOD ROCK	8-BEST ROCK
4-BETTER	9-ARE YOU KIDDIN	4-BETTER ROCK	9-YOU BETTER DUCK

Input

The first line in the data file is an integer that represents the number of data sets to follow. Each data set will contain fourteen characters.

Output

The output should list the translated Killer Mole's stats in the format shown below.

Example Input File

```
3
043100000011AB
777100000101ff
07311110001013
```

Example Output To Screen

```
Killer Mole has Armor Level 3 - Armor type PLUS ONE.
Killer Mole's Current Health 8
Killer Mole has Weapon Level 42 - Weapon type PLUS THREE.

Killer Mole has Armor Level 51 - Armor type SOME.
Killer Mole's Current Health 16
Killer Mole has Weapon Level 51 - Weapon type STICK.

Killer Mole has Armor Level 5 - Armor type ARE YOU KIDDIN?
Killer Mole's Current Health 15
Killer Mole has Weapon Level 1 - Weapon type YOU BETTER DUCK!
```

Problem #4
60 Points

Get Organized

Program Name: GetOrganized.java

Input File: GetOrganized.in

Time to get the company data into some semblance of order. The person who held this job before you really had some quirky ways. All the different data is stored using odd delimiters. You decide to write a program to output the data in a cleaner format and organized in a manner that makes more sense.

Input

The first line in the data file is an integer that represents the number of data sets to follow. The next line of data will be the number of rows in the set followed by the column to sort on followed by the character that is used for the delimiter. Each data set will contain sets of values separated by some character.

Output

Print the chart in the proper order with spaces instead of the odd delimiter.

Example Input File

```
3
3 2 /
AAA/BBB/CCC
GGG/AAA/EEE
FFF/CCC/GGG
4 5 ,
abc,def,ghi,xyz,lmn
ghi,abc,def,plf,qwe
awe,ade,asd,fdg,dfg
tyu,ert,wer,234,ser
2 1 ;
6;3
4;5
```

Example Output To Screen

```
GGG AAA EEE
AAA BBB CCC
FFF CCC GGG

awe ade asd fdg dfg
abc def ghi xyz lmn
ghi abc def plf qwe
tyu ert wer 234 ser

4 5
6 3
```

Problem #5
60 Points

Matters Order

Program Name: MattersOrder.java

Input File : MattersOrder.in

In this world of corporate secrets and big business espionage you have been hired to write a program that will encode our company's secret documents so only we can (hopefully) read them. The process is a relatively easy one, given a number and a word you will rearrange the letters of the word by counting them off and outputting them. For example given the number 2 and the word "FISH" you would count F-1, I-2 outputting the "I" then S-1, H-2 outputting the "H". Starting over with F-1, (I was already used so) S-2 outputting the "S" and finally outputting the F for a encoded word of "IHSF". Not completely secure but keeps the wandering eye from reading our next hostile takeover.

Input

The first line in the data file is an integer that represents the number of data sets to follow. Each data set will contain one word.

Hint

Just because a letter has been used does NOT mean it loses its place in the count.

Output

The output will be the original set of characters rearranged according to our number.

Example Input File

```
3
3 elephant
5 serpent
4 octopuss
```

Example Output To Screen

```
eaepnlht
ersnpet
ospoucst
```

Problem #6
60 Points

Occurs To Me

Program Name: OccursToMe.java

Input File: OccursToMe.in

Problem number two has some benefits and you are happy to have this job. Before you can set the type in that problem you need to know how many of each type of character you will need. So you write a program that will read, sort, and count how many of each character contained in the ad you are to prepare.

Input

The first line in the data file is an integer that represents the number of data sets to follow. Each data set will contain one collection of different kinds of characters.

Output

You will list each character sorted by their ASCII value separated with a space, then a line that tells how many of each you will need.

Example Input File

```
4
qwertyuiopasdfghjklzxcvbnm
1^23^45^67^89^0!^@#^$%^&*()
1q2w3e4r5lq2w3e4r5
aaaaaaaaaaaaaaaaaaaaaaaa
```

Example Output To Screen

```
 a b c d e f g h i j k l m n o p q r s t u v w x y z
 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

 ! # $ % & ( ) * 0 1 2 3 4 5 6 7 8 9 @ ^
 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 8

 1 2 3 4 5 e q r w
 2 2 2 2 2 2 2 2 2 2

 a
22
```

Problem #7
60 Points

Set Them Up

Program Name: SetThemUp.java

Input File : SetThemUp.in

Menial jobs are so boring but they still have a paycheck. You have been given a temporary position determining the importance of pairs of orders. Given two orders you must decide if the first order is larger than the second or smaller and submit a report. You decide a program would do this much easier and you will still get paid.

Input

The first line in the data file is an integer that represents the number of data sets to follow. Each data set will contain four pairs of numbers. None of the numbers will be of equal value.

Output

The output should state the first number in the pair followed by “is larger than” or “is smaller than”, whichever is appropriate, followed by the second number.

Example Input File

```
3
4 5 6 7 8 9 1 2
9 8 7 6 5 4 3 2
1 4 6 7 8 5 3 1
```

Example Output To Screen

```
4 is smaller than 5
6 is smaller than 7
8 is smaller than 9
1 is smaller than 2

9 is larger than 8
7 is larger than 6
5 is larger than 4
3 is larger than 2

1 is smaller than 4
6 is smaller than 7
8 is larger than 5
3 is larger than 1
```


Problem #8
60 Points

Shifty Mat

Program Name: ShiftyMat.java

Input File: ShiftyMat.in

You have been promoted to head data manager; a position that might pay just a bit better than the head trash manager and is infinitely harder. It seems all of the company data has been stored linearly up to this point. You have been chosen to convert it all to matrix format and to reorganize it as you go. Choosing to write a program rather than figure out which end of a broom to use you quickly take all that messy data in a line and output it in neat little boxes.

Input

The first line in the data file is an integer that represents the number of data sets to follow. Each data set will contain a list of values separated by spaces and commas. The spaces delineate the vales and the commas delineate the rows. Each value set will be followed by a pair of rows that need to be swapped as well as a pair of columns that need to be swapped.

Output

Print the matrix in the proper order.

Example Input File

```
3
1 5 6,2 7 8,3 9 10
R 1 3
C 2 3
2.1 3.2 1.5 4.1,4.1 2.3 1.6 3.5,4.4 4.4 4.4 4.4
R 2 3
C 1 2
A B,E F
C 1 2
R 2 1
```

Example Output To Screen

```
3 10 9
2 8 7
1 6 5

3.2 2.1 1.5 4.1
4.4 4.4 4.4 4.4
2.3 4.1 1.6 3.5

F E
B A
```

Problem #9
60 Points

Just Code

Program Name: JustCode.java

Input File : JustCode.in

The word scrambler in problem five was fine for casual internal missives, however, it is time to send our ultra secret information to our international branches. No mere scrambling will do. Instead you need to write a program that will decode the diabolical fiendish messages from corporate. The code is based on 3 boxed sets of the alphabet and an underscore for spaces. Each letter of a message is encoded by finding which box contains the letter(1, 2 or 3) then by which row and column it is in within that box (0, 1, or 2). So given the following set of boxed letters "THE CAT" would be : 301 121 111 322 212 100 301. This is easy enough if you have the right boxes.

```
ABC JKL STU
DEF MNO VWX
GHI PQR YZ_
```

Input

The first line in the data file is an integer that represents the number of data sets to follow. Each data set will contain three boxes of letters and an underscore. These will be followed by the message to be decoded and a blank line.

Output

The output will be the decoded message.

Example Input File

```
3
ABC JKL STU
DEF MNO VWX
GHI PQR YZ_
301 121 111 322 212 202 110 322 101 222 212 311 211 322 102 212 311

DEF MNO VWX
ABC JKL STU
GHI PQR YZ_
112 202 201 311 101 310 311 310 322 200 110 211 101 322 200 101 322 310 212 101
101 220 320

GHI PQR YZ_
DEF MNO VWX
ABC JKL STU
320 120 321 322 202 110 120 300 302 102 320 302 211 212 321 302 120 302 202 111
110 302 110 120 300
```

Example Output To Screen

```
THE_OLD_BROWN_COW
CONTESTS_MAKE_ME_SLEEPY
SATURDAY_IS_NOT_A_RED_DAY
```

Problem #10
60 Points

Stock Answer

Program Name: StockAnswer.java

Input File: StockAnswer.in

With all the money you have been making writing programs for various companies you have decided to invest a little of it in the stock market. You need to write a program to help you keep track of your investments. All you are interested in is the daily percent of gain or loss a particular stock has made. Given the opening and closing value you will need to calculate if there was a percent gain or a percent loss.

Input

The first line in the data file is an integer that represents the number of data sets to follow. Each data set will contain two numbers

Output

The output will be a single number expressed as a percent rounded to the nearest tenth. If the result is a negative percent, representing a loss, it needs to be enclosed in parenthesis instead of being preceded by a dash.

Example Input File

```
3
1.00 2.00
3.01 4.01
.30 .15
```

Example Output To Screen

```
100.0%
33.2%
(50.0%)
```

Problem #11
60 Points

Square Math

Program Name: SquareMath.java

Input File : SquareMath.in

Our company is expanding and we need to do demographical study of the areas surrounding each of our outlets. Each of our regions has been carefully divided into rectangular grids with the pertinent data carefully stored as a boxed region. You are to write a program that will exactly calculate the sum of all the data around a given co-ordinate, including the co-ordinate as well, of course. It is essential that you are accurate and fast.

Input

The first line in the data file is an integer that represents the number of data sets to follow. The next line will be the dimensions of our region followed by the number in the region we will “sum around”. This number will not be repeated anywhere in the area.

Output

The out put will be in the form of “The sum at” followed by the number we summed around “ is “ and of course the precise total.

Example Input File

```
3
3 3 3
1 2 3
4 5 6
7 8 9
3 7 11
1 2 3 4 5 6 7
8 9 10 11 12 13 14
15 16 17 18 19 20 21
2 2 56
23 54
12 56
```

Example Output To Screen

```
The sum at 3 is 16
The sum at 11 is 99
The sum at 56 is 145
```

Problem #12
60 Points

Primer

Program Name: Primer.java

Input File: Primer.in

The new corporate CEO is deep into numerology. Everything the company does is based on the correct alignment of the groups of numbers pertaining to the current deal. You must write a program to list all the possible numbers that could cause our deal to make or break. To do so you will be given the two primary numbers that represent our deal and you will break them down so we know how we shall best out do our competitors.

Input

The first line in the data file is an integer that represents the number of data sets to follow. Each data set will contain two numbers.

Output

Output all of the multiples of the first number between the first number and the second number in descending order divided into even and odd collections separated by commas.

Example Input File

```
3
5 32
2 31
7 212
```

Example Output To Screen

```
EVEN / 5 = 30, 20, 10
ODD / 5 = 25, 15
EVEN / 2 = 30, 28, 26, 24, 22, 20, 18, 16, 14, 12, 10, 8, 6, 4
ODD / 2 = NONE
EVEN / 7 = 210, 196, 182, 168, 154, 140, 126, 112, 98, 84, 70, 56, 42, 28, 14
ODD / 7 = 203, 189, 175, 161, 147, 133, 119, 105, 91, 77, 63, 49, 35, 21
```