

Problem 2.1 **Hello**

General Statement: Read in a team name and output HELLO, team name.

Input: All input will be via the keyboard. There will only be one input. That input will be your team name.

Name of data file : none

Name of Program : pr21.cpp pr21.java

Name of Executable : pr21.exe pr21.class

Output: The output will be "HELLO, team name typed in here".

Helpful Hints / Assumptions: none.

Sample Input :

TEAM 45

Sample Output :

HELLO, TEAM 45

Problem 2.2 BASIC MATH

General Statement : Your job is to read in 2 operands and an operator and perform the operation specified.

Input: The first line in the data file is an integer that represents the number of data sets to follow. Each data set will consist of one operand, one operator, and a second operand. All operand input will be in the range 0 to 9. All operator input will consist of +, -, *, and / only. There will be no modulus.

Name of Data File : none

Name of Program : pr22.cpp pr22.java

Name of Executable : pr22.exe pr22.class

Output: Output the equation and the answer, which must have 2 decimal places.

Assumptions – Helpful Hints : none

Sample Input :

1
+
4

Sample Output :

1 + 4 = 5.00

Sample Input :

5
/
2

Sample Output :

5 / 2 = 2.50

Problem 2.3 YAHTZEE

General Statement : This program reads in 5 numbers at a time from a data file. The 5 numbers represent the result of rolling the 5 dice as part of the YAHTZEE game. The program will look at the 5 dice values and output how the 5 dice values should be used. In YAHTZEE, a FULL HOUSE is 25 points and 3 of a kind is the SUM of all 5 dice. A FULL HOUSE is rolled when you have 3 of a kind and 2 of a kind. Your program must SUM all five dice and determine whether a FULL HOUSE (worth 25 points) or a 3 OF A KIND (sum of all dice) would get the player the most points.

Input: All input will be via the keyboard. Each data set will consist of 5 dice values with each value placed on a single line.

Name of data file : none

Name of Program : pr23.cpp pr23.java

Name of Executable : pr23.exe pr23.class

Output: Output FULL HOUSE if the dice values should be used as a FULL HOUSE (25 points) or output 3 OF A KIND if the dice values should be used as a 3 OF A KIND (sum of all dice).

Assumptions / Helpful Hints : You will always have 5 dice values that range in value from 1 to 6. You will always have (5 of a kind) or (3 of a kind and 2 of a kind). If you sum all 5 dice and it comes out to 25 (the value of a FULL HOUSE), always output FULL HOUSE because a FULL HOUSE is harder to roll than 3 OF A KIND.

Sample Input :

5
5
2
2
2

Sample Output :

FULL HOUSE

Sample Input :

6
6
6
5
5

Sample Output :

3 OF A KIND

Problem 2.4 MARKING VOWELS

General Statement : This program reads in a word and marks the vowels in the word. It finds the first vowel and marks it as a "1" and then progresses through the word marking the next vowel "2" and so on until it marks all vowels in the word.

Input: All input will be via the keyboard. Each data set will consist of one word.

Name of data file : none

Name of Program : pr24.cpp pr24.java

Name of Executable : pr24.exe pr24.class

Output: Output the word with all of the vowels marked. The unmarked consonants will be output in their original form.

Assumptions: Each word should have vowels in it. Words may have upper and lower case letters. There may be a double-digit number of vowels.

Sample Input :

alphabet

Sample Output :

1lph2b3t

Sample Input :

CHICKEN

Sample Output :

CH1CK2N

Problem 2.5 **HOW MANY BIRDS CAN ONE CAT EAT?**

General Statement: BeeBo the cat eats 25 birds per hour on a normal day because BeeBo weighs roughly 18 pounds. Read in the number of birds to be eaten by BeeBo and determine how long it will take Beebo to eat that many birds.

Input: All input will be via the keyboard. Each data set will consist of one integer per line, representing the number of birds to be eaten.

Name of data file : none

Name of Program : pr25.cpp pr25.java

Name of Executable : pr25.exe pr25.class

Output: Output the time it will take Beebo to eat the birds. Output the hours and minutes. Set the appropriate column widths for the output so that it is aligned in columns like the example below.

Assumptions: Integer values for the number of birds will range from 0 to roughly 2 million. The number of hours will be no larger than 2 million.

Sample Input:

10101523

Sample Output:

404060 hours and 55 minutes

Sample Input:

33900

Sample Output:

1356 hours and 0 minutes

Problem 2.6 **IS IT A PERFECT SQUARE?**

General Statement : This program reads one value at a time from a data file and determines if that number is a perfect square. A perfect square is a number that's square root is an integer. 9 would be a perfect square because its square root is 3, which is a whole number (integer). 8 would not be a perfect square because its square root is 2.827, which is not an integer.

Input: All input will be via the keyboard. Each data set will consist of one number.

Name of data file : none

Name of Program : pr26.cpp pr26.java

Name of Executable : pr26.exe pr26.class

Output: Output PERFECT SQUARE if the number is a perfect square or
NOT PERFECT SQUARE if the number is not a perfect square.

Assumptions : There will be no numbers larger than 32767 in the data file.

Sample Input :

144

Sample Output :

PERFECT SQUARE

Sample Input :

65

Sample Output :

NOT PERFECT SQUARE

Problem 5.1 LETTER TRIANGLE

General Statement: Read in a letter and a number. The number indicates how big the letter triangle should be. The number indicating the size of the triangle will have a range from 0 to 250. $num \geq 0$ and $num \leq 250$

Input: The first number indicates the number of data sets to follow. Each data set will contain one letter and one number.

Name of Data File : pr51.dat

Name of Program : pr51.cpp pr51.java

Name of Executable : pr51.exe pr51.class

Output: Output the letter triangle specified.

Helpful Hints / Assumptions: The letters must wrap around from Z to A. If you start with Z and have to print 5 levels, you must wrap around and start with A after the Z level is complete.

Sample Input :

```
3
5
A
3
Z
4
C
```

Sample Output :

```
A
BB
CCC
DDDD
EEEE

Z
AA
BBB

C
DD
EEE
FFFF
```

Problem 5.2 The mean

General Statement: Read in a list of diameters and determine the mean value of the list. There will always be 10 diameters in each data set.

Input: The first line in the data file contains the number of data sets to follow. Each data set will contain 10 diameters.

Name of Data File : pr52.dat

Name of Program : pr52.cpp pr52.java

Name of Executable : pr52.exe pr52.class

Output: The output will be the mean of the group set to 2 decimal places.

Helpful Hints / Assumptions: Add 'em up to find the mean.

Sample Input :

```
2
1 2 3 4 5 6 7 8 9 10
10 20 30 40 20 30 50 60 10 20
```

Sample Output :

```
5.50
29.00
```

Problem 5.3 Number Sequence

General Statement: You will be given two numbers which are the start of number sequence. Your job is to give the x^{th} number of the sequence. To solve this problem you have to add the previous two numbers to obtain the next number in the sequence.

Input: The first line in the data file contains a number of the data sets to follow. Then each line will contain three Integers. The first two Integers are the first two numbers of the sequence. The third Integer is the x^{th} number of sequence requested.

Name of Data File : pr53.dat

Name of Program : pr53.cpp pr53.java

Name of Executable : pr53.exe pr53.class

Output: Output the x^{th} term of the sequence.

Sample Input :

```
3
1 1 5
3 5 6
5 6 6
```

Sample Output :

```
5
34
45
```

Problem 5.4 Union of Two Sets

General Statement : This program reads two sets of integers and determines if there is a union between the two sets. Output the values that are the same in both sets. A union does not repeat values that occur more than once. If 3 is in set one twice and in set two once, 3 will appear in the new set once.

Input : The first number in the data set is an integer that represents the number of data sets that follow. The lines that follow have six values per line. The first three values make up the first set and last three values make up the second set.

Name of Data File : pr54.dat

Name of Program : pr54.cpp pr54.java

Name of Executable : pr54.exe pr54.class

Output : Output the values that make up the union between the two sets or NO UNION if there is no union between the two sets. Output the values in the order they appear in set one. If there is a 3 in both sets and it is the first value in set one, output the 3 before any other values.

Assumptions : There will be three data members in each set.

Sample Input :

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

Sample Output :

```
NO UNION
2
9 3
```

Problem 5.5 Child Dosage

General Statement: Read in an age and an adult dosage in millileters. Then, determine the dosage for the child.

Input: The first line in the data file contains a number of the data sets to follow. Each data set will contain the child's age and the adult dosage.

child dosage = (child age / child age + 12) * adult dosage

Name of Data File : pr55.dat

Name of Program : pr55.cpp pr55.java

Name of Executable : pr55.exe pr55.class

Output: The dosage for a child of the age specified.

Sample Input :

3
5
2.5
7
1.5
9
3.5

Sample Output :

0.735 ml
0.553 ml
1.500 ml

Problem 5.6 **SCRAMBLED WORDS**

General Statement : This program reads in strings of text from a data file. The program then takes the string and scrambles each word in the string, but preserves the word order if there is more than one word.

Input: The first number indicates the number of data sets to follow. Each data set will contain one sentence. Each sentence will be on a separate line and sentence length will vary.

Name of Data File : pr56.dat

Name of Program : pr56.cpp pr56.java

Name of Executable : pr56.exe pr56.class

Output: Output the string read with each word scrambled. Make sure to keep the string in original word order.

Assumptions – Helpful Hints : There could be a few words or many words on each line. Determine how the words are scrambled. There is a specific pattern being used.

Sample Input :

```
3
This is fun.
The dog ran down the road.
I love to manipulate words!
```

Sample Output :

```
isTh si n.fu
hTe odg arn wndo hte adro.
I velo ot ulatemanip ds!wor
```