Task 1: bill   2.5xp

Often I go to lunch with my friends and we split the bill. I would like a function that will take 3 arguments: the total of the bill, the percent tip we want to give, and the total number of people in the group and output what each person in the group should pay. For example:

```
int main(){
    cout << tip(50, 20, 5) << "\n";
}
```

Should print 12.

Task 2: pigify 5xp

I would like a function that takes a word as an argument and returns the Pig Latin version of that word. The rules for Pig Latin are as follows:

1. For words that start with a vowel, just add *way* to the end:
   1.1. *egg* → *eggway*
   1.2. *and* → *andway*

2. For words that start with a consonant or consonant cluster move it to the end of the word and add *ay*
   2.1. *dog* → *ogday*
   2.2. *kids* → *idskay*
   2.3. *frog* → *ogfray*

For example,

```
int main(){
    cout << pigify("egg") << "\n";
    cout << pigify("and") << "\n";
    cout << pigify("frog") << "\n";
    cout << pigify("dog") << "\n";

}
should output
eggway
andway
ogfray
ogday
```

Task 3: Palindrome: 5xp

A palindrome is a sequence of symbols that is identical forward or backward. Please write a function that takes a string as an argument and returns 1 if that string is a palindrome and 0 if it is not.

For example,

```
int main(){
    cout << palindromeP("aba") << "\n";
    cout << palindromeP("abbccbbaa") << "\n";
    cout << palindromeP("aabbccba") << "\n";
    cout << palindromeP("a") << "\n";

}
```

Should print

```
1
1
0
1
```

Task 4: Binary: 5xp

Please write a function that takes a positive integer and returns a string representing that number in binary.

For example,

```
int main(){
    cout << binary(0) << "\n";
    cout << binary(5) << "\n";
    cout << binary(21) << "\n";

}
```

should print

```
0
101
10101
```

Task 5: Change: 5xp

I want a function that takes as an integer argument the number of cents change I should give a person, and returns the minimal number of coins that are required to make that amount (using the standard quarter, dime, nickel, and penny coins). For example, the minimal number of coins to make 76 cents of change is 4 (3 quarters and 1 penny).

```
int main(){

    cout << coins(0) << "\n";
    cout << coins(76) << "\n";
    cout << coins(73) << "\n";
}
```

should print

```
0
4
7
```

Task 6: Overtime: 2.5 xp

For some jobs, when you work over 40 hours in one week you get what is called "time and a half" meaning the employee gets paid 1.5 times their usual rate for any hours over 40. Suppose a person gets paid $10/hr and works 50 hours in a week. That person gets paid $10/hr for the first 40 hours and then $15/hr for 10 hours for a total of $550.

Write a function that takes 2 integer arguments, the wage, and the number of hours worked, and returns the total pay.

```
int main(){

    cout << pay(10, 0) << "\n";
    cout << pay(36, 10) << "\n";
    cout << pay(50, 10) << "\n";
}
```

should print

```
0
360
500
```

Task 7: Trip: 5 xp

This summer I took a motorcycle trip. I have gas stations on my route represented in a text file with the following format:

```
5 Mesilla
25 Leasburg
37 Hatch
33 TorC
40 Winston
120 Datil
70 Grants
```

meaning it is 5 miles from my house to Mesilla, 25 miles from Mesilla to Leasburg, etc. Sadly, my motorcycle only holds 2 gallons and I get 75 miles to the gallon. I would like you to write a program that reads in this route from standard input and prints the cities where I should stop and get gas and the distance between those stops. For example, the first city & distance it should print is

Winston 140

since Winston is 140 miles from the start but if I tried to get to the next city I would run out of gas.
The file containing the route is available on our website.
The correct output should be

```
Winston      140
Datil        120
Dzilth       148
Shiprock     100
Chinle       120
Gallup       112
```

Task 8: vowels: 2.5 xp

I would like you to write a function that takes a string argument and returns the number of vowels (including *y*) in that string.

For example,

```
int main(){
    cout << vowels("thrzt!!") << "\n";
    cout << vowels("Mississippi!!") << "\n";
    cout << vowels("e i e i o") << "\n";
    cout << vowels("That was crazy stuff") << "\n";

}
```

should print

```
0
4
5
5
```

Task 9: Fibonacci: 5 xp

Recall that a Fibonacci number is defined as

$$F_0 = 0$$
$$F_1 = 1$$
$$F_n = F_{n-1} + F_{n-2}$$

Write a function that takes an integer argument, n, and returns F_n.

For example

```
int main(){

    for (int i= 0; i < 10; i++){
       cout << fibonacci(i) << "\n";
     }
}
```

should print

```
0
1
1
2
3
5
8
13
21
34
```

Task 10: Compute Average: 5 xp

This problem makes use of the file auto-mpg.data.

Each line contains the following attributes for autos:

1. mpg: continuous
2. cylinders: multi-valued discrete
3. displacement: continuous
4. horsepower: continuous
5. weight: continuous
6. acceleration: continuous
7. model year: multi-valued discrete
8. origin: multi-valued discrete
9. car name: string (unique for each instance)

Write a program the reads this file from standard in and prints the average mpg.

Additional 2.5xp
Write a program that prints the average mpg for 4, 6, and 8 cylinder cars.

Task 11: Largest: 2.5 xp

Write a program that prints all the attributes of the car with the best (largest) mpg from the file auto-mpg.data

Task 12: remove: 2.5 xp

Write a function that takes a string as input and returns a string that is a copy of the input string minus the vowels.

```
int main(){

    cout << removed("This is a test!!") << "\n";
    cout << removed("Write a function that takes a
string as input") << "\n";
}
```

should print


```
Ths s  tst!!
Wrt  fnctn tht tks  strng s npt
```

Task 13: online games: 5 xp

In an online game I play I have acquired a pet gerbil who I send into crevices to acquire precious metal nuggets. Sadly, she can only carry 10 ounces. In the game, there are 4 possible metals and the value of these in order are:

Rhodium   Platinum   Gold   Ruthenium

When I send my little gerbil into a crevice I want her to return with the most valuable haul. For example, if the crevice contains 5 ounces of Rhodium, 6 of Platinum, 4 of Gold, and 7 of Ruthenium, I want her to return with 5 ounces of Rhodium and 5 of Platinum.

I want you to write a program that reads in these values from standard input and prints out what little gerbil should take. The above example is represented as the first line in my input file:

5 6 4 7
10 10 10 10
3 0 0 1
running my program produces:

5 Rhodium
5 Platinum

10 Rhodium

3 Rhodium
0 Platinum
0 Gold
1 Ruthenium

Task 14: acronym: 5 xp

I would like you to write a program that reads a line from standard input and outputs the acronym of that line. For example, if I have a file acronymData containing

laughing out loud
keep it simple stupid
light amplification stimulated emission radiation
university mary washington

then the program should produce...

./a.out < acronymData
lol
kiss
laser
umw

Task 15: Beowulf: 10 xp

I would like to know how many of each vowel are in Beowulf
(file on website). For example:

```
./vowelAnalyzer < Beowulf
a: 13954
e: 26640
i: 11866
o: 14568
u: 4804
```