

Programming Assignment #3

Cellular Data Plan Charges

CS 1428.255, Spring 2019

Instructor: Jill Seaman

Due: before class **Tuesday, 2/26/2019** (upload electronic copy by 9:00am)

Problem:

You have been asked by a cell phone service provider to write a program that will calculate the amount of the data portion of a customer's monthly bill. Write a C++ program that will calculate the amount of the bill given which data plan the customer subscribes to and how many gigabytes of data they used during the month.

The cellular service provider offers the following data plans:

Package A: Unlimited gigabytes for \$45/month.

Package B: \$14 for each gigabyte used each month.

On plan A, after 20 GB, the customer may experience reduced speeds for the rest of the bill cycle.

A one-time Activation Fee of \$10 per line will be applied to the first month's bill.

Input:

Use the following menu to prompt the user for the customer's data **plan**:

```
Data Plans:
```

```
A. The unlimited plan ($45)
```

```
B. The By the Gig plan ($14/GB)
```

```
Enter which data plan the customer subscribes to:
```

Then the program should ask the user to input the number of **gigabytes** used in the month. This value could have fractional amounts included (like 2.875).

Then the program should ask: Is this is a **new line** (y/n)? The user will enter one character.

For the plan and the gigabytes, use an **if** statement to perform input validation. The user should select only A, or B from the menu, and the gigabytes should be greater than or equal to 0. If either input is invalid, the program should exit with an appropriate error message. Do not validate the response to the last question.

Processing: Compute the amount of the monthly bill according to the plan descriptions above. Note for plan B if the amount of gigabytes has a non-zero fractional amount, it should be rounded up before multiplying by the charge per gigabyte. For example, if the user used 1.2 GB, the bill is \$28 (2 times 14, not 1.2 times 14). You can use the `ceil(x)` function from the math library to perform this operation.

If the user answered 'y' or 'Y' to the last question, your program should add \$10 to the bill.

Output:

If the customer's bill for that month would be cheaper on the other plan, output a message indicating this fact.

If the customer is on plan A and the gigabytes are over 20, your program should output a message indicating that the customer may have experience reduced speeds.

Then display the amount of the monthly bill with a dollar sign and formatted to 2 decimal places. Here are 5 different sample executions of the program:

Data Plans:

A. The Unlimited plan (\$45)

B. The By the Gig plan (\$14/GB)

Enter which data plan the customer subscribes to: A

Enter the amount of data used during the month, in gigabytes: 2

Is this a new line? (y/n): n

Your bill would be cheaper on plan B

The amount due for the month is \$45.00

Data Plans:

A. The Unlimited plan (\$45)

B. The By the Gig plan (\$14/GB)

Enter which data plan the customer subscribes to: B

Enter the amount of data used during the month, in gigabytes: 4.2

Is this a new line? (y/n): n

Your bill would be cheaper on plan A.

The amount due for the month is \$70.00

Data Plans:

A. The Unlimited plan (\$45)

B. The By the Gig plan (\$14/GB)

Enter which data plan the customer subscribes to: B

Enter the amount of data used during the month, in gigabytes: 2

Is this a new line? (y/n): y

You have been charged an activation fee

The amount due for the month is \$38.00

Data Plans:

A. The Unlimited plan (\$45)

B. The By the Gig plan (\$14/GB)

Enter which data plan the customer subscribes to: A

Enter the amount of data used during the month, in gigabytes: 23

Is this a new line? (y/n): n

You may have experienced reduced speeds.

The amount due for the month is \$45.00

Data Plans:

A. The Unlimited plan (\$45)

B. The By the Gig plan (\$14/GB)

Enter which data plan the customer subscribes to: B

Enter the amount of data used during the month, in gigabytes: 3.0

Is this a new line? (y/n): Y

You have been charged an activation fee.

The amount due for the month is \$52.00

Additional Requirements:

- Your program **must compile** and run, otherwise you will receive a 0.
- Do NOT use ANY LOOPS! The program should compute one bill only.

Style:

See the Style Guidelines document on the course website. The grader will deduct points if your program violates the style guidelines.

- Use named constants for all numeric literals (char literals are permitted).
- Make sure your code is indented neatly (see the book for good examples: all statements inside of an if or else branch should be indented).

Logistics:

Name your file **assign3_XXXXX.cpp** where XXXXX is your TX State NetID (your txstate.edu email id). The file name should look something like this: assign3_js236.cpp

There are two steps to the turn-in process:

1. Submit an **electronic copy** using the Assignments tool on the TRACS website for this class (tracs.txstate.edu). Submit the .cpp file only.
2. Submit a **printout** of the .cpp file at the beginning of class on the day the assignment is due. Please print your name on the front page. Print the .cpp file only. Do **not** submit a printout of the output.

See the assignment turn-in policy on the course website (cs.txstate.edu/~js236/cs1428) for more details, including deadlines, penalties, and where to submit printouts after class.