Bachelor of Information Technology (Hons)

Assignment Cover Sheet

Course Code: EC3105 Course Title: C Programming

Assignment Title: Assignment 1 Due Date: March 27, 2023

Date Submitted: Apr 4 Lecturer Name: Aashish Acharya

To be completed if this is an individual assignment

I declare that this assignment is my individual work. I have not worked collaboratively nor have I copied from any other student's work or from any other source except where due acknowledgement is made explicitly in the text, nor has any part been written for me by another person.

Student Name: Amrita Tamang Student ID:_____

Signature: ___ _____

To be completed if this is a group assignment

We declare that this is a group assignment and that no part of this submission has been copied from any other student's work or from any other source except where due acknowledgement is made explicitly in the text, nor has any part been written for us by

another person.

Student ID	Student Name	Signature
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Lecturer's comments: _____

_____

Total Marks: _____ Lecturer's Signature:_____

Feedback to Student:

I/We acknowledged receiving feedback from the lecturer on this assignment.

Student's Signature: _____ _____ _____ _____

Extension certification:

This assignment has been given an extension and is now due on _____.

Lecturer's Signature: _____

DECLARATION

I, "Amrita Tamang" hereby affirm that the project work presented here, titled "Programming Report" completed for a degree requirement at Padmashree International College in Tinkune, Kathmandu, Nepal, under the supervision of supervisor Aashish Acharya, is my original, authentic work. It has not been published or submitted elsewhere. Any sources of information, facts, or works created by other people that were cited in this project work have been properly acknowledged and are noted in the reference section.

Date: April 3, 2023

Contents

Problem Specification

You are required to create a billing system for an ISP which provides subscription based internet with additional volume options. There are two subscription plans namely: Home Plan and Corporate Plan. Both the plan have their own base rates and billing structure. Refer to the table below for pricing plans:

Plan Base Rate Top Up Rate Home Plan NPR 1500 for up to 350GB NPR 3 per GB extra Corporate Plan NPR 3500 for up to 1000GB NPR 1.5 per GB extra

Calculate the total amount for a customer when the final GB usage is provided. Your billing system should account for the taxes applicable according to the Law (13% on the final amount).Your programming solution should have the following functionalities:

a) A choice for the user to enter their plan: Home Plan or Corporate Plan

b) Once the choice is given, your system should ask for Customer ID, Name and GB consumed.

c) Create a short, formatted bill to show final amount to the user

d) Your program should ask for a choice to repeat the program after one billing is complete. If the user chooses to, he/she should be able to create another bill without exiting the system.

Introduction

Our ISP understands the value of a dependable and inexpensive internet connection. As a result, we provide two subscription options to meet the demands of our consumers. The Home Plan is best suited for home usage, whilst the Corporate Plan is best suited for enterprises or offices with large data needs.

Our Home Plan begins at NPR 1500 per month for up to 350GB of data consumption. If you go above this limit, you'll be charged NPR 3 per extra Gigabyte. Our Corporate Plan, on the other hand, starts at NPR 3500 for up to 1000GB of data use. Any usage in excess of this restriction will result in an extra charge of NPR 1.5 per GB.

We have created a user-friendly billing system that automates the process of calculating the total amount owing in order to make invoicing easier and more comfortable for our clients. All you have to do is select your plan and provide your customer ID, name, and GB use. The entire amount payable will then be calculated by our system, taking into account the basic rate as well as any additional costs paid for exceeding your data limit.

We have included a structured bill that indicates the total amount payable as well as any relevant taxes to ensure that our clients are completely informed about their invoicing. We recognize the significance of billing transparency and accuracy, which is why we created our system to be as simple as possible.

Furthermore, we know that our clients' data needs may vary from month to month. As a result, our billing system enables you to generate several bills without exiting the site, making it quicker and more convenient to keep track of your consumption and expenditures.

Overall, we feel that our billing system provides our clients with a dependable and hassle-free experience, guaranteeing that they receive accurate and clear billing information for our internet services. We are dedicated to providing the greatest level of service to our clients and are constantly searching for ways to enhance our billing system to meet their changing demands.

Algorithm

Step 1: Start

Step 2: Read variables for choice, GB consumed, base rate, top-up rate, final amount, tax amount, total amount, Customer ID, Customer name and report.

Step 3: Create a do-while loop that will continue to run the program until the user chooses to exit.

Step 4: Read message to enter plan type (Home Plan : 1, Corporate Plan : 2) and store in plan.

Step 5: Input the Customer Id, Customer name and GB consumed and store them in id, name, gb.

Step 6: if (plan = 1)

```
 if (gb <= 0)
 final_amount = 0;
  else if (gb > 0 && gb <= 350)
 base_rate = 1500;
 topup_rate = 3;
 final_amount = base_rate;

 else if (gb > 350)
 base_rate = 1500;
 topup_rate = 3;
 final_amount = base_rate + (gb - 350) * topup_rate;
 else if (plan == 2)

 if (gb <= 0)
 final_amount = 0;

 else if (gb > 0 && gb <= 1000)
```

```
base_rate = 3500;
topup_rate = 1.5;
final_amount = base_rate;

else if (gb > 1000)
base_rate = 3500;
topup_rate = 1.5;
final_amount = base_rate + (gb - 1000) * topup_rate;

else
printf("Invalid choice. Please select again.\n");
```

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Step 7: Calculate the tax owed using the following formula:

tax_amount = 0.13 * final_amount

Step 8: Calculate the total amount owed using the following formula:

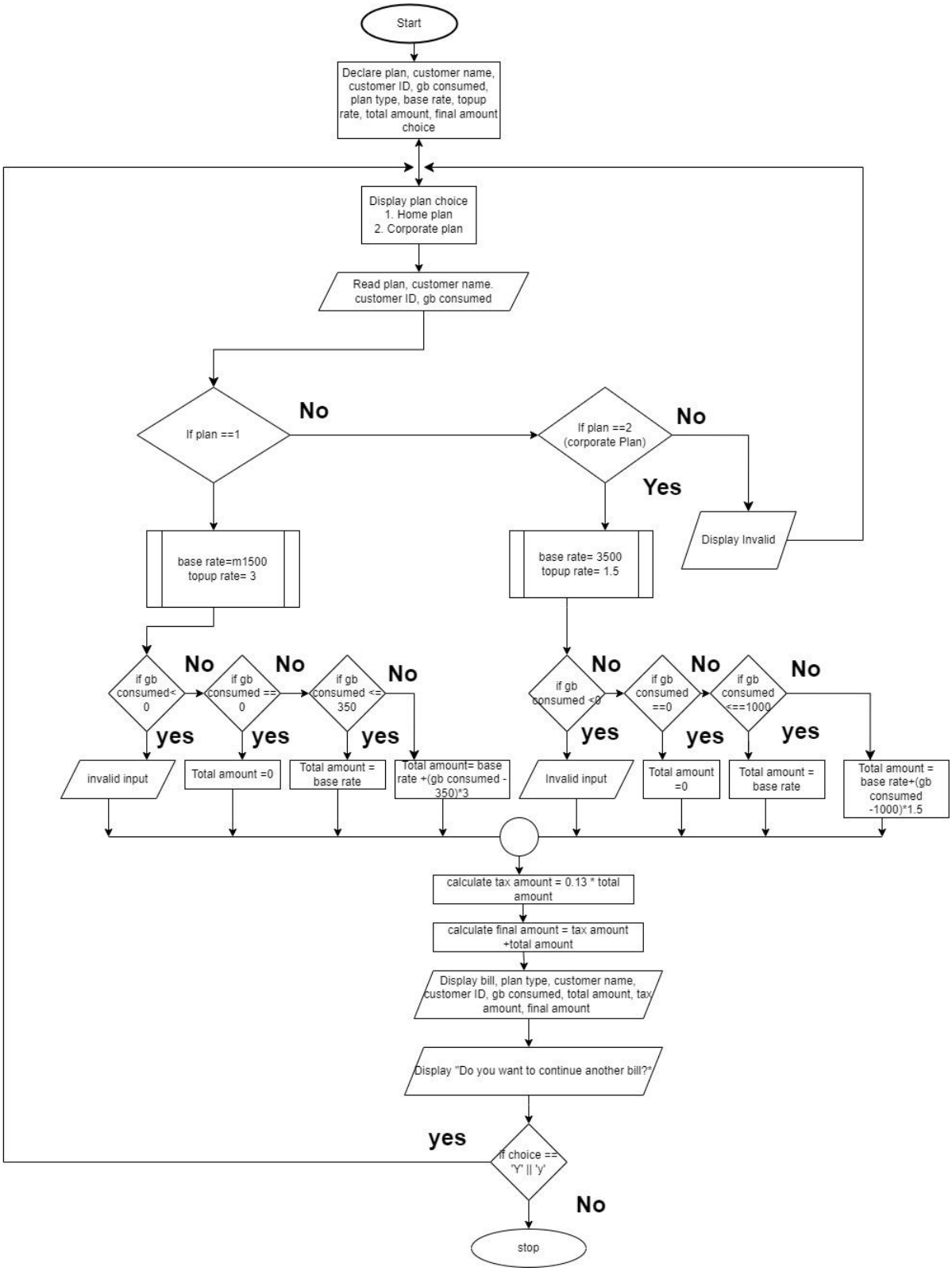
total_amount = final_amount + tax_amount

Step 9: Display the Customer ID, Customer name, Plan chosen, base rate, GB consumed, final amount tax amount, and total amount tax amount in a formatted bill.

Step 14: Ask the user if they want to create another bill. If they enter'Y', the program will repeat the step 3. Otherwise, the program will exit.

Step 15: Stop

Flowchart


Start
Declare plan, customer name, customer ID, gb consumed, plan type, base rate, topup rate, total amount, final amount choice
Display plan choice
1. Home plan
2. Corporate plan
Read plan, customer name. customer ID, gb consumed
If plan ==1
No
If plan ==2 (corporate Plan)
No
Yes
Display Invalid
base rate=m1500 topup rate= 3
base rate= 3500 topup rate= 1.5
if gb consumed< 0
No
yes
invalid input
if gb consumed == 0
No
yes
Total amount =0
if gb consumed <= 350
No
yes
Total amount = base rate
Total amount= base rate +(gb consumed - 350)*3
if gb consumed <0
No
yes
Invalid input
if gb consumed ==0
No
yes
Total amount =0
if gb consumed <==1000
No
yes
Total amount = base rate
Total amount = base rate+(gb consumed -1000)*1.5
calculate tax amount = 0.13 * total amount
calculate final amount = tax amount +total amount
Display bill, plan type, customer name, customer ID, gb consumed, total amount, tax amount, final amount
Display "Do you want to continue another bill?"
yes
if choice == 'Y' || 'y'
No
stop

Code

```
#include <stdio.h>

int main()

{

 int id, plan, gb;

 float base_rate, topup_rate, final_amount, tax_amount, total_amount;

 char name[50], repeat;

 do

 {

 printf("Home Plan : 1\nCorporate Plan : 2\n");

 printf("Enter Your plan : ");

 scanf("%d", &plan);

 if (plan == 1 || plan == 2)

 {

 printf("Enter Customer ID: ");

scanf("%d", &id);

 printf("Enter Customer Name: ");

 scanf("%s", name);

 printf("Enter GB Consumed: ");

 scanf("%d", &gb);

 if (plan == 1)

 {

 if (gb <= 0)

 {

 final_amount = 0;

 }

 else if (gb > 0 && gb <= 350)

 {
```

```
10

base_rate = 1500;

topup_rate = 3;

10

final_amount = base_rate;

}

else if (gb > 350)

{

base_rate = 1500;

topup_rate = 3;

final_amount = base_rate + (gb - 350) * topup_rate;

}

else

{

printf("Wrong Gb consumed");

continue;

}

}

else if (plan == 2)

{

if (gb <= 0)

{

final_amount = 0;

}

else if (gb > 0 && gb <= 1000)

{

base_rate = 3500;

topup_rate = 1.5;
```

```
final_amount = base_rate;
}
else if (gb > 1000)
{
base_rate = 3500;
topup_rate = 1.5;
final_amount = base_rate + (gb - 1000) * topup_rate;
}
else
{
printf("Wrong Gb consumed");
continue;
}
}
else
{
printf("Invalid choice. Please select again.\n");
continue;
}
tax_amount = 0.13 * final_amount;
total_amount = final_amount + tax_amount;
printf("\nBill Details\n");
printf("Customer ID: %d\n", id);
printf("Customer Name: %s\n", name);
printf("Plan: %d\n", plan);
printf("Base rate: NPR %.2f\n", base_rate);
```

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```
 printf("GB consumed: %d\n", gb);
 printf("Final amount: NPR %.2f\n", final_amount);
 printf("Tax amount (13%%): NPR %.2f\n", tax_amount);
 printf("Total amount: NPR %.2f\n", total_amount);
 printf("\nDo you want to print another bill?");
 printf("\nType 'Y' or 'y' to print another bill: ");
 scanf(" %c", &repeat);
 }
 }
 while (repeat == 'Y' );
 return 0;
}
```

Test plan and test data to be used with testing

Home Plan

Customer ID	Customer Name	Base Consumed	GB Consumed	Amount	Tax	Total Amount
011	Amrita	0.00	0	1500.00	195.00	1695
011	Amrita	1500.00	350	1500.00	195.00	1695
011	Amrita	1500.00	550	2100.00	273.00	2373
011	Amrita	1500.00	1200	4050.00	526.50	4576
011	Amrita	0.00	-600	1500.00	195.00	1695

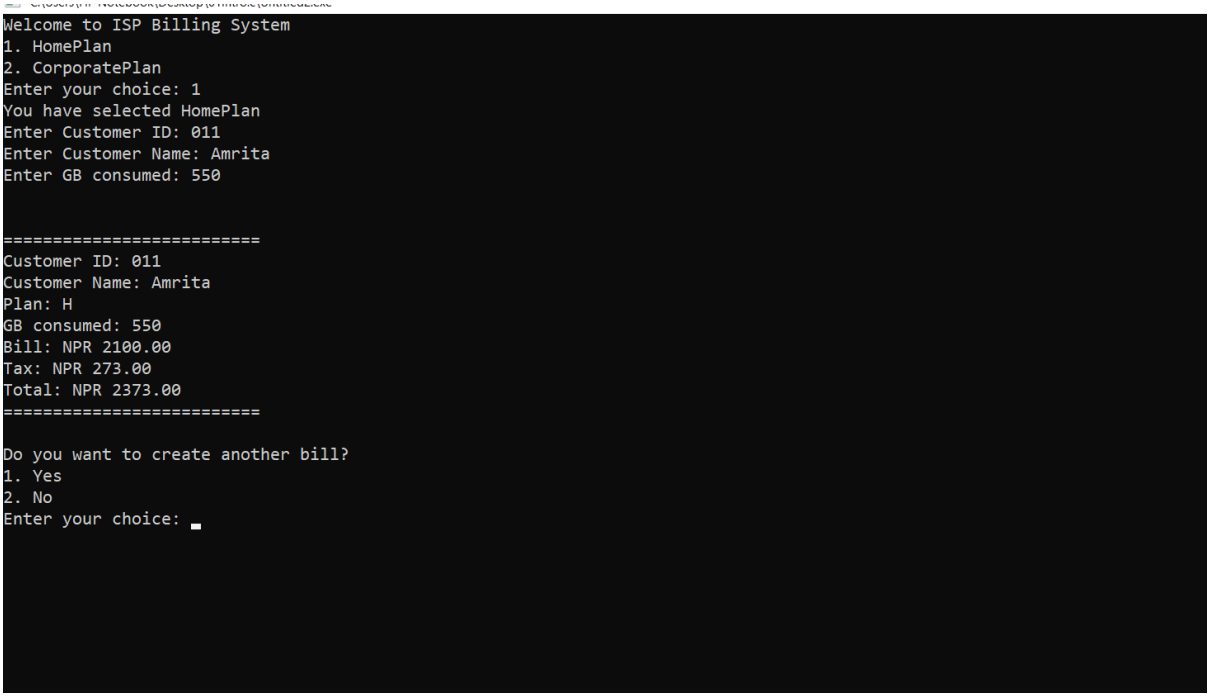
Corporate plan

Customer ID	Customer Name	Base Rate	GB Consumed	Amount	Tax	Total Amount
011	Saru	3500.00	450	3500.00	455.00	3955.00
011	Saru	3500.00	1000	3500.00	455.00	3955.00
011	Saru	3500.00	100000	152000.00	19760.00	171760.00
011	Saru	0.00	-555555	3500.00	455.00	3955.00
011	Saru	0.00	0	3500.00	455.00	3955.00

Output Solution

```
Welcome to ISP Billing System
1. HomePlan
2. CorporatePlan
Enter your choice: 1
You have selected HomePlan
Enter Customer ID: 011
Enter Customer Name: amrita
Enter GB consumed: 0


==========================
Customer ID: 011
Customer Name: amrita
Plan: H
GB consumed: 0
Bill: NPR 1500.00
Tax: NPR 195.00
Total: NPR 1695.00
==========================

Do you want to create another bill?
1. Yes
2. No
Enter your choice:
```

```
Welcome to ISP Billing System
1. HomePlan
2. CorporatePlan
Enter your choice: 1
You have selected HomePlan
Enter Customer ID: 011
Enter Customer Name: Amrita
Enter GB consumed: 350


==========================
Customer ID: 011
Customer Name: Amrita
Plan: H
GB consumed: 350
Bill: NPR 1500.00
Tax: NPR 195.00
Total: NPR 1695.00
==========================

Do you want to create another bill?
1. Yes
2. No
Enter your choice:
```

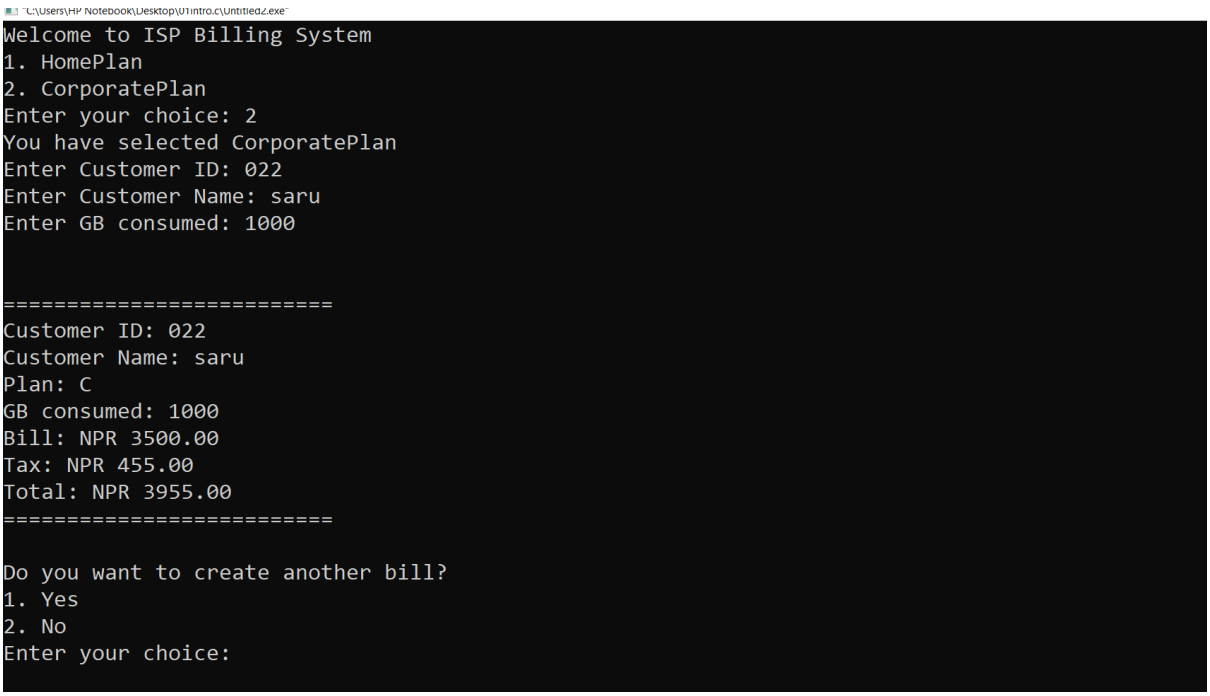

Welcome to ISP Billing System
1. HomePlan
2. CorporatePlan
Enter your choice: 1
You have selected HomePlan
Enter Customer ID: 011
Enter Customer Name: Amrita
Enter GB consumed: 550
==========
Customer ID: 011
Customer Name: Amrita
Plan: H
GB consumed: 550
Bill: NPR 2100.00
Tax: NPR 273.00
Total: NPR 2373.00
==========
Do you want to create another bill?
1. Yes
2. No
Enter your choice:

```
Welcome to ISP Billing System
1. HomePlan
2. CorporatePlan
Enter your choice: 1
You have selected HomePlan
Enter Customer ID: 011
Enter Customer Name: Amrita
Enter GB consumed: 1200


==========================
Customer ID: 011
Customer Name: Amrita
Plan: H
GB consumed: 1200
Bill: NPR 4050.00
Tax: NPR 526.50
Total: NPR 4576.50
==========================

Do you want to create another bill?
1. Yes
2. No
Enter your choice:
```

```
Welcome to ISP Billing System
1. HomePlan
2. CorporatePlan
Enter your choice: 1
You have selected HomePlan
Enter Customer ID: 011
Enter Customer Name: Amrita
Enter GB consumed: -600


========================
Customer ID: 011
Customer Name: Amrita
Plan: H
GB consumed: -600
Bill: NPR 1500.00
Tax: NPR 195.00
Total: NPR 1695.00
========================

Do you want to create another bill?
1. Yes
2. No
Enter your choice:
```

Corporate plan

```
Welcome to ISP Billing System
1. HomePlan
2. CorporatePlan
Enter your choice: 2
You have selected CorporatePlan
Enter Customer ID: 022
Enter Customer Name: Saru
Enter GB consumed: 450


==========================
Customer ID: 022
Customer Name: Saru
Plan: C
GB consumed: 450
Bill: NPR 3500.00
Tax: NPR 455.00
Total: NPR 3955.00
==========================

Do you want to create another bill?
1. Yes
2. No
Enter your choice:
```



```
Welcome to ISP Billing System
1. HomePlan
2. CorporatePlan
Enter your choice: 2
You have selected CorporatePlan
Enter Customer ID: 022
Enter Customer Name: saru
Enter GB consumed: 100000


==========================
Customer ID: 022
Customer Name: saru
Plan: C
GB consumed: 100000
Bill: NPR 152000.00
Tax: NPR 19760.00
Total: NPR 171760.00
==========================

Do you want to create another bill?
1. Yes
2. No
Enter your choice:
```

```
Enter your choice: 2
You have selected CorporatePlan
Enter Customer ID: 022
Enter Customer Name: saru
Enter GB consumed: -555555


==========================
Customer ID: 022
Customer Name: saru
Plan: C
GB consumed: -555555
Bill: NPR 3500.00
Tax: NPR 455.00
Total: NPR 3955.00
==========================

Do you want to create another bill?
1. Yes
2. No
Enter your choice:
```

```
Welcome to ISP Billing System
1. HomePlan
2. CorporatePlan
Enter your choice: 2
You have selected CorporatePlan
Enter Customer ID: 022
Enter Customer Name: saru
Enter GB consumed: 0


=========================
Customer ID: 022
Customer Name: saru
Plan: C
GB consumed: 0
Bill: NPR 3500.00
Tax: NPR 455.00
Total: NPR 3955.00
=========================

Do you want to create another bill?
1. Yes
2. No
Enter your choice:
```

Conclusion

Finally, creating a billing system for an ISP is a crucial process that needs careful attention to every little detail. The system should be able to figure out the overall cost for the consumer, taking into account any taxes that are necessary under the law. The system should also be able to offer the user a brief, structured bill that shows the total cost.

In order to do this, we developed a billing system that gives consumers the option of selecting either the Home Plan or the Corporate Plan. The system prompts the user to provide their customer ID, name, and amount of utilized GB once they have chosen their desired plan. The algorithm then determines the total sum, accounting for the applicable plan's base rate and top-up rate.

Also, a feature that enables the user to repeat the billing procedure without leaving the system has been implemented. Customers who wish to produce several bills without having to restart the system may do somore easily thanks to this capability.

Making ensuring the billing system is safe and simple to use is crucial. This entails adding authentication and authorization safeguards to safeguard client data as well as making the system simple to use with obvious prompts and instructions.The billing system must also be updated to include new features and functionalities that enhance the user experience as technology advances. To increase the effectiveness and simplicity of the billing system, for instance, online payment choices and automatic billing reminders can be included.

To sum up, it takes rigorous planning, design, and execution to create a billing system for an ISP. Taxes should be taken into account when calculating the ultimate cost for the consumer, and a structured bill should be sent. It should also be safe, simple to use, and flexible enough to change to meet changing client demands and technology improvements.

Marking Scheme

20% Design

- UML class diagram with essential attributes and operations.
- Detailed pseudo-code illustrating your design

20% quality of the program implementation attributes and operations

- Readability
- Well documented
- Clear and straightforward code
- Provide description for each segment

20% Test plan

- Test cases
- Test data
- Expected and actual output
- Comments

30% Correctness

- Code produces correct result

10% Documentation

Well-structured with content page, introduction design, test plan, program listing, screen shots and conclusion with reference.