CS201 – Spring 2017-2018 - Sabancı University

Homework #2: Phone Bill

Due March 7, Wednesday, 19:00 (Sharp Deadline)

Introduction

The aim of this homework is to practice on parametric functions and if-else statements. The use of if-else statements is necessary in this problem; however, the use of functions is for good (modular) programming design. That means, it is possible to accomplish this homework without using functions, but it is a must to use them. The details about the use of functions in this homework are given later.

Description

In this homework, you will write a C++ program that will calculate the total phone bills of two separate users. Name (taken as first name and last name) of a user, the number of minutes they talked, the number of SMS's they sent and their internet usage as MB will be your inputs. Additionally, your program will also ask the users how many additional packages they bought for calls, SMS and/or internet.

Please note that there are two users, therefore you should handle each user separately. This means, you should get the inputs for one user first, and display his/her results. After that, you should do the same for the other user.

In this scenario, every user has a base package (shown in Table 1), and they can buy additional packages for calls, SMS and/or internet (detailed in Table 2). Please note that, additional packages are only for one kind of usage. Users can buy separate packages for calls, SMS and/or internet. It is also possible for users to buy more than one type of additional packages (e.g. packages for both calls and SMS), and more than one package for any one kind of package (e.g. three packages for internet). If they exceed their base packages and did not buy any additional packages; or they exceed the additional packages as well, the cost of their usage will be calculated using the standard rates given in Table 3. For example, if a user spent 1050 minutes for calls, and bought two additional packages for calls; they exceed their package by 1050 – 500 – (250 * 2) = 50 minutes. The cost of excess minutes' will be calculated using the standard rate of 66 kuruş (krş.) per minute (66 krş. * 50 = 3300 krş. = 33 TL).

Base Package	**49 TL**
Calls	500 minutes
SMS	1000 SMS
Internet	3 GB

Table 1

Additional Packages (12 TL for each)	
Calls	250 minutes (12 TL)
SMS	250 SMS (12 TL)
Internet	1 GB (12 TL)

Table 2

Standard Rates	
Calls	66 krş. per minute
SMS	55 krş. per SMS
Internet	1 TL per 100 KB

Table 3

VERY IMPORTANT!

Your programs will be compiled, executed and evaluated automatically; therefore, you should definitely follow the rules for prompts, inputs and outputs. See **Sample Runs** section for some examples.

- **Order of inputs and outputs** must be in the abovementioned format.
- **Prompts before inputs and outputs** must be **exactly the same** with examples.

Following these rules is crucial for grading, otherwise our software will not be able to process your outputs and you will lose some grades in the best scenario.

Input Checks and Program Flow

Firstly, your program will ask the user for their first name and last name. Please note that the first name and the last name should be separate inputs, and your program should then merge them.

Then, your program will ask for the number of minutes spent for calls. At this point, you should make an input check to make sure the number of minutes is equal to or greater than zero. If this input check fails, then you should display an appropriate message and end the flow for that user. If the input is entered correctly, then your program will ask for the number of SMS's, and make another input check to see if that is equal to or greater than zero. Again, if this input check fails, you should display a message and end the flow for that user If the input is correct, then your program will ask for the internet usage in MB's and make the final input check to see if it is equal to or greater than zero. If this check fails, you will display a message and end the flow for that user. Otherwise, you will continue.

If all previous inputs are entered correctly, then your program will ask a single question for the user to enter how many additional packages they bought for calls, SMS and/or internet. You do not need to make any input checks for these inputs. You may assume that they are correctly given integer values equal to or greater than zero. **You may also assume that the users will not buy additional packages if they do not exceed their base package.**

After that, your program should calculate the total cost of all services. You should remember that the base package is 49 TL and all users pay at least that amount. On top of that, you should add the cost of additional packages if the user bought any, and the outside of package uses for any of the services. Please do not forget to refer to the given tables above (Table 2, 3) to see the prices of additional packages and standard rates for outside of package uses of services. Please note that, you should make conversions between GB, MB and KB when necessary.

After the calculations, your program will display the total cost and display a special message according to the total cost of the bill. You may see the cases and their respective messages in Table 4.

Cases	Messages
if the total cost is equal to 49	You did not exceed your base package.
if the total cost is greater than 49 and smaller than 100	You exceeded your base package.
if the total cost is equal to or greater than 100	You exceeded your base package too much. We suggest you to change your base package.

Table 4

Please remember that there are two users, therefore you should handle each case separately. This means, you should get the inputs for one user first, and display their results. After that, you should do the same for the other user. You may (and you should) check the "Sample Runs" below.

IMPORTANT!

If your code does not compile, you will get **zero**. Please be careful about this and double check your code before submission.

Use of Functions (EXTREMELY IMPORTANT!)

You have to follow the specifications below for function declaration and callings. The grading criteria will include proper use of these parametric functions. Do NOT use any global variables (variables defined outside the functions) to avoid parameter use. Unnecessary code duplication will cause grade reduction as well.

In the first homework you were not supposed to implement any functions. However, in this homework you are expected to (actually you have to) use some function(s). The guidance about using functions in this homework is below.

A total of four user-defined functions (other than main) must be implemented. Three of these functions are void functions and one of them is a non-void function. You have to implement and use these four functions. If you don't, your grade will be lowered because of the missing functions. On top of these functions, you may use other functions if you want.

The program flow will be as follows:

- **Main function:** In the main function, you will ask for the first name and the last name of the first user. Then, you should proceed to **function1** with this user name (as a single `string` merging the first and last names) as its parameter. The same steps will be repeated for the other user.

- **void function1(…):** This function will be called from main with user name as the parameter, and it will be used to prompt for the inputs and to get them from the user. Please remember that, you should get first three inputs one by one and make an input check for each input before asking for another input. Therefore, your program will call **function2** to make input checks for each input separately whenever necessary. If there are no errors in the first three inputs taken, then it will prompt for the remaining inputs and finally call **function3** for calculations.

- **bool function2(…):** Gets an `integer` value, user name, and the type of service in question as parameters. It then checks if the given integer value is equal to or greater than zero. It will **return** the appropriate boolean (`bool`) value.

- **void function3(…):** Takes all inputs as parameters and calculates the total cost of all services. (Please refer to Tables 1, 2 and 3 to calculate the total cost.) After the calculations, it calls **function4** to display the results.

- **void function4(…):** Takes the name of the user and the total cost as parameters, and displays the total cost and the appropriate special message for that total cost as given in Table 4.

Needless to say, you have to name these for functions using **meaningful** identifiers, not as function1, function2, etc.

No abrupt program termination please!

You may want to stop the execution of the program at a specific place (before the end) in the program. Although there are ways of doing this in C++, it is not a good programming practice to abruptly stop the execution in the middle of the program. Therefore, your program flow should continue until the end of the main function and finish there.

Sample Runs

Below, we provide some sample runs of the program that you will develop. The italic and bold phrases are inputs taken from the user. You should follow the input order in these examples and the prompts your program will display must be **exactly the same** as in the following examples.

Sample Run 1

```
Please enter your name: Gulsen Demiroz
Gulsen Demiroz, please enter how many minutes you used this month: 438
Gulsen Demiroz, please enter how many SMSs you sent this month: 666
Gulsen Demiroz, please enter how many MBs you used this month: 1324
Gulsen Demiroz, please specify how many additional packages you bought for
calls, SMS and internet in this order: 0 0 0
Gulsen Demiroz, total cost of your phone usage is 49 TL. You did not exceed
your base package.
Please enter your name: Inanc Arin
Inanc Arin, please enter how many minutes you used this month: 721
Inanc Arin, please enter how many SMSs you sent this month: 0
Inanc Arin, please enter how many MBs you used this month: 2923
Inanc Arin, please specify how many additional packages you bought for
calls, SMS and internet in this order: 0 0 0
Inanc Arin, total cost of your phone usage is 194.86 TL. You exceeded your
base package too much. We suggest you to change your base package.
```

Sample Run 2

```
Please enter your name: Ece Egemen
Ece Egemen, please enter how many minutes you used this month: 310
Ece Egemen, please enter how many SMSs you sent this month: 5
Ece Egemen, please enter how many MBs you used this month: 3075
Ece Egemen, please specify how many additional packages you bought for
calls, SMS and internet in this order: 0 0 0
Ece Egemen, total cost of your phone usage is 79.72 TL. You exceeded your
base package.
Please enter your name: Emir Artar
Emir Artar, please enter how many minutes you used this month: 310
Emir Artar, please enter how many SMSs you sent this month: 5
Emir Artar, please enter how many MBs you used this month: 3075
Emir Artar, please specify how many additional packages you bought for
calls, SMS and internet in this order: 0 0 1
Emir Artar, total cost of your phone usage is 61 TL. You exceeded your base
package.
```

Sample Run 3

```
Please enter your name: Yasin Findik
Yasin Findik, please enter how many minutes you used this month: 310
Yasin Findik, please enter how many SMSs you sent this month: 5
Yasin Findik, please enter how many MBs you used this month: 4098
Yasin Findik, please specify how many additional packages you bought for
calls, SMS and internet in this order: 0 0 1
Yasin Findik, total cost of your phone usage is 81.48 TL. You exceeded your
base package.
Please enter your name: Tibet Iskesen
Tibet Iskesen, please enter how many minutes you used this month: 310
Tibet Iskesen, please enter how many SMSs you sent this month: 5
Tibet Iskesen, please enter how many MBs you used this month: 4098
Tibet Iskesen, please specify how many additional packages you bought for
calls, SMS and internet in this order: 0 0 2
Tibet Iskesen, total cost of your phone usage is 73 TL. You exceeded your
base package.
```

Sample Run 4

```
Please enter your name: Cem Karaca
Cem Karaca, please enter how many minutes you used this month: 605
Cem Karaca, please enter how many SMSs you sent this month: 1201
Cem Karaca, please enter how many MBs you used this month: 3205
Cem Karaca, please specify how many additional packages you bought for
calls, SMS and internet in this order: 1 1 1
Cem Karaca, total cost of your phone usage is 85 TL. You exceeded your base
package.
Please enter your name: Erkin Koray
Erkin Koray, please enter how many minutes you used this month: 1002
Erkin Koray, please enter how many SMSs you sent this month: 1101
Erkin Koray, please enter how many MBs you used this month: 6300
Erkin Koray, please specify how many additional packages you bought for
calls, SMS and internet in this order: 2 1 4
Erkin Koray, total cost of your phone usage is 134.32 TL. You exceeded your
base package too much. We suggest you to change your base package.
```

Sample Run 5

```
Please enter your name: MrWrong Input
MrWrong Input, please enter how many minutes you used this month: -10
MrWrong Input, number of minutes cannot be smaller than 0.
Please enter your name: MrsWrong Input
MrsWrong Input, please enter how many minutes you used this month: 100
MrsWrong Input, please enter how many SMSs you sent this month: -20
MrsWrong Input, number of SMSs cannot be smaller than 0.
```

Sample Run 6

```
Please enter your name: MrWrong Input
MrWrong Input, please enter how many minutes you used this month: 0
MrWrong Input, please enter how many SMSs you sent this month: 10
MrWrong Input, please enter how many MBs you used this month: -1
MrWrong Input, internet usage cannot be smaller than 0.
Please enter your name: MrsWrong Input
MrsWrong Input, please enter how many minutes you used this month: 100
MrsWrong Input, please enter how many SMSs you sent this month: 0
MrsWrong Input, please enter how many MBs you used this month: -2
MrsWrong Input, internet usage cannot be smaller than 0.
```

General Rules and Guidelines about Homeworks

The following rules and guidelines will be applicable to all homeworks, unless otherwise noted.

How to get help?

You may ask questions to TAs (Teaching Assistants) of CS201. Office hours of TAs are at the class website. Recitations will partially be dedicated to clarifying the issues related to homework, so it is to your benefit to attend recitations.

Moreover, in the recitations for the first homework, there will be a demonstration on how to prepare homework for submission and how to submit it to SUCourse. This process is not so straightforward. We have experienced several unsuccessful submissions in the previous years. Therefore, we strongly recommend you attend this demo.

What and Where to Submit

Please see the detailed instructions below/in the next page. The submission steps will get natural/easy for later homeworks.

Grading and Objections

Careful about the semi-automatic grading: Your programs will be graded using a semi-automated system. Therefore, you should follow the guidelines about input and output order; moreover, you should also use same prompts as given in the Sample Runs. Otherwise semi-automated grading process will fail for your homework, and you may get a zero, or in the best scenario you will lose points.

Grading:

- ❑ Late penalty is 10% off the full grade and only one late day is allowed.
- ❑ **Having a correct program is necessary, but not sufficient to get the full grade. Comments, indentation, meaningful and understandable identifier names, informative introduction and prompts, and especially proper use of required functions, unnecessarily long program (which is bad) and unnecessary code duplications (which is also bad) will also affect your grade.**
- ❑ Please submit your own work only (even if it is not working). It is really easy to find out "similar" programs!
- ❑ For detailed rules and course policy on plagiarism, please check out http://myweb.sabanciuniv.edu/gulsend/su_current_courses/cs-201-spring-2008/plagiarism/ and keep in mind that

Plagiarism will not be tolerated!

Grade announcements: Grades will be posted in SUCourse, and you will get an Announcement at the same time. You will find the grading policy and test cases in that announcement.

Grade objections: It is your right to object to your grade if you think there is a problem, but before making an objection please try the steps below and if you still think there is a problem, contact the TA that graded your homework from the email address provided in the comment section of your announced homework grade or attend the specified objection hour in your grade announcement.

- Check the comment section in the homework tab to see the problem with your homework.
- Download the .zip file you submitted to SUCourse and try to compile it.
- Check the test cases in the announcement and try them with your code.
- Compare your results with the given results in the announcement.

What and where to submit (IMPORTANT)

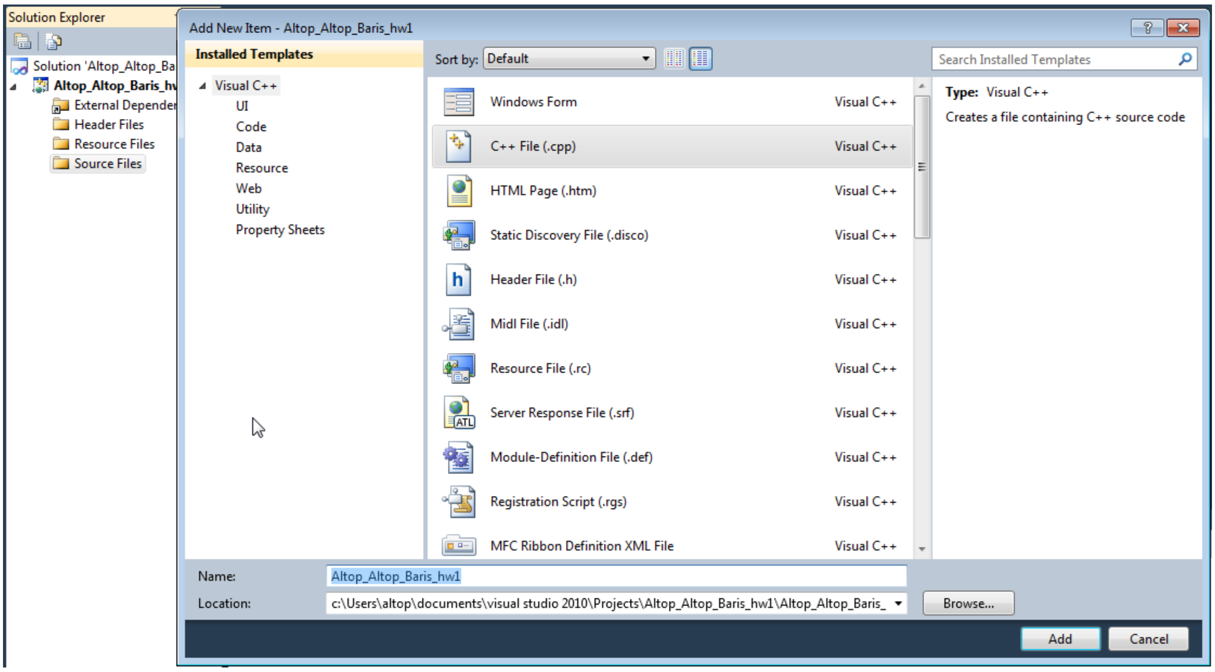
Submissions guidelines are below. Most parts of the grading process are automatic. Students are expected to strictly follow these guidelines in order to have a smooth grading process. If you do not follow these guidelines, depending on the severity of the problem created during the grading process, 5 or more penalty points are to be deducted from the grade.

Add your name to the program: It is a good practice to write your name and last name somewhere in the beginning program (as a comment line of course).

Name your submission file:

- □ Use only English alphabet letters, digits or underscore in the file names. Do not use blank, Turkish characters or any other special symbols or characters.
- □ Name your cpp file that contains your program as follows.

  “**sucourseusername_yourlastname_yourname_HWnumber.cpp**”


Solution Explorer
Solution 'Altop_Altop_Ba
Altop_Altop_Baris_hv
External Depender
Header Files
Resource Files
Source Files
Add New Item - Altop_Altop_Baris_hw1
Installed Templates
Visual C++
UI
Code
Data
Resource
Web
Utility
Property Sheets
Sort by: Default
Search Installed Templates
Windows Form Visual C++
C++ File (.cpp) Visual C++
HTML Page (.htm) Visual C++
Static Discovery File (.disco) Visual C++
Header File (.h) Visual C++
Midl File (.idl) Visual C++
Resource File (.rc) Visual C++
Server Response File (.srf) Visual C++
Module-Definition File (.def) Visual C++
Registration Script (.rgs) Visual C++
MFC Ribbon Definition XML File Visual C++
Browse...
Add
Cancel

Type: Visual C++

Creates a file containing C++ source code

Name: Altop_Altop_Baris_hw1

Location: c:\Users\altop\documents\visual studio 2010\Projects\Altop_Altop_Baris_hw1\Altop_Altop_Baris_

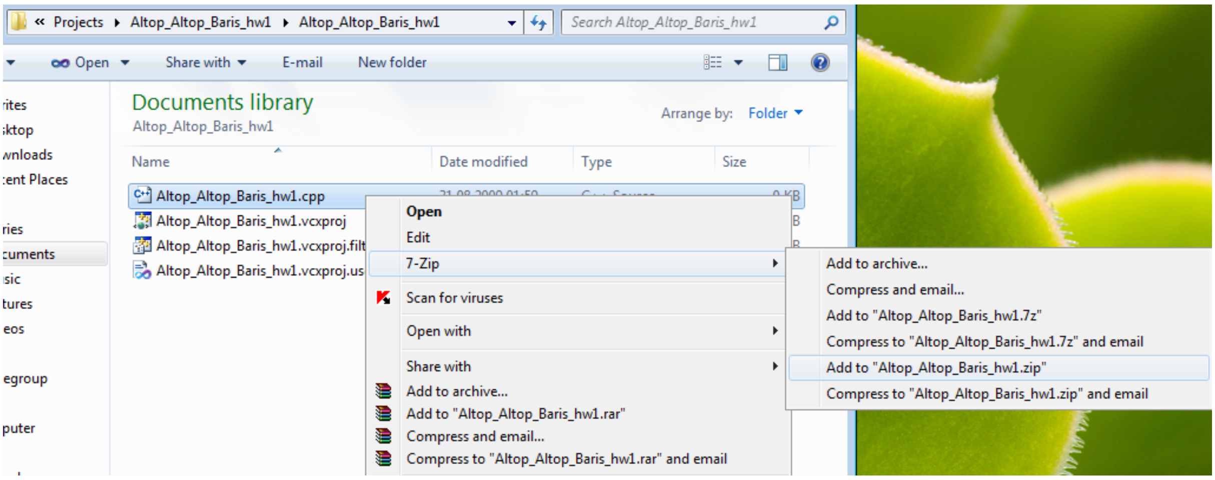
❑ Your SUCourse user name is actually your SUNet user name which is used for checking sabanciuniv e-mails. Do NOT use any spaces, non-ASCII and Turkish characters in the file name. For example, if your SUCourse user name is cago, name is Çağlayan, and last name is Özbugsızkodyazaroğlu, then the file name must be:

cago_ozbugsizkodyazaroglu_caglayan_hw2.cpp

❑ Do not add any other character or phrase to the file name.

❑ Make sure that this file is the latest version of your homework program.

❑ Compress this cpp file using WINZIP or WINRAR programs. Please use "**zip**" compression. "rar" or another compression mechanism is NOT allowed. Our homework processing system works only with zip files. Therefore, make sure that the resulting compressed file has a zip extension.


« Projects ▸ Altop_Altop_Baris_hw1 ▸ Altop_Altop_Baris_hw1
Search Altop_Altop_Baris_hw1
Open
Share with
E-mail
New folder
ites
ktop
wnloads
ent Places
ries
cuments
sic
tures
eos
egroup
puter
Documents library
Altop_Altop_Baris_hw1
Arrange by: Folder
Name
Date modified
Type
Size
Altop_Altop_Baris_hw1.cpp
Altop_Altop_Baris_hw1.vcxproj
Altop_Altop_Baris_hw1.vcxproj.filt
Altop_Altop_Baris_hw1.vcxproj.us
Open
Edit
7-Zip
Scan for viruses
Open with
Share with
Add to archive...
Add to "Altop_Altop_Baris_hw1.rar"
Compress and email...
Compress to "Altop_Altop_Baris_hw1.rar" and email
Add to archive...
Compress and email...
Add to "Altop_Altop_Baris_hw1.7z"
Compress to "Altop_Altop_Baris_hw1.7z" and email
Add to "Altop_Altop_Baris_hw1.zip"
Compress to "Altop_Altop_Baris_hw1.zip" and email

❑ Check that your compressed file opens up correctly and it contains your **cpp** file. You will receive no credits if your compressed zip file does not expand or it does not contain the correct file.

❑ The naming convention of the zip file is the same as the cpp file (except the extension of the file of course). The name of the zip file should be as follows.

“**sucourseUserName_yourLastname_yourName_HWnumber.zip**”

For example zubzipler_zipleroglu_zubeyir_hw2.zip is a valid name, but
hw2_hoz_HasanOz.zip, HasanOzHoz.zip are NOT valid names.

Submission:

❑ Submit via SUCourse ONLY! You will receive no credits if you submit by other means (e-mail, paper, etc.).

1) Click on "Assignments" at CS201 SUCourse (not the CS201 web site).
2) Click Homework 2 in the assignments list.
3) Click on "Add Attachments" button.
4) Click on "Browse" button and select the zip file that you generated.
5) Now, you have to see your zip file in the "Items to attach" list.
6) Click on "Continue" button.
7) Click on "Submit" button. We cannot see your homework if you do not perform this step even if you upload your file.

Resubmission:

- ❑ After submission, you will be able to take your homework back and resubmit. In order to resubmit, follow the following steps.
    1) Click on "Assignments" at CS201 SUCourse.
    2) Click Homework 2 in the assignments list.
    3) Click on "Re-submit" button.
    4) Click on "Add/remove Attachments" button
    5) Remove the existing zip file by clicking on "remove" link. This step is very important. If you do not delete the old zip file, we receive both files and the old one may be graded.
    6) Click on "Browse" button and select the new zip file that you want to resubmit.
    7) Now, you have to see your new zip file in the "Items to attach" list.
    8) Click on "Continue" button.
    9) Click on "Submit" button. We cannot see your homework if you do not perform this step even if you upload your file.

Successful submission is one of the requirements of the homework. If, for some reason, you cannot successfully submit your homework and we cannot grade it, your grade will be 0.

Good Luck!
Ece Egemen, İnanç Arın, Gülşen Demiröz