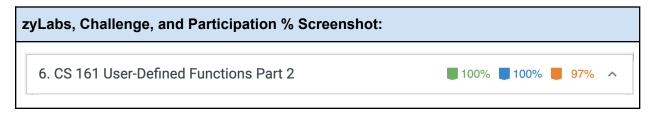# Assignment 05 Algorithmic Design Document

Make a copy before you begin (File -> Make a copy). Add the Assignment # above and complete the sections below BEFORE you begin to code and submit with your Assignment to D2L (File -> Download -> PDF). The sections will expand as you type.

zyBooks

Add your zyBooks screenshots for the % and assigned zyLabs completions below. Required percentages: all assigned zyLabs, Challenge Activity with at least 70%, and Participation Activity with at least 80%.

zyLabs, Challenge, and Participation % Screenshot:
6. CS 161 User-Defined Functions Part 2 ■ 100% ■ 100% ■ 97% ∧

Assigned zyLabs completion Screenshot:

Assignment

Program description:
Program fitClub Menu driven program that allows users to build a customized membership. Menu will give users some choices, and they will be able to pick a choice. Based on the choice they pick, they will be asked some questions and given results. This process will repeat until the user chooses to quit the program.

Before you begin coding, **you must first plan out the logic** and think about what data you will use to test your program for correctness. All programmers plan before coding - this saves a lot of time and frustration! Use the steps below to identify the inputs and outputs, calculations, and steps needed to solve the problem.

Algorithmic design:
a. Identify all of the user input. What are the data types of the inputs? Define the input variables.
char optionsChar - will store the user's "a" / "b" choice of entering or exiting the program. char yesNoAnswer - will store the user's "Y" / "N" answer to Yes or No questions. bool senior - will store the user's answer to whether or not they are a Senior Citizen

int months - will store the user's input for how many month's membership they want

int personal - will store the user's input for how many personal training sessions they want

b. Describe the program output. What is displayed to the user? What are the data types of the output? Define the output variables.

Your membership cost after the 10% off is $270.00

- This output is type double

Your personal training cost for 0 sessions is $0.00

- This output is type double

Your total membership cost is $270.00.

- This output is type double

After your Senior discount, your membership cost is $189.00

- This output is type double

Thank you for checking out my fitClub center!!   Come back and be fit!

- This output is a string output via "cout" command

c. What calculations do you need to do to transform inputs into outputs? List all formulas needed, if applicable. If there are no calculations needed, state there are no calculations for this algorithm.

For membership pre-pay less than 12 months:
- totalCost += MONTHLY_FEE * months;
- membershipCost = MONTHLY_FEE * months;

For membership pre-pay 12 months or more:
- totalCost += (MONTHLY_FEE * (1 - MEMBERSHIP_PRE_PAY_DISCOUNT)) * months;
- membershipCost = (MONTHLY_FEE * (1 - MEMBERSHIP_PRE_PAY_DISCOUNT)) * months;

For personal training sessions, pre-pay less than 5:
- totalCost += PERSONAL_TRAIN_FEE * personal;
- persTrainTotal = PERSONAL_TRAIN_FEE * personal;

For personal training sessions, pre-pay 5 or greater:
- totalCost += (PERSONAL_TRAIN_FEE * (1 - PERSONAL_TRAIN_DISCOUNT)) * personal;
- persTrainTotal = (PERSONAL_TRAIN_FEE * (1 - PERSONAL_TRAIN_DISCOUNT)) * personal;

If senior citizen:
- totalCost *= (1 - SENIOR_DISCOUNT);

d. Design the logic of your program using pseudocode or flowcharts. Here is where you would use conditionals, loops, functions or array constructs (if applicable) and list the steps in transforming inputs into outputs. Walk through your logic steps with the test data from the assignment document.

The user will be initially prompted with a Menu Board for Membership Pricing, and given the option to enter the program by selecting "a", or quitting the program by selecting "b".

A. If a user selects "a":
    1) User will be asked if they are a Senior Citizen
    2) User will be asked how many months of membership they would like
    3) User will be asked how many personal training sessions they would like

B. Once a user enters this data, the program will calculate their total cost, based on the following:
    1) Membership Total:
        a) If buying less than 12 months, regular pricing applies
        b) If buying 12 or more months, discount is applied
    2) Personal Training Total:
        a) If buying less than 5 sessions, regular pricing applies
        b) If buying 5 or more sessions, discount pricing applies
    3) Senior Discount:
        a) If not a Senior, no discount off total.
        b) If they are a senior, the discount applies to the total price.

C. Printing the Quote:
    1) Individual line item pricing is printed for the following:
        a) Membership cost
        b) Personal training session cost
        c) Total membership cost (monthly cost and personal training combined)
        d) If user is senior citizen, discount is taken off total and separate line item stating "After your Senior Discount, your membership cost is $XXXX"
            i) If NOT a senior citizen, no discount applies and the line item mentioning the discount does not render to screen.

D. Quitting the program:
    1) If in the beginning or at any other time after program resets, the user selects "b", the program will exit and display: "Thank you for checking out my fitclub center!! Come back and be fit!"

e. Include 2 Sample Program Runs for your program using your own set of data. This data set must be different from my Sample Runs in the Assignment document. This process is similar to Unit Testing and will help you test your program better.

Sample Program Run 1:

Welcome to my fitClub program!!
The cost to become a member of the fitClub center is as follows:

• The membership fee per month is $20.00
• The personal training session fee per session is $10.00
• If the membership is bought and paid for 12 or more months, the discount is 10% off membership cost
• If more than five personal training sessions are bought and paid for, the discount on each session is 20%
• The senior citizens discount is 30% off the total amount.

Please pick one of the following options:

    a. Calculate membership cost
    b. quit this program

a

Are you a Senior Citizen (y|Y/n|N): y

How many months of membership would you like? 12

How many personal training sessions would you like? 6

Your membership cost after the 10% off is $216.00

Your personal training cost for 6 sessions is $48.00

Your total membership cost is $184.80.

After your Senior discount, your membership cost is $184.80

Thank you for checking out my fitclub center!! Come back and be fit!

Sample Program Run 2:

Welcome to my fitClub program!!
The cost to become a member of the fitClub center is as follows:

• The membership fee per month is $20.00
• The personal training session fee per session is $10.00
• If the membership is bought and paid for 12 or more months, the discount is 10% off
    membership cost
• If more than five personal training sessions are bought and paid for, the discount on each
    session is 20%
• The senior citizens discount is 30% off the total amount.

Please pick one of the following options:

a. Calculate membership cost
    b. quit this program

a

Are you a Senior Citizen (y|Y/n|N): n

How many months of membership would you like? 6

How many personal training sessions would you like? 10

Your membership cost after the 10% off is $120.00

Your personal training cost for 10 sessions is $80.00

Your total membership cost is $200.00.

Thank you for checking out my fitclub center!! Come back and be fit!