Project 3.1.3

Combo Menu

Distance Learning Support

Check with your teacher about:

- ☐ Materials or resources you need for this project
- ☐ What work you need to turn in and how to submit it
- ☐ Collaboration strategies

GOALS

- Apply coding fundamentals in a text-based language
- Apply file naming conventions and version control
- Develop and test code incrementally
- Develop a program independently

TASKS DESCRIPTION

“I have this culinary arts class in the tech wing of our school,” you tell Francisco. “One of our assignments is to make a menu, price food, and make change with money. I’m wondering whether we could write that as a program that I could use.”

He responds with a wink, “Certainly, es pan comido.”

You’ve taken a little Spanish and you hazard a guess, “It’s bread eating?”

“Yes, it’s one of our idioms. It means, it will be easy.”

“Ah!” you say, “In English, we use the expression ‘piece of cake’.”

Create a program that automates the ordering of a meal by offering options in the menu, capturing the responses, and providing a summary of the order to the user.

ESSENTIAL QUESTIONS

1. Can I describe what an algorithm does to someone new to coding?
2. What are some mathematical and logical concepts that are used over and over?
3. What computer science terms keep confusing me?

ESSENTIAL CONCEPTS

- Algorithms, Variables, Arguments, Procedures, Strings and Concatenation, and Logic
- Arithmetic Operators, Relational Operators, Logical Operators, and Conditionals and Event-driven Programming

Project Introduction

In this project you will use *Python*® to plan, design, and create a program that allows a user to select some options from a combo menu at a restaurant. This will be a highly abstracted program that implements only the most basic and necessary structures. **Abstraction** helps programmers focus on a particular level of coding to avoid extra complexity and focus on only the immediately relevant parts of a problem. The level of abstraction you are focusing on now is that of a basic working program, and not the user interface or input error handling.

> **PLTW COMPUTER SCIENCE NOTEBOOK** - Program Planning
>
> Document all project work in your PLTW Computer Science Notebook.

Development Process

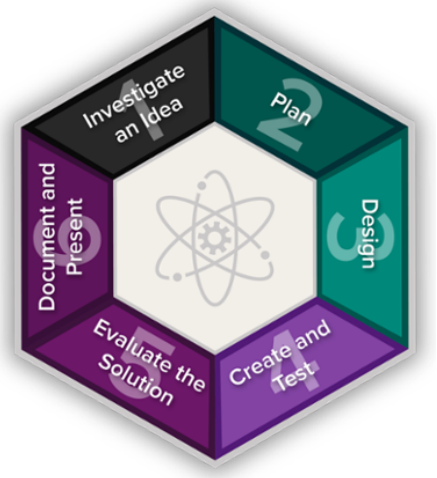
As you create your program, you will do some of your work with an elbow partner and then do other work individually. The instructions will indicate when to work together and when to work individually.

To help make your teamwork effective, remember to:

- Communicate clearly and respectfully.
- Try to build a consensus.
- Resolve conflicts before finalizing the plan.
- Negotiate to find the best ideas and direction.

Development Process

- Investigate an Idea
- Plan
- Design
- Create and Test
- Evaluate the Solution
- Document and Present



Software Development Process: For more information, refer to the **Software Development Process** in the GSR.

For this project, you will work through each phase of the design process.

Investigate an Idea

Using what you have learned about *Python* so far, you will create a basic program named `combo_menu`. Use the steps below to investigate an idea for your project.

1. Begin by reviewing the requirements that this project must meet. The requirements are broken down into iterations. The Combo Menu program should behave as follows in each iteration.

Requirements

> **Important**: How are you going to store values in this program?

Iteration 1

- [ ] Ask the user for a type of sandwich (chicken $5.25, beef $6.25, tofu $5.75).
- [ ] Have the program output the user's sandwich selection to verify that the program is working correctly.

Iteration 2

Add the following features to your first iteration:

- [ ] Ask the user whether they would like a beverage (yes, no).
    - [ ] If they say yes, ask what size beverage they would like:
        small $1.00
        medium $1.75
        large $2.25
- [ ] Have the program output the user's beverage size selection, or lack of selection, to verify that the program is working correctly.
- [ ] Have the program output the total cost so far.

Iteration 3

Add the following features to your first iteration:

- [ ] Ask the user whether they would like french fries (yes, no).
    - [ ] If they say yes, ask what size french fries they would like:
        small $1.00
        medium $1.50
        large $2.00
    - [ ] If they say “small,” ask the user whether they’d like to mega-size their fries (yes, no).
    - [ ] If the user inputs yes to mega-size, give them large fries at the large fries price instead of their small fries.
- [ ] Have the program output the user’s fries selection to verify that the program is working correctly.
- [ ] Adjust the program so the total cost only outputs to the user after their sandwich, drink, and fries selection.

Iteration 4

- [ ] Ask the user how many ketchup packets they would like (enter a positive integer; cost is $0.25 per packet).

After ordering the sandwich, drink, fries, and ketchup packets:

- [ ] If the user selected a sandwich, french fries, and a beverage, reduce the total cost of the order by $1.00.
- [ ] The program informs the user of their menu selections, for only the items they ordered.
- [ ] The program should print the total cost of the order. Remove any other totals before this point.

> **Important**: Use variables and Boolean logic to help with the dollar discount. What would the default values be? When would they change? What conditions should the final part of the app check for?

Plan

2 After reading through the different iterations for `combo_menu`, document some ideas to plan for your program.

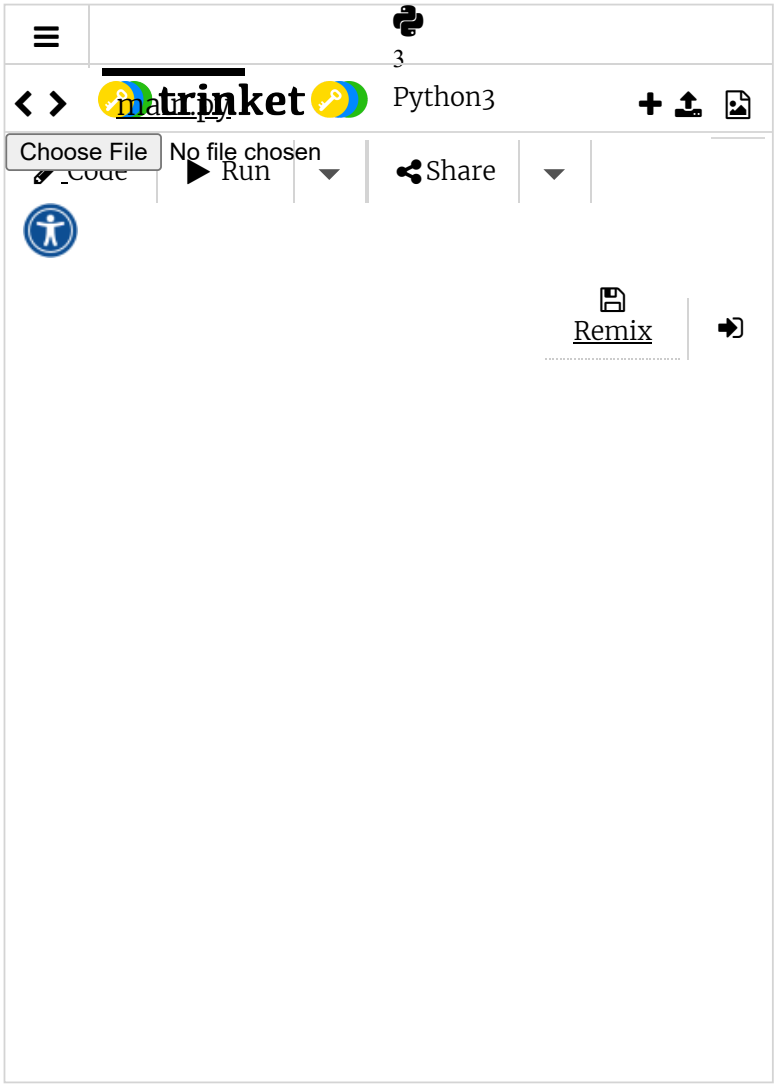
> **PLTW Computer Science Notebook** - Program Planning
>
> Start outlining how you will write your program. What kind of variables, conditionals, and Boolean statements will you need?

Design, Create, and Test

Using what you have learned about *Python* so far, and the requirements for each iteration, program the `combo_menu`.

3. You may use the code editor below to help with testing and developing your program.

> **Note**: Your teacher may direct you to use your AWS Academy account to complete this project. For instructions on how to create an AWS Academy account and a Cloud9 workspace, refer to the **AWS Academy and Cloud9** resource in the General Student Resources.



4 Save your code as directed by your teacher.

5 Let your teacher know when your program is done.

Evaluate the Solution

6 Share your solution with an elbow partner.

Discussion Prompts

Can you read and understand your classmate's program?

- Is it well commented?
- Are variables well named?
- Is it well structured and logical?

Document and Present

A program can be described broadly by what it does, or in more detail by both what the program does and how the program statements accomplish this function. You will document your program using standard guidelines for presentations. Your documentation will describe your development process and the program you developed.

As part of your project documentation, you will take screenshots of your code and output.

Screenshot Quality: Do *not* use a mobile device to take a snapshot of your screen. This results in a very poor quality image. *Do* use screen-capture software available on your computer. Your teacher will tell you what software to use.

The screenshots of your Combo Menu program should be of at least the same quality as the following screenshots of the `circle_text` program from Activity 2.1.1.

main.py

```
import math

radius = float(input("What is the radius of the tire?"))
seconds = float(input("What is the time in seconds it traveled for?"))

circumference = (2 * math.pi) * radius
minutes = seconds / 60
remainder = seconds % 60
print("It traveled ", math.floor(minutes), "minutes and ", remainder, " seconds.")
print("The tire circumference is " + str(circumference))

```

This is the code for the **circle_text** program from Activity 2.1.1.

Figure 1. Circle Text Program Screenshots

7. Explain your program's overall functionality and how you developed it:
   a. Create good quality screenshots of your program's output. You should use more than one screenshot to convey what the program does.
   b. Identify the purpose of your program and explain what the screenshots illustrate.
   c. Describe two program code segments related to the different iterations. Include information about the variables you created.

> **Documentation**: All these things together help form **program documentation** .

8. Submit your work as your teacher directs.

CAREER CONNECTIONS

Automatic Speech Recognition

Michael Running Wolf grew up in a small village in Montana, with no reliable electricity or water. He spent a lot of his time outside in the woods, fishing in rivers nearby, and riding horses. His first exposure to technology was playing Atari with his sisters.

Michael Running Wolf
Source

Although he chose to become a computer scientist, his passion was in languages and poetry. As he gained experience in technology, he used his skills in artificial intelligence to build a database for indigenous languages. Since 2019, he has been working with data scientists to address the need for automatic speech recognition for indigenous languages. **Source**

CONCLUSION

1. What, if anything, is something new you learned about the use of variables and conditionals in *Python* while working on the Combo Menu program?

2. How did you interpret and respond to the Essential Questions? Capture your thoughts for future conversations.

Proceed to next lesson