FIRIA LABS

LESSON: Traversing a List	Time: 50 minutes

Overview:

An important concept when working with lists is the ability to traverse the list. This could be to run all the data in the list, or to look for a specific value, or to create a sub-list. This lesson will focus on the first part – traversing a list to run all the data. A future lesson will focus on the second and third reasons. The lesson is designed for students to work in groups to complete the activities. Groups of three, standing at white board, is the recommendation.

Objectives:
- I can define "traverse"
- I can write a while loop that will traverse a list
- I can write a for loop that will traverse a list
- I can describe what the lines of code are doing in a loop

Standards:
2-CS-03 Systematically identify and fix problems with computing devices and their components.

2-AP-13 Decompose problems and subproblems into parts to facilitate the design, implementation, and review of programs.

3A-AP-17 Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects.

CSP Framework:
Computational Thinking Practices:

2.B Implement and apply an algorithm.

3.B Use abstraction to manage complexity in a program.

3.C Explain how abstraction manages complexity.

4.C Identify and correct errors in algorithms and programs, including error discovery through testing.

Key Concepts:
- **Traversing a list** is a common activity in coding that uses a list.
- Traversing a list uses **iteration** – either **a while loop** or a **for loop.**
- **Traversing a list** means each element or item in the list will be accessed.

Preparation:

Make a copy of the assignment or put it in the LMS
Decide how you will have students complete the activities – individual or in groups (random, etc.), using white boards or paper
Prepare any formative assessments you want to use in the wrap-up

Links:
- [Assignment](#)
- [Instructions slide deck](#)

Resources:
- [Spicy Challenge solution](#)
- [Traversing a list solutions](#)

Agenda:
- Warm-up / list review (5 minutes)
- Activities (40 minutes)
- Challenges (15 minutes – probably won't have time but they are included just in case)
- Wrap-up & Assessment (5 minutes)

Vocabulary:
- **Traverse:** traveling or traversing through a list one element at a time, in order, starting with index 0 (first element) and going through to the last element (index len-1)
- Review **sequential, selection,** and **iteration** from previous lessons (Mission 3, 4, and 6)

Assessment:
- Daily reflection journal or Google form
- Assignment completion
- Demonstrate ability to define and call functions

Teaching Guide

Warm-up / Traversing a List (5 minutes)

This short warm-up is to review lists and the coding concepts of sequence, selection and iteration. Warm-up questions are included on the assignment, but they can be modified to any warm up questions you feel are important to review.

💡 **Teaching tip – warm-up**
- Go through slides #1-3
- Ask the students what they remember about lists. The question on the assignment is very general. You can have students do a share-out. Or you may want to be very specific and change the questions. Make sure you cover these facts:
  - What is an element, or item
  - How do you find the length of a list
  - What is the first index
  - What is the last index
- This is also a good time to review sequence, selection and iteration. The terms are used during the AP exam, so students need to be familiar with them and what programming structures are associated with each type.

Traversing a list introduction (40 minutes)

💻 Students will work in random groups of three at vertical white boards.
💻 Alternatively, if students want to try the code as they are writing loops and traversing a list, they could work in pairs at a computer typing the code.

💡 **Teaching tip:**
A new concept – traversing a list – is introduced. After the warm-up go over the first slides together (slides 4-9).

I didn't include any practice with creating a while loop for traversal. You can add in extra practice slides here if you want to and have students write while loops for traversal.

Traversing a list activities

💡 **Teaching tip:**
For loops are introduced, starting with slide 10. Go over this slide together.

Activities are included for students on slides 11-14.

- Slide 11 – Compare the loops (discussion)
- Slide 12 – Explain what each loop is doing (discussion)
- Slide 13 – Write a for loop
- Slide 14 – Write a for loop

💡 **Teaching tip:**
Slide 15 shows how to access multiple lists in a loop while traversing. This is an instructional slide

Activities are included for students on slides 16 and slide 17.

- Slide 16 – Change while loop to for loop
- Slide 17 – Write a for loop

💡 **Teaching tip:**

A specialized for loop is introduced on slides 18 and 19. This type of for loop is often used in multiple choice questions during the AP exam. Go over these slides with your students.

Activities are included for students on slides 20-23.

- Slide 20 – change for loop to specialized for loop
- Slide 21 – change for loop to specialized for loop
- Slide 22 – write a specialized for loop
- Slide 23 – write a specialized for loop

✅ You decide what want you want students to turn in for a grade, and how they turn it in. You can require work from all three missions, or just the last one. You can look at the code on student computers, or have them submit code. The assignment document is a review and can be turned in.

✅ If students used the CodeX, they should clear the CodeX at the end of the class period.

Wrap-Up (5 minutes)

The wrap-up can be very short for this lesson (slides 27-28). This is the class's chance to review traversing a list. I can also be an alternative to meaningful notes.

Formative Assessment:
- Daily reflection journal or Google form
- Class discussion on what they learned about traversing a list
- Assignment completion
- Programming Journal
- Wrap-up questions
- Exit ticket

SUCCESS CRITERIA:
- ❏ Complete the warm up questions
- ❏ Write a for loop to traverse a list
- ❏ Write a specialized for loop to traverse a list
- ❏ Be able to discuss what lines of code are doing in a loop
- ❏ Complete the wrap up questions