

### CS116 – List indexing - Part 3

**Purpose:** Although using either the index or the index plus an offset is very common, sometimes we need to use a more sophisticated computation to get the index we want into the list.

**Schema:** Process a list using a computation of the *index*

```
for index in range(0, length to be processed):
    process list [computation of index]
```

**Activity:** With your group perform the following tasks and answer the questions. You will be reporting your answers back to the class in 15 minutes.

1. The following code reverses a Sound. Test it out.

```
def reverse(self):
    result = Sound(self.getLength())
    samples1 = self.getSamples()
    samples2 = result.getSamples()
    length = self.getLength()
    for i in range(0, length):
        samples2[length-i-1].setValue(samples1[i].getValue())
    return result
```

Consider a Sound with 10 samples with indices 0 through 9. The computation for the index of the resulting Sound is `length-i-1`

At what index would the sample at index 0 be placed in the result?

At what index would the sample at index 1 be placed in the result?

At what index would the sample at index 9 be placed in the result?

2. We can raise the pitch of a Sound by compressing the sound wave. If we create a sound wave comprised of every other sound sample we double the pitch.

Again consider a Sound with 10 samples.

At what index would the sample at index 0 be placed in the resulting sound?

The sample at index 1 would be tossed away. At what index would the sample at index 2 be placed in the resulting sound?

The sample at index 3 would be tossed away. At what index would the sample at index 4 be placed in the resulting sound?

Predict what the computation should be for the index of the resulting sound and then check your result on the next page.

```
def raisePitch(self):
    result = Sound(self.getLength()//2)
    samples1 = self.getSamples()
    samples2 = result.getSamples()
    for i in range(0,len(samples1)):
        if i%2 == 0:
            samples2[i//2].setValue(samples1[i].getValue())
    return result
```

Complete each of the following assignments to be submitted for grading. Each should be done individually but you can consult with a classmate to discuss your strategies or if you get an error message that you do not understand.

For list indexing problems it will help if you ask yourself the following questions:

1. What computation is required for the index into the list?

**Assignment 1:**

Write Picture method which mirrors a picture by copying the first half of the pixels in reverse for the bottom half.

**Criteria of Success:** Here is the mirror of the waterlilies



**Assignment 2:**

Write a method to lower the pitch of a Sound by duplicating every sample in the original sound twice in the resulting sound.

**Criteria of Success:** When you play the resulting sound you will hear the lowered pitch

Submit your python files with your methods in Canvas for grading.