# A2: Loopy Turtles, Loopy Languages

- Assignment A2 should be done alone.
- To begin, go to “File” and Select “Make a Copy...”
- You should seek help completing assignment A2 from the TAs at the evening lab.

## Learning Objectives:

- Reflect on languages in general, both natural and artificial
- Reflect on how your language impacts your thinking
- Practice using loops in Python
- Practice using the Turtle library

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## Does Your Language Shape How You Think?

Read the following excerpt from "Does Your Language Shape How You Think?"[1] by Guy Deutscher, NYTimes, 8/26/2010

> ...
> The area where the most striking evidence for the influence of language on thought has come to light is the language of space — how we describe the orientation of the world around us. Suppose you want to give someone directions for getting to your house. You might say: “After the traffic lights, take the first left, then the second right, and then you’ll see a white house in front of you. Our door is on the right.” But in theory, you could also say: “After the traffic lights, drive north, and then on the second crossing drive east, and you’ll see a white house directly to the east. Ours is the southern door.” These two sets of directions may describe the same route, but they rely on different systems of coordinates. The first uses egocentric coordinates, which depend on our own bodies: a left-right axis and a front-back axis orthogonal to it. The second system uses fixed geographic directions, which do not rotate with us wherever we turn.
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> We find it useful to use geographic directions when hiking in the open countryside, for example, but the egocentric coordinates completely dominate our speech when we describe small-scale spaces. We don’t say: “When you get out of the elevator, walk south, and then take the second door to the east.” The reason the egocentric system is so dominant in our language is that it feels so much easier and more natural. After all, we always know where “behind” or “in front of” us is. We don’t need a map or a

[1] SourceURL: http://www.nytimes.com/2010/08/29/magazine/29language-t.html

compass to work it out, we just feel it, because the egocentric coordinates are based directly on our own bodies and our immediate visual fields.

But then a remote Australian aboriginal tongue, Guugu Yimithirr, from north Queensland, turned up, and with it came the astounding realization that not all languages conform to what we have always taken as simply "natural." In fact, Guugu Yimithirr doesn't make any use of egocentric coordinates at all. The anthropologist John Haviland and later the linguist Stephen Levinson have shown that Guugu Yimithirr does not use words like "left" or "right," "in front of" or "behind," to describe the position of objects. Whenever we would use the egocentric system, the Guugu Yimithirr rely on cardinal directions. If they want you to move over on the car seat to make room, they'll say "move a bit to the east." To tell you where exactly they left something in your house, they'll say, "I left it on the southern edge of the western table." Or they would warn you to "look out for that big ant just north of your foot." Even when shown a film on television, they gave descriptions of it based on the orientation of the screen. If the television was facing north, and a man on the screen was approaching, they said that he was "coming northward."

When these peculiarities of Guugu Yimithirr were uncovered, they inspired a large-scale research project into the language of space. And as it happens, Guugu Yimithirr is not a freak occurrence; languages that rely primarily on geographical coordinates are scattered around the world, from Polynesia to Mexico, from Namibia to Bali. For us, it might seem the height of absurdity for a dance teacher to say, "Now raise your north hand and move your south leg eastward." But the joke would be lost on some: the Canadian-American musicologist Colin McPhee, who spent several years on Bali in the 1930s, recalls a young boy who showed great talent for dancing. As there was no instructor in the child's village, McPhee arranged for him to stay with a teacher in a different village. But when he came to check on the boy's progress after a few days, he found the boy dejected and the teacher exasperated. It was impossible to teach the boy anything, because he simply did not understand any of the instructions. When told to take "three steps east" or "bend southwest," he didn't know what to do. The boy would not have had the least trouble with these directions in his own village, but because the landscape in the new village was entirely unfamiliar, he became disoriented and confused. Why didn't the teacher use different instructions? He would probably have replied that saying "take three steps forward" or "bend backward" would be the height of absurdity.

So different languages certainly make us speak about space in very different ways. But does this necessarily mean that we have to think about space differently? By now red lights should be flashing, because even if a language doesn't have a word for "behind," this doesn't necessarily mean that its speakers wouldn't be able to understand this concept. Instead, we should look for the possible consequences of what geographic languages oblige their speakers to convey. In particular, we should be on the lookout

> for what habits of mind might develop because of the necessity of specifying geographic directions all the time.
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> In order to speak a language like Guugu Yimithirr, you need to know where the cardinal directions are at each and every moment of your waking life. You need to have a compass in your mind that operates all the time, day and night, without lunch breaks or weekends off, since otherwise you would not be able to impart the most basic information or understand what people around you are saying. Indeed, speakers of geographic languages seem to have an almost-superhuman sense of orientation. Regardless of visibility conditions, regardless of whether they are in thick forest or on an open plain, whether outside or indoors or even in caves, whether stationary or moving, they have a spot-on sense of direction. They don't look at the sun and pause for a moment of calculation before they say, "There's an ant just north of your foot." They simply feel where north, south, west and east are, just as people with perfect pitch feel what each note is without having to calculate intervals. There is a wealth of stories about what to us may seem like incredible feats of orientation but for speakers of geographic languages are just a matter of course. One report relates how a speaker of Tzeltal from southern Mexico was blindfolded and spun around more than 20 times in a darkened house. Still blindfolded and dizzy, he pointed without hesitation at the geographic directions.
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> How does this work? The convention of communicating with geographic coordinates compels speakers from the youngest age to pay attention to the clues from the physical environment (the position of the sun, wind and so on) every second of their lives, and to develop an accurate memory of their own changing orientations at any given moment. So everyday communication in a geographic language provides the most intense imaginable drilling in geographic orientation (it has been estimated that as much as 1 word in 10 in a normal Guugu Yimithirr conversation is "north," "south," "west" or "east," often accompanied by precise hand gestures). This habit of constant awareness to the geographic direction is inculcated almost from infancy: studies have shown that children in such societies start using geographic directions as early as age 2 and fully master the system by 7 or 8. With such an early and intense drilling, the habit soon becomes second nature, effortless and unconscious. When Guugu Yimithirr speakers were asked how they knew where north is, they couldn't explain it any more than you can explain how you know where "behind" is.

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Now, provide thoughtful responses to the following prompts. You only need write a paragraph of 3-5 sentences or more for each. The goal is that your response shows you have thought about the article and added your own experience or insights to its ideas.

1. Have there been moments in which you felt that your language or a language "got in the way" of something you wanted to express? That is, have you run into the limitations of language in the manner suggested by the excerpt? Elaborate.

2. Discuss to what extent you think artificial languages (such as Python) have the ability to shape human thought, if at all. Or, do you think artificial languages are fundamentally different from human ones, such as Guugu Yimithirr or English?

| Your response to the reading: |
| --- |
| 1. I once was trying to explain a specific part of a song to a friend. I have a lot of experience with music and the language behind it. My friend had zero experience. In my brain everything made sense, but to him, he had no idea what I was saying. There was a huge barrier between what I wanted to explain, and what he was able to understand.<br><br>2. I believe that artificial languages are an extension of our own language. This is sort of like how math has their own words to describe things specifically in math, that have different meanings outside a conversations about math. This same idea can be applied to artificial languages. If you just look at a piece of code without knowing anything about any coding languages, you will be lost, and it won't make any sense to you. However, if you take the time to learn the language of coding, you begin to understand very quickly that a lot of what the code is, is just regular english sentences presented in a different way. This is just like in math when you start using english words for different purposes that only pertain to math concepts. |

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# Loopy Turtles

Now let's explore some code. Here are a few examples of Python code which uses the turtle library and loops.

- t2_turtle_spiral.py
- a2_turtle_house.py
- a2_think_cs.py
  (this last example has a number of new, not-yet-covered concepts. Don't be surprised if you don't know what everything is in this file.)

Create a new Python program either by modifying the code above or writing brand new code that has the following features:

1. Your program uses the Turtle library to draw on the screen.
2. What you draw is something that brings a smile to your face.
3. The program uses at least one loop.
4. The program makes use of multiple attributes and methods of either the turtle class, the screen class, or both.

5. Your program has the standard header block used in all our programs.
6. Any lines that are doing something that is not immediately clear, add comments to clarify your intent.

## Submission Instructions

1. Download this document as a PDF. To do this, go to File >> Download as...
2. Rename the document to ***A2_username.pdf.*** Replace *username* with your Berea username. For example, my document would be named **A2_heggens.pdf.**
   **NOTE:** From now on**,** incorrect filenames will automatically reduce your grade by 1 point for each assignment. Fortunately, the format is always the same no matter what the assignment.
3. Rename your Python code to **A2_username.py**. Replace *username* with your Berea username.
4. Zip the two files together. If you do not know how to zip two files together, refer to this short tutorial. Also, TA's in the evening lab will be happy to show you how to do this.
5. Upload the zip folder to Moodle by the due date listed on the course website: https://trello.com/b/w7bIrLoV/.