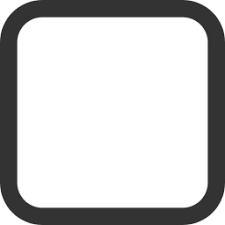
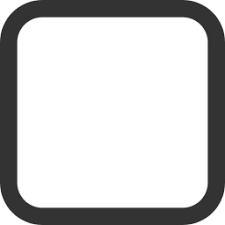
**MSU CSC 540/640, Fall 2018.**

**Assignment 2: Search on a coin image**

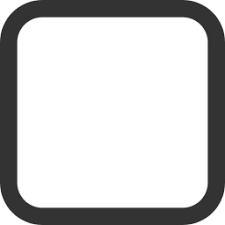
The provided code implements A\* search on an image, using the Red component of the RGB color at a pixel to select the node (location) to pursue as part of a path. *That technique of choosing the next state may not match your visual concept of which path should be next – disregard that visual conflict and assume that the path selection is valid.*

 Choose a coin image for your search to operate upon. *Unknown: the maximum size of an image that can be loaded by the PILLOW graphics library. Up to about 1000x1000 seems reasonable but I have not tried greater than 500x500.*

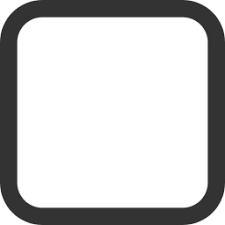
* Some locations for coin images (use color as height)
  + <https://www.usmint.gov/news/image-library/circulating>
  + Many quarters, <https://www.usmint.gov/news/image-library/america-the-beautiful-quarters-program>
  + <https://www.money.org/morgan-dollar-coin-grading>
* You must be able to save that image in **PNG format**. Recommended image software for saving in a specific type is PAINT.NET (in the CS labs) or IrfanView.
* The provided program is hardcoded to expect an **image size** of 500x500 pixels, so either resize and save your selected image as 500x500, or change the hardcoded values in the provided program at about line 40. The height and width of the image do not need to be the same.

 Select sensible **start** and **end** coordinate points for a path search on your coin.

* The provided program has hardcoded start and end points. Change the hardcoded values in the provided program at about line 40.

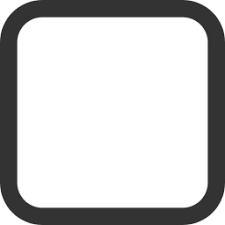
 Select some sensible color for the nodes (locations) of the path search on your image that is visible over most of the image.

* Find color names in one of the provided charts, **TK colors in alphabetical order** and **TK colors in some other order.**
* Set the selected color in the line **canvas.create\_oval . . .** at about line 140 of provided code. *(There is only one occurrence in the code of the line canvas.create\_oval . . . )*

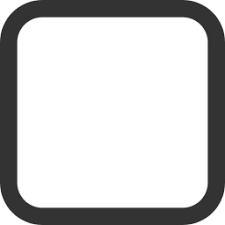
 Submit your Python program and your selected image to Blackboard.

* If BlackBoard rejects your image file because it is a security risk, rename your image file with a **txt** extension and resubmit.

(Continues next page)

 RENAME YOUR PROGRAM to Assn2SearchBFS.py. Change the search type from A\* Search to Breadth-First Search by modifying the **priority( )** function to behave as needed.

* The program will still use a priority queue, but the priority value for a location will be chosen to make the priority queue behave as an ordinary queue.
* IMPORTANT – Don’t forget to comment out the original part of the function that does A\* search.
* *NOTE: My implementation of this BFS search ran as expected for about 50 steps, then ran so slowly as to appear hung up. There’s possibly a performance issue with the priority queue. If your program seems stuck, just kill it. The 50 steps are sufficient to demonstrate that your program was implementing BFS.*

 Submit your second Python program, named Assn2SearchBFS.py, to Blackboard.

Example questions on A\* and BFS search (not for this assignment)

Why does route planning, from a start point to a goal point, require intelligence?

Where does the “artificial intelligence” appear in A\* and BFS search?

UPS plans its routes to [never make left-hand turns](https://www.businessinsider.com/ups-efficiency-secret-our-trucks-never-turn-left-2011-3). That is a **policy** that is embedded in the model of next-step selection. Where and how in the provided code would you modify the route planning so that left-hand turns are discouraged from selection?

In the provided code on Liberty Dime, the search moves from the start at left to an area by Liberty’s ear, then back to Liberty’s chin before eventually moving to the goal behind her head. How can that sequence be defended or explained as “continuously moving to a state that is better than the current state”?