Preliminary Project Pnotes

* It’s Mario; agent will need to get as far right as possible to win levels
* BEATING LEVELS PAST 1-1 IS EXTRA BONUS CONTENT; FOCUS ON 1-1 BEFORE IMPLEMENTING THINGS LIKE PALLETTES, SUBAREAS, LAKITUS etc.
* Water levels do exist, but probably won’t be tested in basic testing; if you have time do account for them
* We only get Mario’s position, the picture of the screen (as an array of arrays containing RGB values), and a few other variables like powerups; identifying what is ahead is for the agent to do
* Main issue I can think of is distinguishing between brown blocks and brown Goombas (and similar issues)
* Identifying enemies could involve checking each pixel on the screen (besides ground ones); if you see a pixel that matches the enemiy’s top-leftmost pixel, check the surrounding pixels for the rest of the enemy
* Basic rule-based design would include ‘go right whenever possible; if Goomba, Koopa Troopa, bottomless pit etc. is in front of you jump; if your x position doesn’t change for 3 seconds jump as high as possible while going right; if it still doesn’t change go left for a second; if mushroom/fire flower is in front of you run towards it; spam run if you have fire flower, if above pipe try to go down in case there’s a subarea; same with right-facing pipes’
* Libraries are allowed, just mention them in the report
* Include a README.md file with your submission
* Online solutions exist; feel free to look at them, but DO NOT copy them
* I’m using Poetry for my machine’s installation; use poetry run python marioScript.py to run it
* Use SuperMarioBros-v0 as the environment; it has all the graphics
* Check pytorch tutorial; even if you don’t use pytorch itself its design lends itself to learning reinforcement agents
* Use ‘poetry run python ruleBasedMario.py’ to run the code
* Remember that the actions possible are:
* COMPLEX\_MOVEMENT = [
* ['NOOP'],
* ['right'],
* ['right', 'A'],
* ['right', 'B'],
* ['right', 'A', 'B'],
* ['A'],
* ['left'],
* ['left', 'A'],
* ['left', 'B'],
* ['left', 'A', 'B'],
* ['down'],
* ['up'],
* ]
* HUD COIN: 252, 160, 68 in light colouring; at wide part leftmost pixel is at index 90 of row 26-31; highest part is index 91-92 of row 25
* Screen is 256\*256 pixels, each with one triple representing their RGB value in the observation table. Each subtable of observation is a row, with the rows listed top to bottom. Each triple in a row is a pixel, with pixels taken left to right. In other words, entries are just left to right top to bottom
* For the basic ground theme like 1-1: Sky is (104, 136, 252), ground tile is (228, 92, 16) with bits of pure (0,0,0) black and (240, 208, 176) tan, ? blocks alternate between primarily ((228, 92, 16) [dark] and (252, 160, 68) [light] with unchanging bits being black and ground brown
* Idea: use 16\*16 grid based search to simplify block search (won’t work for Goombas and the like)
* Idea: categorise objects as just ‘enemy’, ‘hazard’, ‘block’ etc.
* Colours in ground theme:
* (104, 136, 252) light blue: sky
* (228, 92, 16) brown: ground tiles, bricks, ? blocks at some stages + ? edges, coins at some stages, Goombas
* (240, 208, 176) tan: Goomba stalks, brick edges,
* (252, 160, 68) yellow: coins at their brightest, ? blocks at their brightest, Mario’s face
* (0, 0, 0) black: edges of many blocks, Goomba eye[brow]s

Goomba: