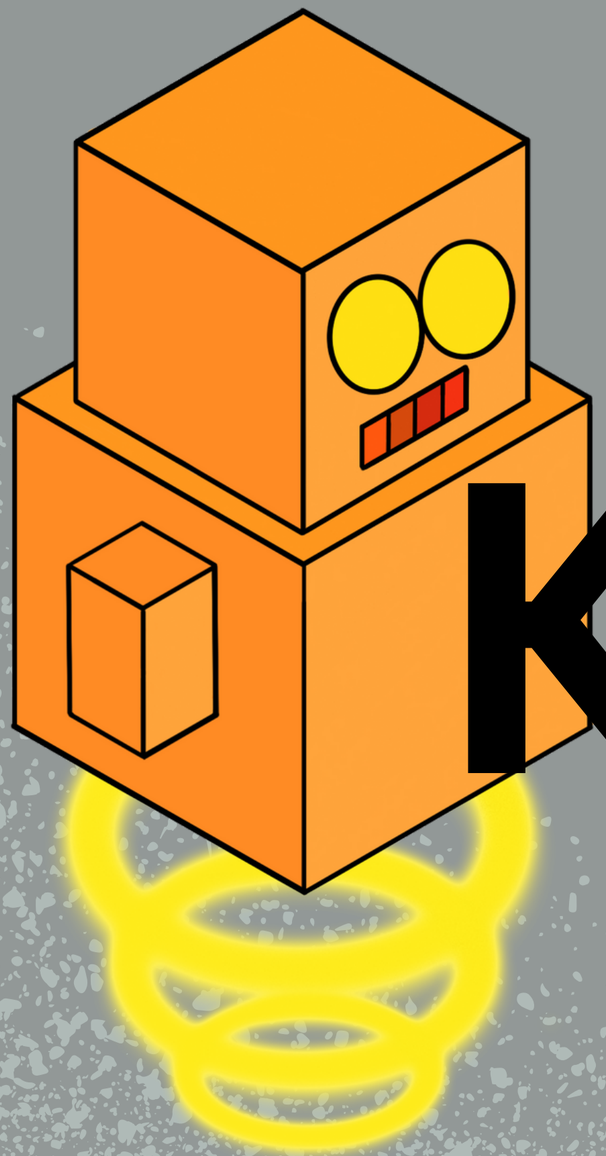
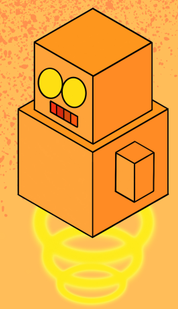


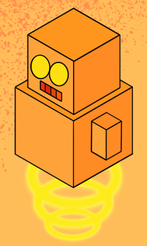
Karela

PROJECT DESCRIPTION:



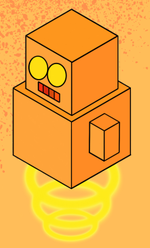
DEVELOP A GENTLE EDUCATIONAL PROGRAMMING LANGUAGE THAT ENABLES A STUDENT TO VISUALLY CONSTRUCT AND EXECUTE PROGRAMS IN A SIMPLE ENVIRONMENT.

PROGRAM REQUIREMENTS



- Rename Karela however you wish. ✗
- Visit Karel the Robot for ideas. ✓
- Develop an IDE that shows the command menu, the program, and a visual of Karela executing the commands. ✓
- Of course Karela can save and open existing programs. ✓
- Karela should be sensitive to the student's level of understanding. ✓
- Provide a tutorial that shows how to program Karela at each level. ✓
- Design lab experiments for students at different grade levels. ✗
- Some programming features might include:
  - Simple commands like turnon, turnoff, turnleft, putbeeper, getbeeper ✓
  - An environment containing roads and walls ✓
  - Control commands like if, while, repeat (iterate) ✓
  - Booleans that are used by the control commands ✓
  - Functions or new words that describe a task in terms of existing words/commands ✗
  - Functions that use parameters ✗
  - Giving Karela the ability to visually run more than one program concurrently ✗

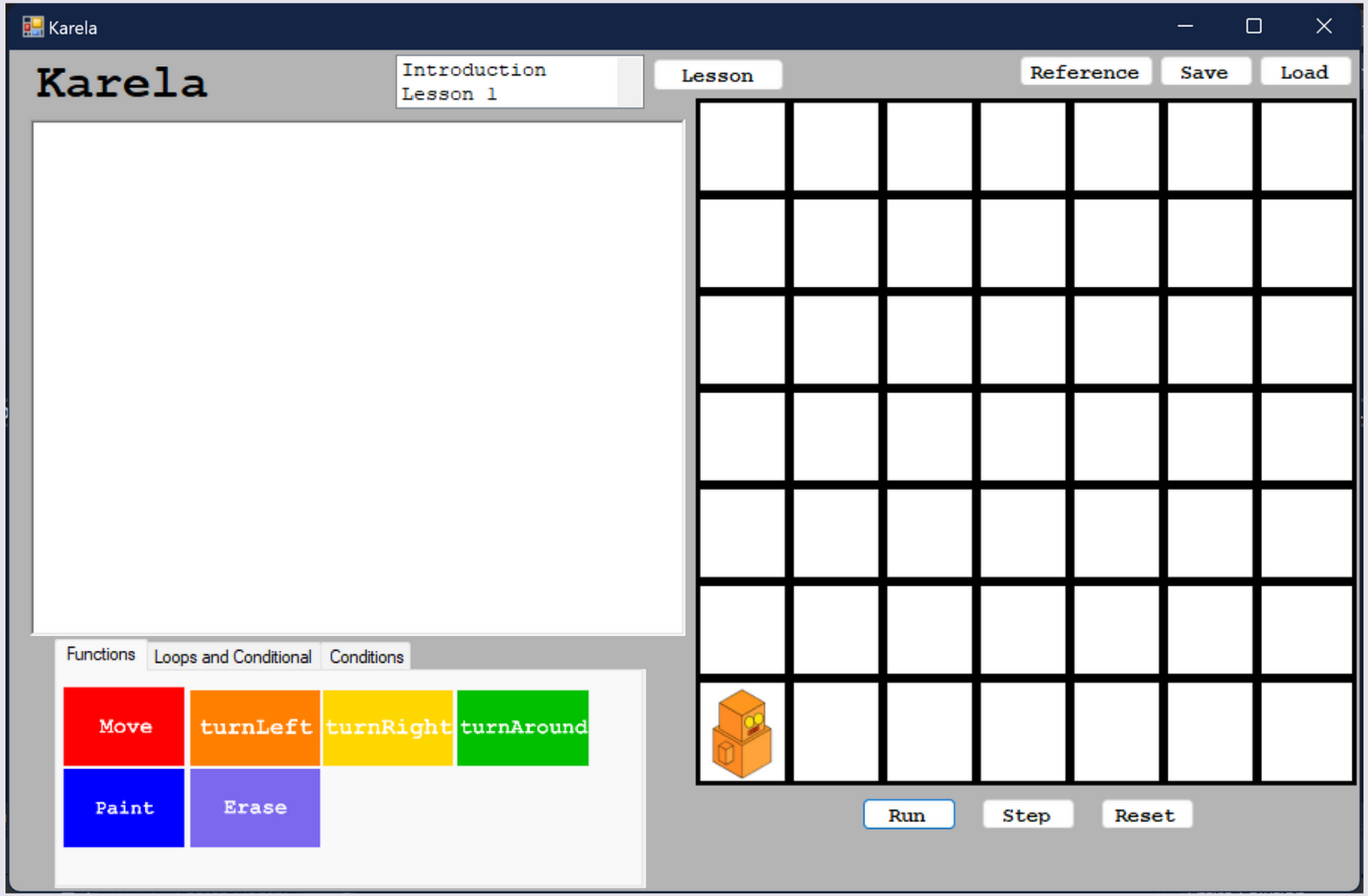
WHAT I USED:

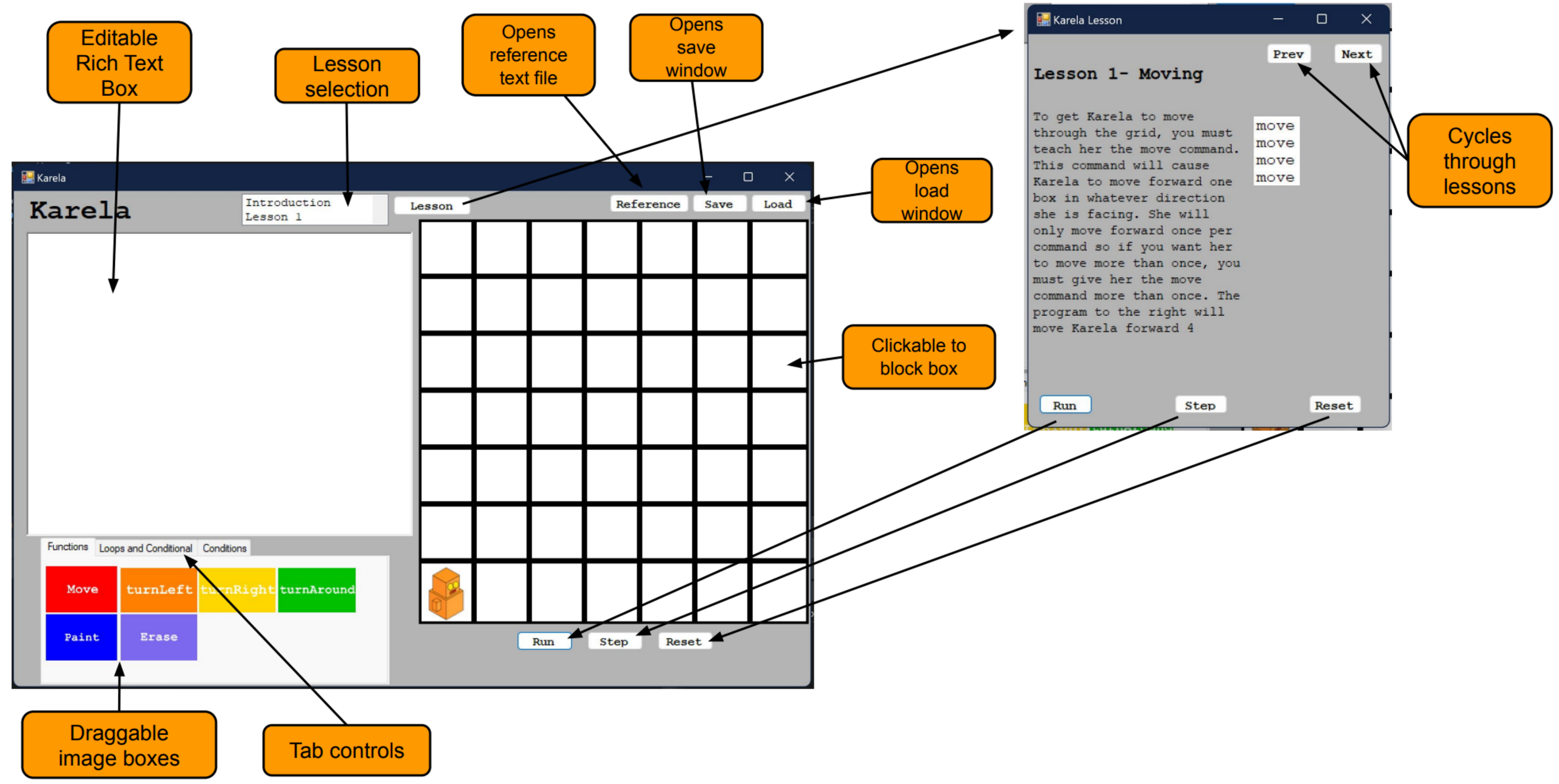


- Visual Studio
- Windows Forms
- Using websites like Karel and Scratch for reference

The User Interface

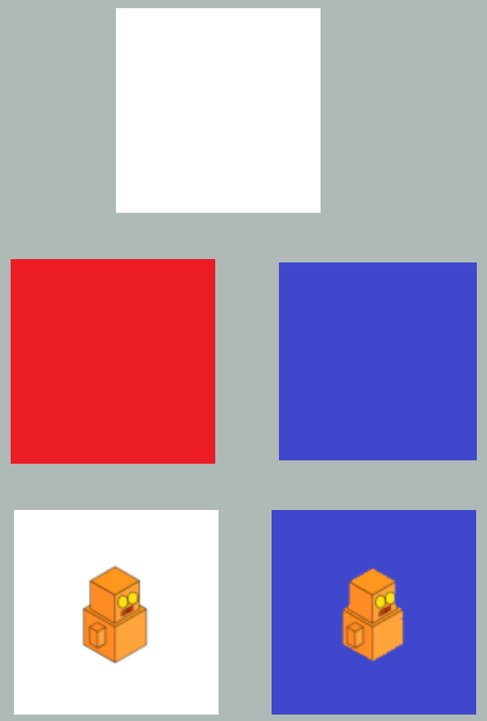
- Draggable commands
- Grid with pictureboxes
- Editable text box
- Lots of buttons

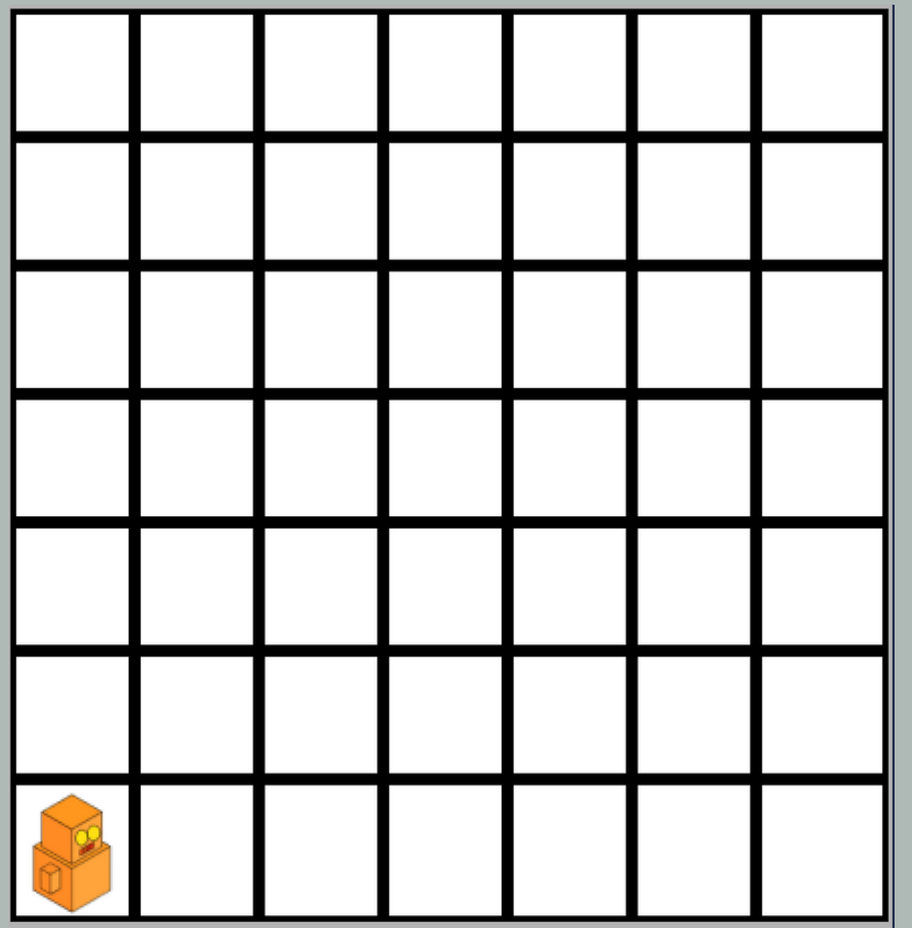



Editable Rich Text Box
Lesson selection
Opens reference text file
Opens save window
Opens load window
Clickable to block box
Cycles through lessons
Draggable image boxes
Tab controls
Karela
Karela
Introduction
Lesson 1
Lesson
Reference
Save
Load
Functions
Loops and Conditional
Conditions
Move
turnLeft
turnRight
turnAround
Paint
Erase
Run
Step
Reset
Karela Lesson
Prev
Next
Lesson 1- Moving
To get Karela to move through the grid, you must teach her the move command. This command will cause Karela to move forward one box in whatever direction she is facing. She will only move forward once per command so if you want her to move more than once, you must give her the move command more than once. The program to the right will move Karela forward 4
move
move
move
move
Run
Step
Reset

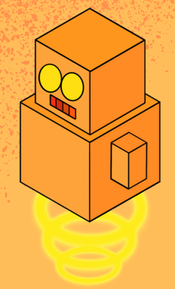
Moving Karela

- Grid of pictureboxes
- Box class
  - Image
  - blocked
  - coordinates
  - painted
- Different images for each spot





3 MAIN PARTS SOLVED

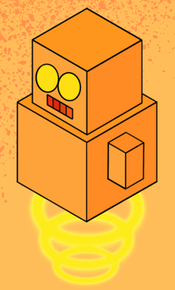


Run and step through a program

Open a lesson and navigate through multiple lessons

Save/Load a program from a text file

RUN AND STEP

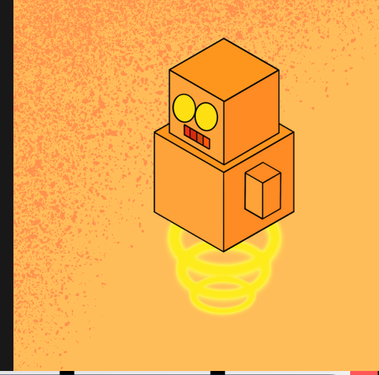


- Precompile:
  - Creates a table with compound statements like while and if
- Run:
  - Runs program by going through line numbers
  - Uses the compound statement table to know what line to jump to
- Step:
  - The same thing as run but doesn't repeat/go to the next line until the button is clicked again

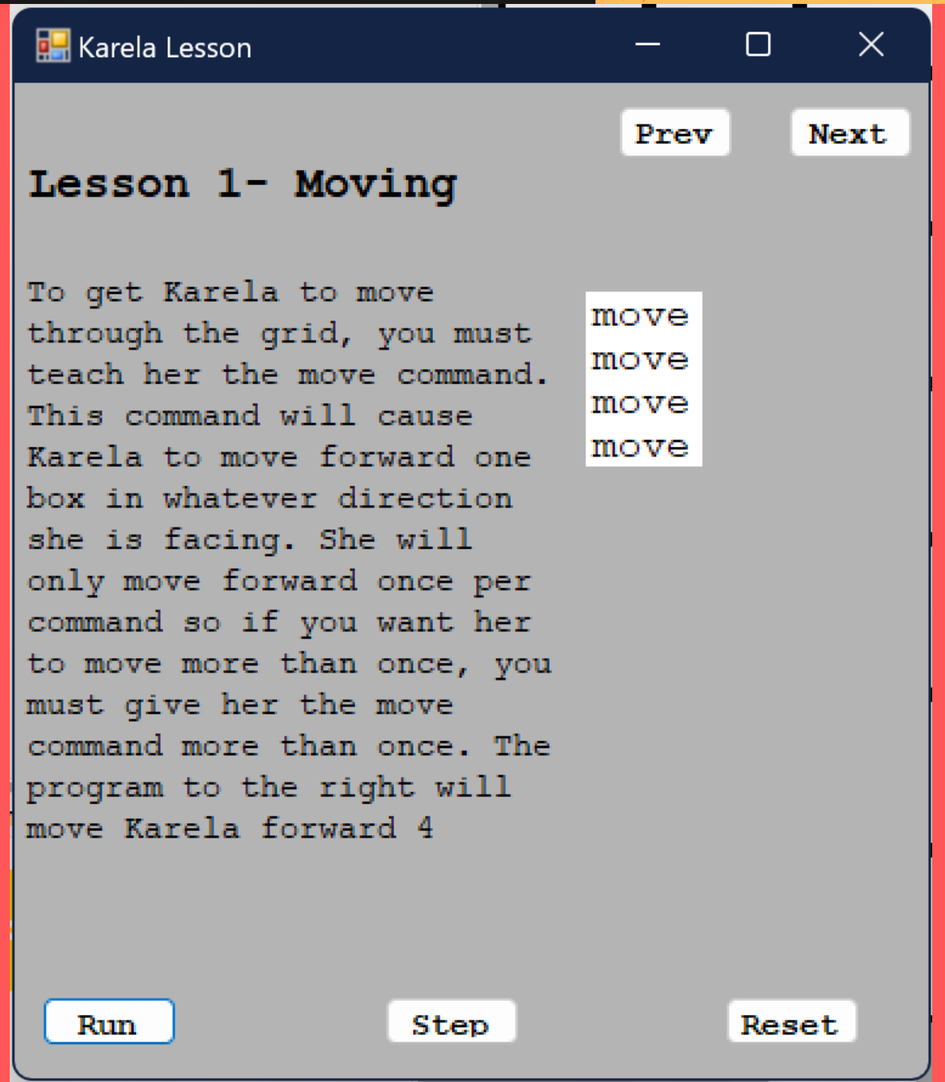
```
0     move
1     while(notblocked){
2     move
3     if(notPainted){
4     paint
5     }
6     turnleft
7     };
8     if(notBlocked){
9     move
10    }
```

Statement Type	{	}
1 (while)	1	7
2 (if)	3	5
2(if)	8	10

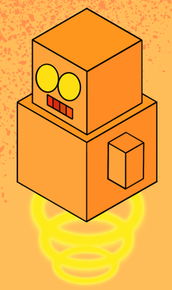
LESSONS



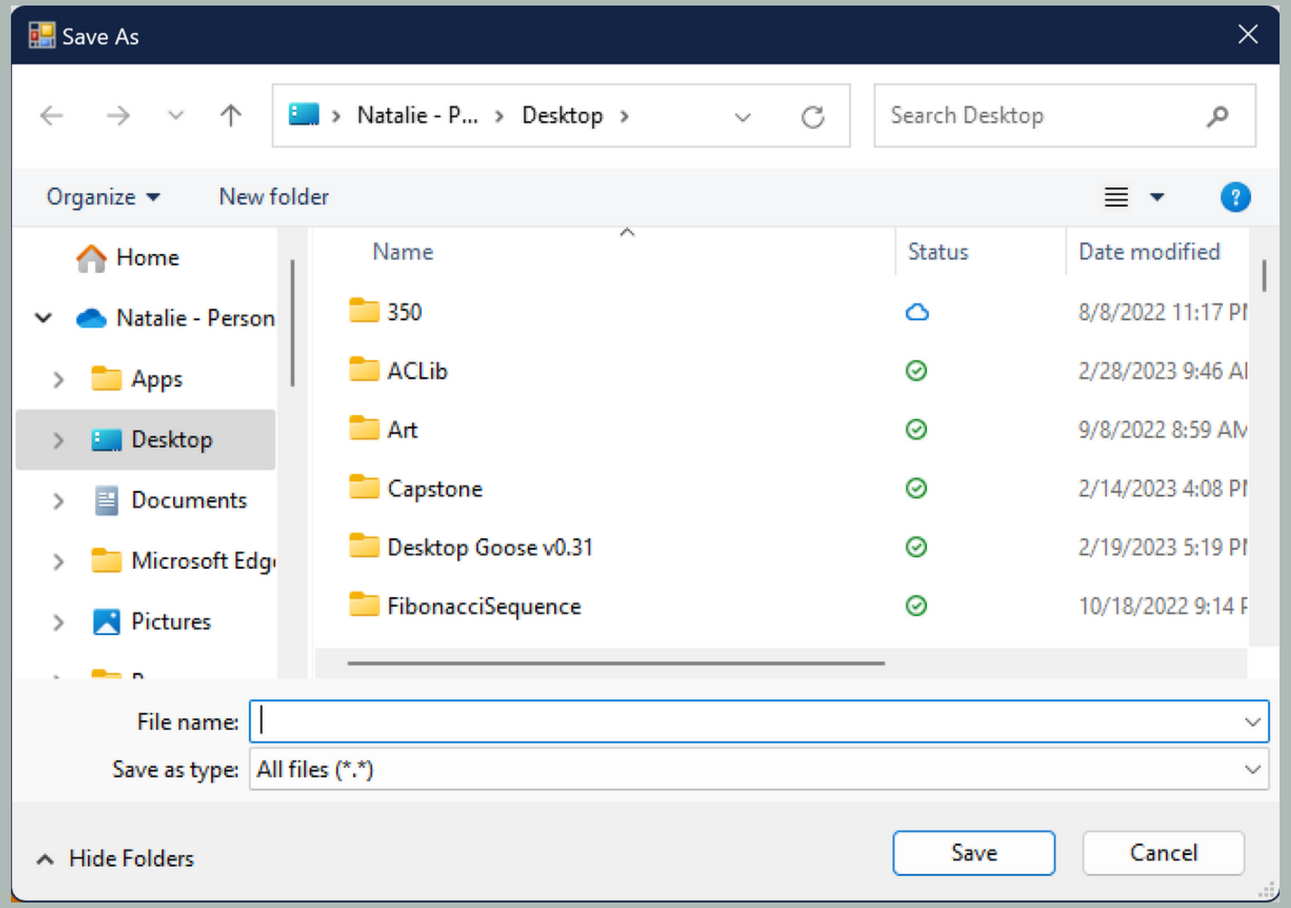
- Opens a lesson from main form
- Lessons are stored in a text file that is separated
- Cycles through lessons
- Runs an example program from the lesson in the main form



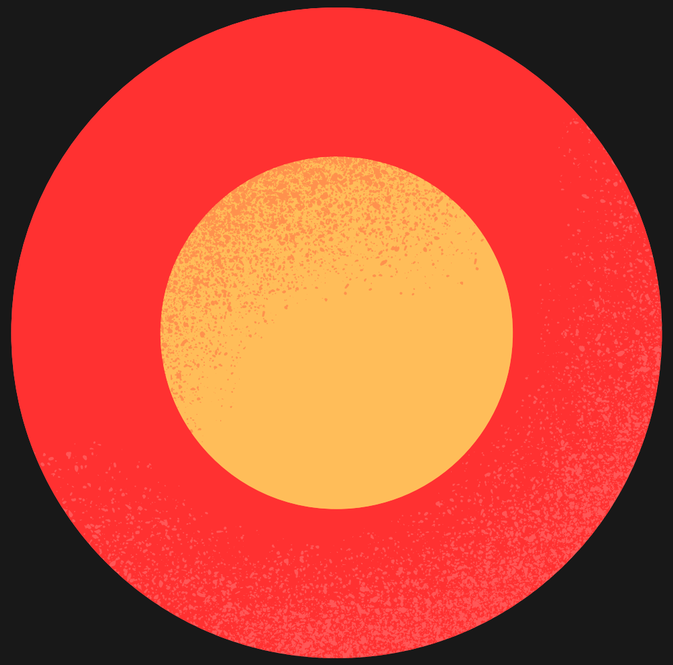
SAVING AND LOADING



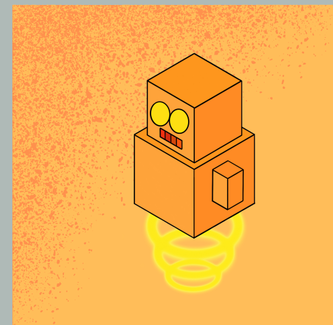
- Windows forms has a file save and open dialog box
- Checks to see if the program has been modified before
- Saves the program as a text file



PROBLEMS NOT SOLVED:

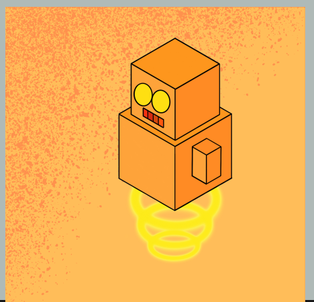


- Allowing functions
- Color coding the text in the rich textbox
- Resizing the grid

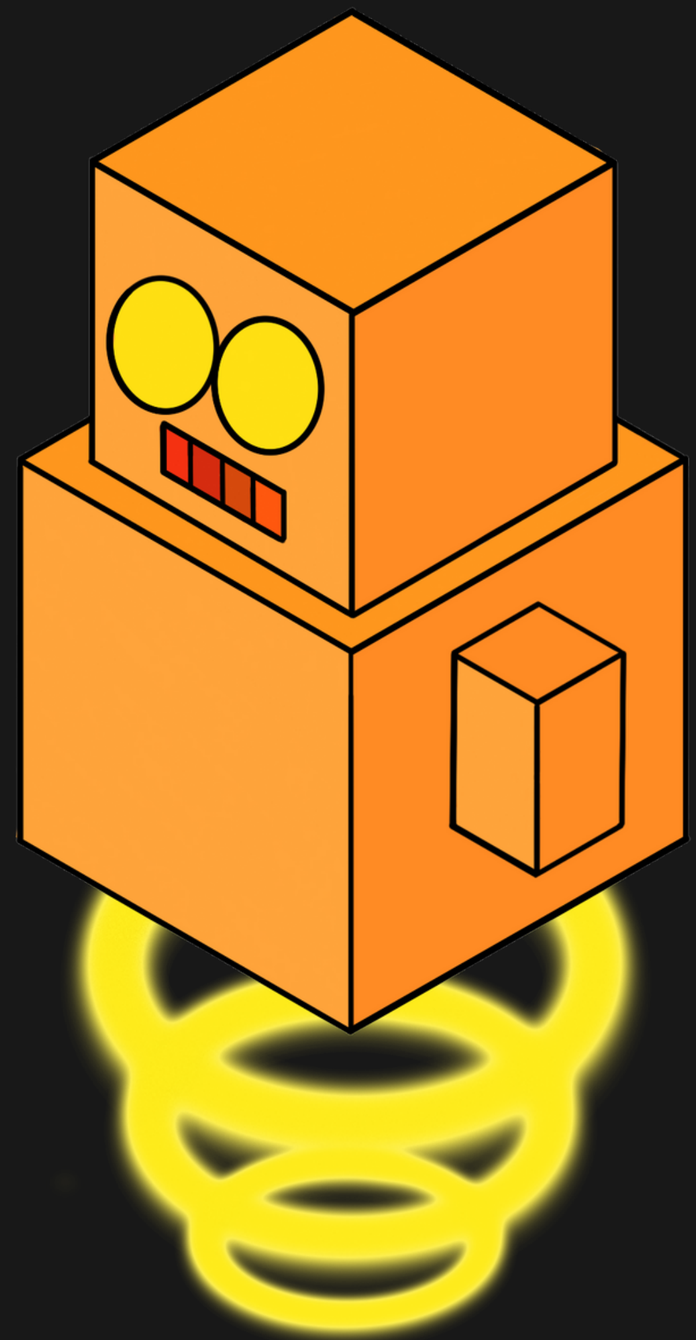


MY METHODS:

- Breaking problems down
- Taking it one step at a time
- Focusing on what could be done at that time
- Keeping a document with goals and what needs to be done
- Keeping a working version



Demonstration



Strategies:

- Meetings!
- Using resources from my 350 labs and projects
- Using resources from Dr. McVey's past 350 labs

Resources:

- Microsoft Learn documentation
- StackOverflow

Extensions

Creating a web based Karela

Creating more commands for Karela to allow her to do more things and be customizable

Creating user profiles that save progress