Title	GP 2-02 - Coordinate System
Grade level	8th
Discipline(s)	Computer Science, Game Programming
Start & end dates	
Author(s)	Adam Driggers

Long-Term Learning Targets Addressed

Long Term Learning Target	This lesson?
I can apply common coding patterns in javascript.	
I can code using object methods and properties.	X
I can use variables and functions to abstract parts of my code.	X
I can design and manage game code with multiple sprites and scenes.	
I can create structured, well documented code.	

Supporting Learning Targets Assessed	**Ongoing Assessment**
I can explore the coordinate system of MakeCode. I can move a sprite to a given location.	
Agenda Overview	**Teaching Notes**
Warm-Up - 5 min Unplugged Activity - Driggs Bot- 25 min Debrief - 10 min Pairing Activity - 10 min Cool Down - 5 min	
Lesson Vocabulary	**Materials**
Commands Errors	Slides Code Stems Blue Tarp with 16 by 12 grid

Opening

- *How will this lesson or series of lessons help students make progress towards the learning target(s)?*
- *What will cause students to be curious and want to learn?*
- *How will I provide students with a vision of the learning targets in a way that gives them ownership of their learning?*

Instructional Plans	**Duration**	**Meeting Students' Needs** • *What support and/or extension do you anticipate students will need?*

		• *How will you adjust the process of and resources used for learning to fit each student's readiness, interest, or learning profile?*
Warm-Up - Turn and Talk When the Scratch Cat is at 0, 0. What is its x value? What is its y value?	5 min	Activating Prior Knowledge
Oof Show two seconds of live code. When a is pressed send the sprite to 0,0	1 min	

Work Time

- *What sequenced steps will the students and I take to ensure that all students meet the learning targets?*
- *Is it appropriate to let students grapple first rather than see a model first?*
- *How will students know what quality looks like, and how will I support them in producing quality work?*
- *How will students work or practice together during learning?*

Instructional Plans	Duration	Meeting Students' Needs
Unplugged Activity Setup -A blue tarp with a 16 by 12 grid on it. The bigger the better. -Clear the room and lay the tarp in the middle. -Have small slips of paper or post-it notes. -Have error slips ready or a different color of post-it to return error messages to the student. Introduce "Driggs Bot" Driggs Bot can... -Give a True of False response to a question. -Give a number as a response to a question. -Give a response on paper. -Know things about his environment. -Move to a X Y position if told nicely. "Please go to X:_ Y:_.." Driggs Bot can't... -Tell you what to do. -Answer any other type of question. Uncomputable questions will get an error message or a null. Your mission... Driggs Bot is in need of energy. Get the Driggs Bot to the battery Icon to recharge. **Round 1 - Do as a whole group.** Place the Battery Icon anywhere on the screen. Start the Driggs Bot. Driggs goes to 0,0 to start.	20 minutes	Less confident students are participate as the "BUS" If students are struggling, break character to drop hints and guide students through questioning. - How could you figure out what values the lines represent? - What could you ask Driggs Bot to figure out where he currently is? Have a student chart commands that we know work.

Students must direct Driggs Bot to the battery by asking questions and using “goto” commands Students will have to suss out how to get Driggs Bot to the battery by asking the size of the screen and his current position. They can see where the battery is. To be successful students must give Driggs Bot a set of commands to move him between 0 **Challenge Rounds** - groups of 3-4. Students can no longer see where Driggs Bot is at and can communicate with Driggs Bot through a “bus” **Challenge Level 1 - Remote command!** -Go into the hallway where you can’t see Driggs Bot. -Assign a “bus.” This person can go between the hallway and the classroom, but cannot speak or write. Driggs Bot will start a random position. The battery is in the middle of the screen. **Challenge Level 2 - Efficiency** Get Driggs bot to the middle of the screen with only two commands. The catch. There is a new screen size, now it is 320 by 240. **Extensions** You can add characters **Scene** can tell people the width and height, and color of the scene. **Battery** can tell people it’s x and y position. Then Driggs Bot “forgets” these commands.		
Debrief Have students debrief this activity... -How did you get to know Driggs Bot “Methods” -How could you access his position? -How did he react to commands that were not written currently? -How did he react to commands that he had to answer for?	10 min	Think Pair Share to give students processing time.
Pairing Activity Basically the same thing now in code. Command the sprite to get different parts of the screen. Level 1	15 min	Challenge levels Code Stem with directives

When A is pressed Send the sprite to x:50 y:50 Level 2 When B is pressed Send the sprite to the middle of the screen Boss Level Send the sprite to a random location when b is released!		

Closing and Assessment

- *How will students demonstrate their understanding toward the supporting targets?*
- *What information do I need in order to plan my next instructional steps?*

Instructional Plans	Duration	Meeting Students' Needs
Cool Down - Exit Slip Write the command to set a cake sprite's position to X: 50 Y:50. Fist to five check-in	5	

Homework

- *What can students practice on their own after this lesson? How can the learning from this lesson be shared at home to reinforce student learning?*
- *What can students do to prepare for the next lesson? What learning could take place at home, allowing time in class to be spent sharing, discussing, and practicing?*

Coordinate System

GP 202

Learning Targets

I can explore the coordinate system of MakeCode.

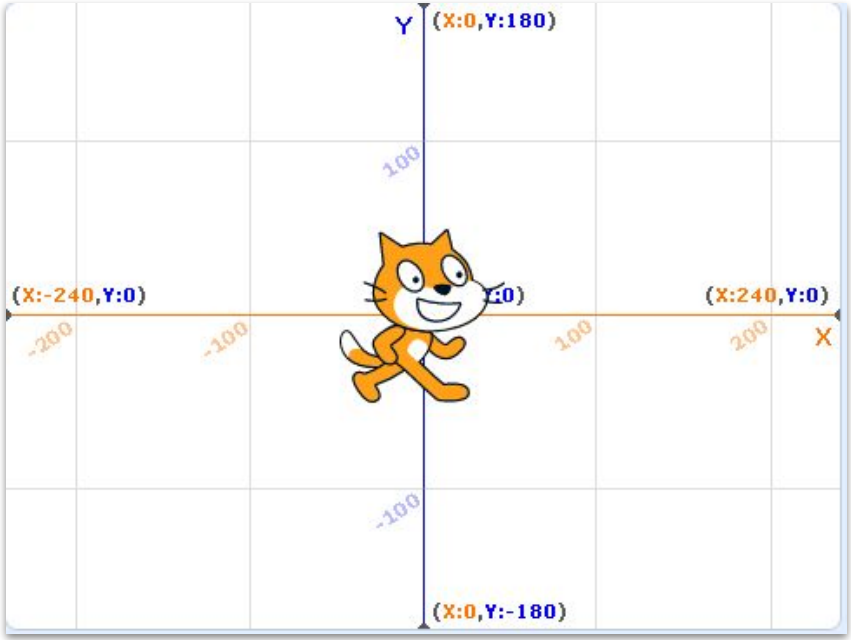
I can move a sprite to a given location.

Agenda

WarmUp 5 min
Unplugged Activity Driggs Bot 25 min
Debrief 10 min
Pairing Activity 10 min
Cool Down 5 min

Warm Up

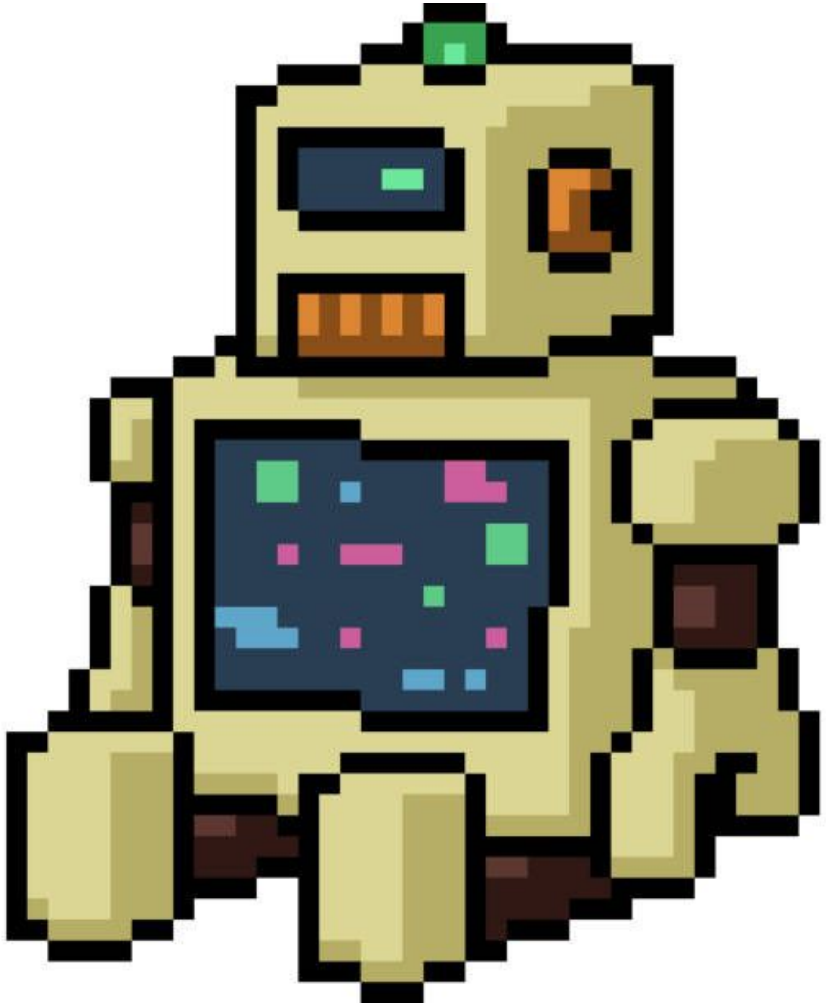
With Scratch, when the cat is in the center of the screen, what is it's x value? What is it's y value?



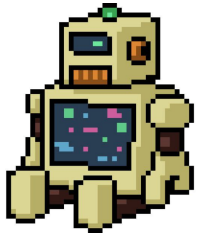
Oof! Live

A is Pressed

Driggs Bot



Introducing Driggs Bot



Driggs Bot can…

- Give a True or False response to a question.
- Give a number as a response to a question.
- Know things about his environment.
- Move if told correctly.
- Write a response on paper.

Driggs Bot can’t…

- Tell you what to do.
- Answer any other type of question. Uncomputable questions will get an error message or a null.

Your Mission

Get Driggs Bot to the Battery!

Pair Programming

Level 1
When A is pressed
Send the cake sprite to x:50 y:50

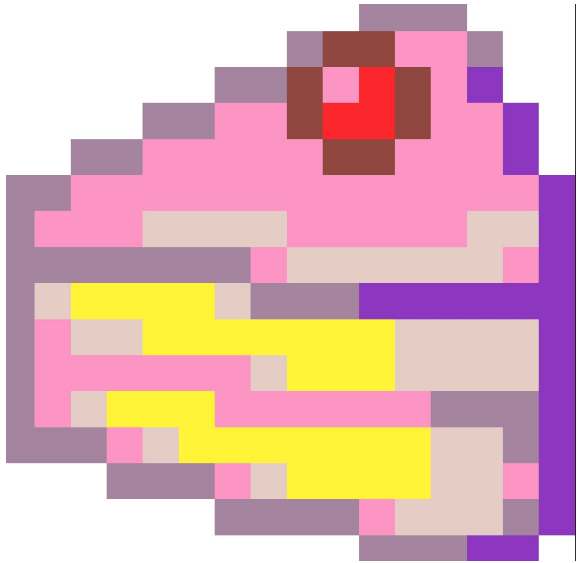
Level 2
When B is pressed
Send the cake sprite to the middle of the screen

Boss Level
Send the cake sprite to a random location when b is released!

Copy and Paste GP 2-02 Starter Code from the Class Repo!

Cool Down Exit Slip

Write commands to set a cake sprite’s position to X: 50 Y:50.



Closing How did you feel about today's learning target?

What is a LT?

Confused

Rocked it!

Oof!

```
// creates a sprite
let cake = sprites.create(img`
    . . . . . . . . . . . b b b . . .
    . . . . . . . . . b e e 3 3 b . .
    . . . . . . b b e 3 2 e 3 a . .
    . . . . b b 3 3 e 2 2 e 3 3 a .
    . . b b 3 3 3 3 3 e e 3 3 3 a .
    b b 3 3 3 3 3 3 3 3 3 3 3 3 3 a
    b 3 3 3 d d d d 3 3 3 3 3 d d a
    b b b b b b b 3 d d d d d d 3 a
    b d 5 5 5 5 d b b b a a a a a a
    b 3 d d 5 5 5 5 5 5 5 d d d d a
    b 3 3 3 3 3 3 d 5 5 5 d d d d a
    b 3 d 5 5 5 3 3 3 3 3 3 b b b a
    b b b 3 d 5 5 5 5 5 5 5 d d b a
    . . . b b b 3 d 5 5 5 5 d d 3 a
    . . . . . . . b b b b 3 d d d b a
    . . . . . . . . . . . b b b a a .
`, SpriteKind.Player);

controller.moveSprite(cake); //assigns the controller to a sprites

//runs the code anytime the a button is pressed
controller.A.onEvent(ControllerButtonEvent.Pressed, function () {
 cake.x = 0;
 cake.y = 0;
})
```

Pair Programming Starter

```
// creates a sprite
let cake = sprites.create(img`
  . . . . . . . . . . b b b . . .
  . . . . . . . . b e e 3 3 b . .
  . . . . . . b b e 3 2 e 3 a . .
  . . . . b b 3 3 e 2 2 e 3 3 a .
  . . b b 3 3 3 3 3 e e 3 3 3 a .
  b b 3 3 3 3 3 3 3 3 3 3 3 3 3 a
  b 3 3 3 d d d d 3 3 3 3 3 d d a
  b b b b b b b 3 d d d d d d 3 a
  b d 5 5 5 5 d b b b a a a a a a
  b 3 d d 5 5 5 5 5 5 5 d d d d a
  b 3 3 3 3 3 3 d 5 5 5 d d d d a
  b 3 d 5 5 5 3 3 3 3 3 3 b b b a
  b b b 3 d 5 5 5 5 5 5 5 d d b a
  . . . b b b 3 d 5 5 5 5 d d 3 a
  . . . . . . b b b b 3 d d d b a
  . . . . . . . . . . b b b a a .
`, SpriteKind.Player);

controller.moveSprite(cake); //assigns the controller to a sprites

//YOU DO :: follow the comments below to complete your mission.

// Level 1
// When A is pressed, remember there is a block for this
// Send the sprite to x: 50 y: 50

// Level 2
// When B is pressed, remember, there is a block for this!
// Send the sprite to the middle of the screen.

// Boss Level
// Send the sprite to a random location when a OR b is pressed.
```

Pair Programming Solution

```
// creates a sprite
let cake = sprites.create(img`
  . . . . . . . . . . . b b b . . .
  . . . . . . . . . b e e 3 3 b . .
  . . . . . . b b e 3 2 e 3 a . .
  . . . . b b 3 3 e 2 2 e 3 3 a .
  . . b b 3 3 3 3 3 e e 3 3 3 a .
  b b 3 3 3 3 3 3 3 3 3 3 3 3 3 a
  b 3 3 3 d d d d 3 3 3 3 3 d d a
  b b b b b b b 3 d d d d d d 3 a
  b d 5 5 5 5 d b b b a a a a a a
  b 3 d d 5 5 5 5 5 5 5 d d d d a
  b 3 3 3 3 3 3 d 5 5 5 d d d d a
  b 3 d 5 5 5 3 3 3 3 3 3 b b b a
  b b b 3 d 5 5 5 5 5 5 5 d d b a
  . . . b b b 3 d 5 5 5 5 d d 3 a
  . . . . . . b b b b 3 d d d b a
  . . . . . . . . . . . b b b a a .
`, SpriteKind.Player);

controller.moveSprite(cake); //assigns the controller to a sprites

//YOU DO :: follow the comments below to complete your mission.

// Level 1
// When A is pressed, remember there is a block for this
// Send the sprite to x: 50 y: 50
controller.A.onEvent(ControllerButtonEvent.Pressed, function() {
   cake.x = 50;
   cake.y = 50;
})

// Level 2
```

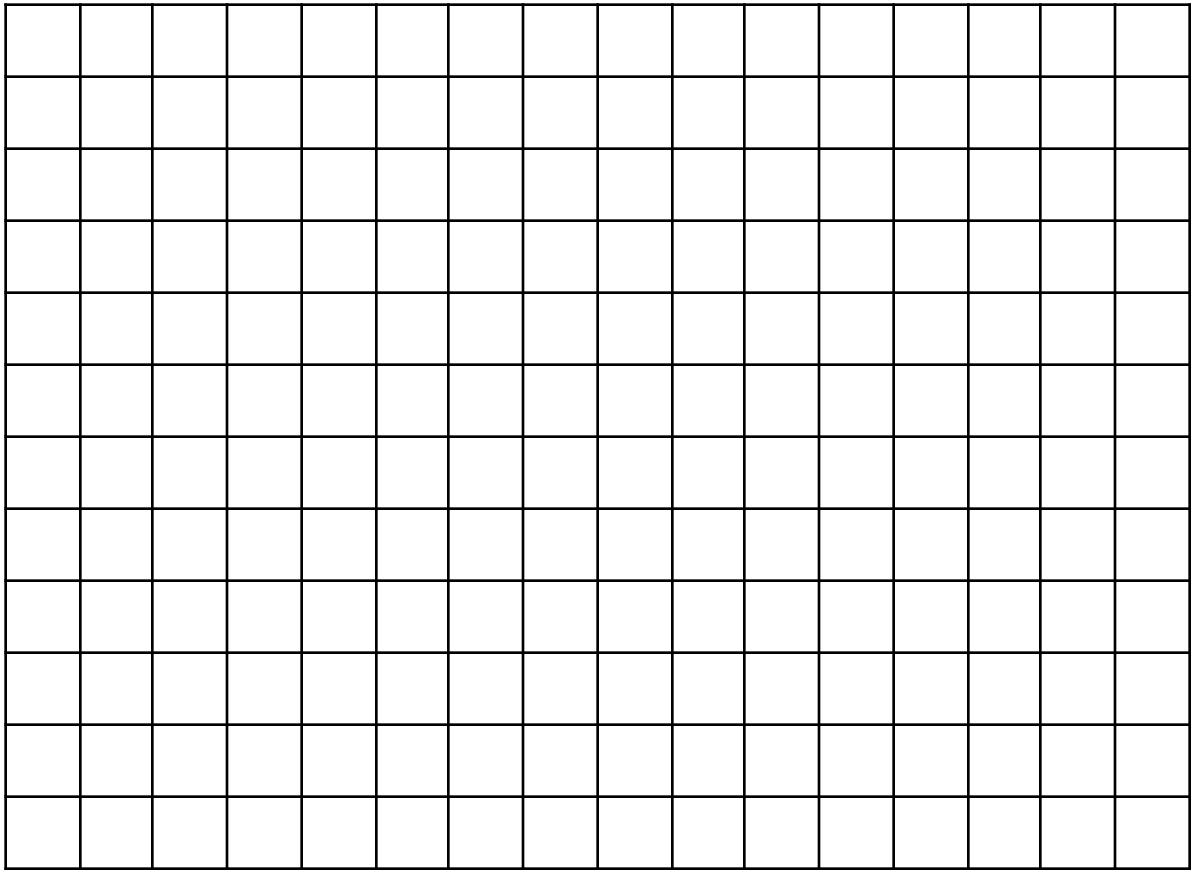
```
// When B is pressed, remember, there is a block for this!
// Send the sprite to the middle of the screen.
controller.B.onEvent(ControllerButtonEvent.Pressed, function () {
    cake.x = scene.screenWidth()/2; //fancy! scene is an object and
has a function to return the width
    cake.y = scene.screenHeight()/2; //same for screenHeight
})

// Boss Level
// Send the sprite to a random location when b is released.
controller.B.onEvent(ControllerButtonEvent.Released, function () {
    cake.x = randint(0, scene.screenWidth()) //get a random value
between 0 and the screen width1!
    cake.y = randint(0, scene.screenHeight())
})
```

Level 0

Driggs Bot will start at 0, 0.
The battery is at a random position.
Get Driggs Bot to the battery.

The Screen

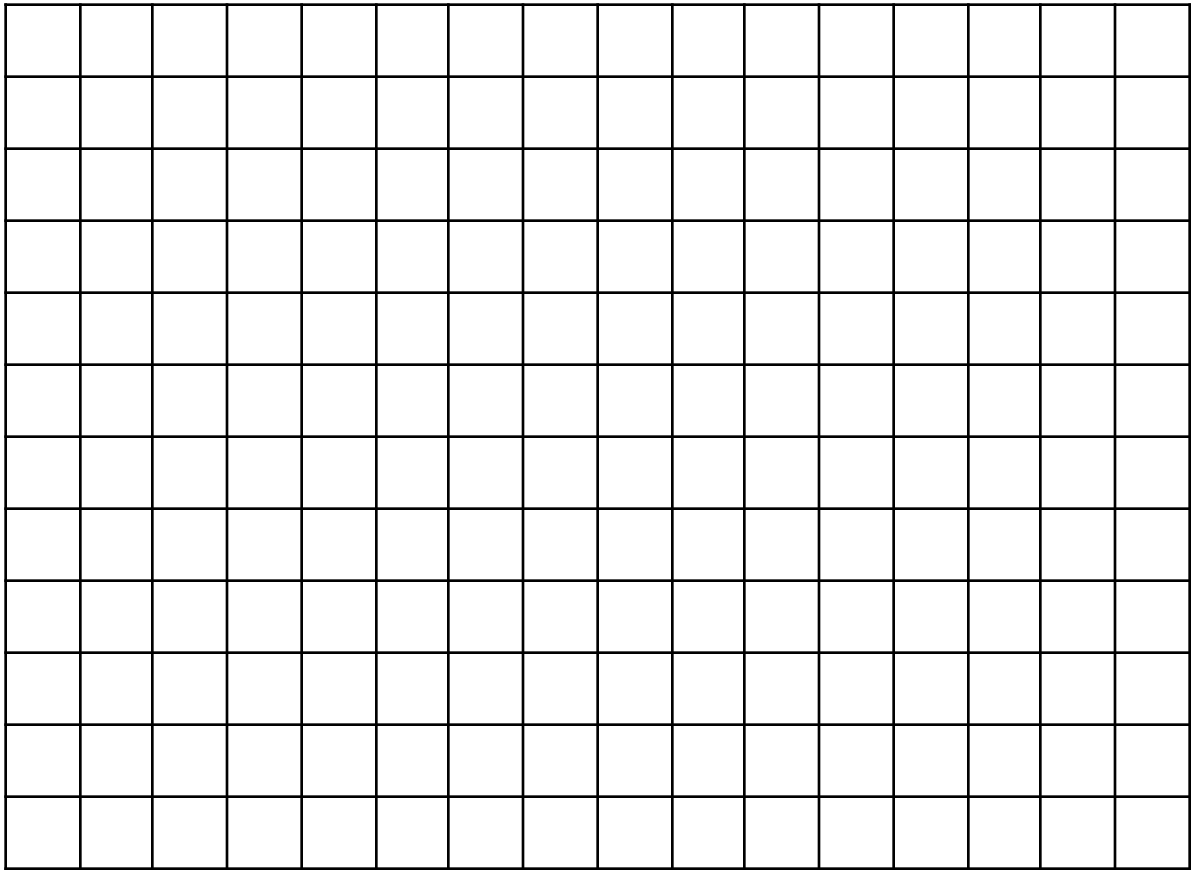


Commands

Level 1

Driggs Bot will start a random position.
The battery is at a random position.
Get Driggs Bot to the battery.

The Screen



Commands

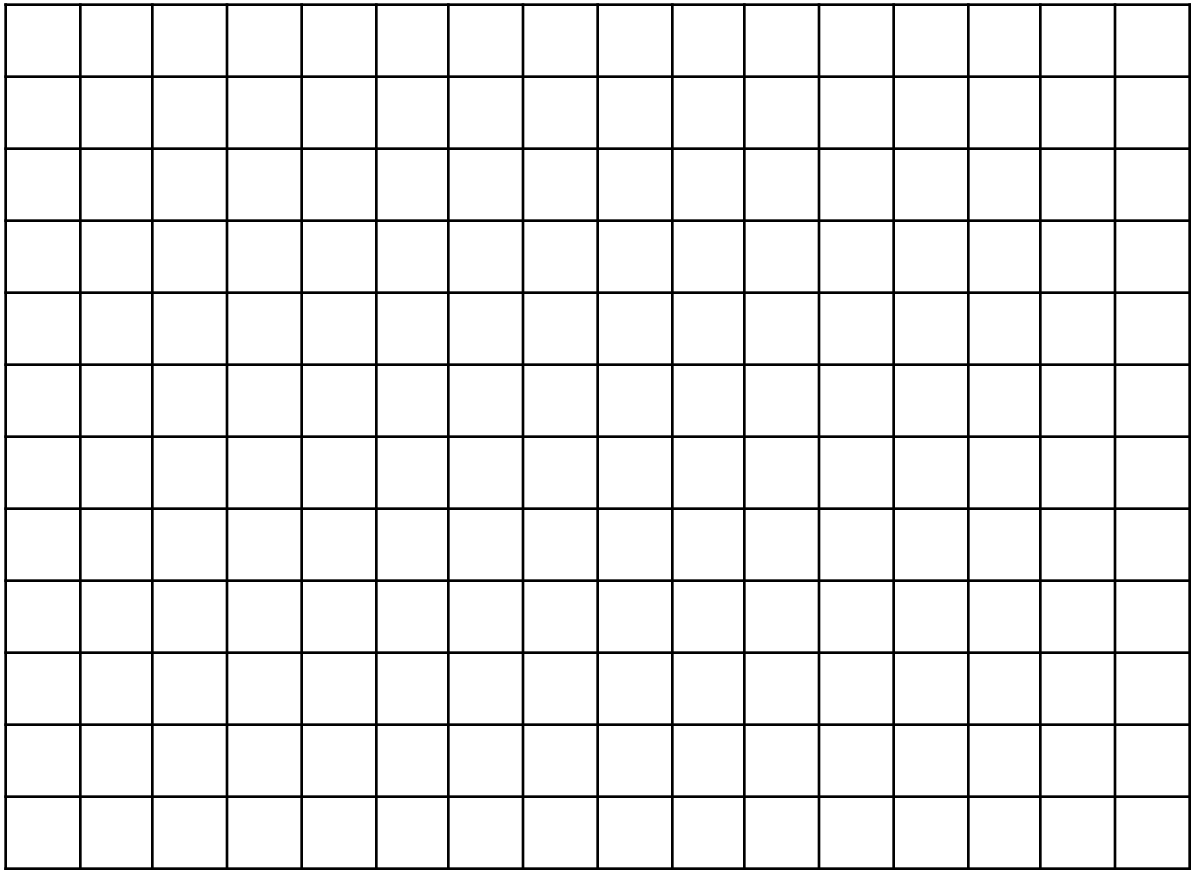
Level 2

Driggs Bot will start a random position.

Get Driggs Bot to the Center of the Screen.

Boss Level → do this using only 2 commands.

The Screen



Commands