Code in Place 2024

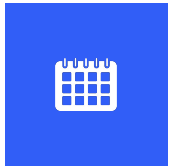
Stanford CS106A

Section - Week 1

Welcome to Section!

David Tsai, Code in Place

Today's Agenda



Introductions

Icebreakers

Norms

Guidelines

Concept Review

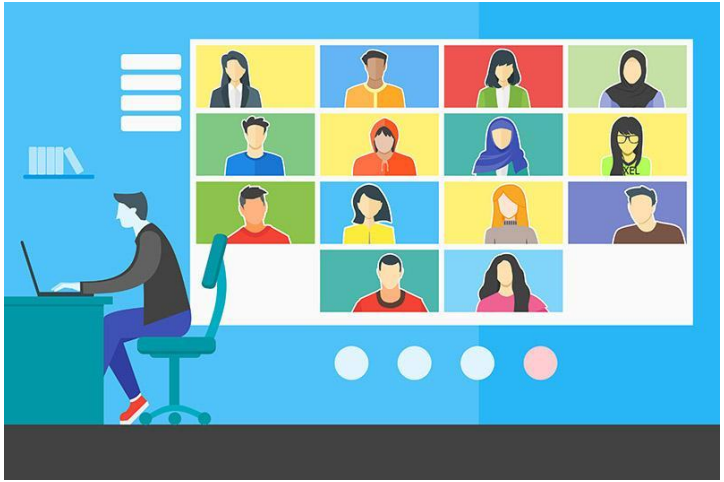
Karel, Control Flow

Practice Problems

"Hospital Karel"

Please Turn On Your Camera

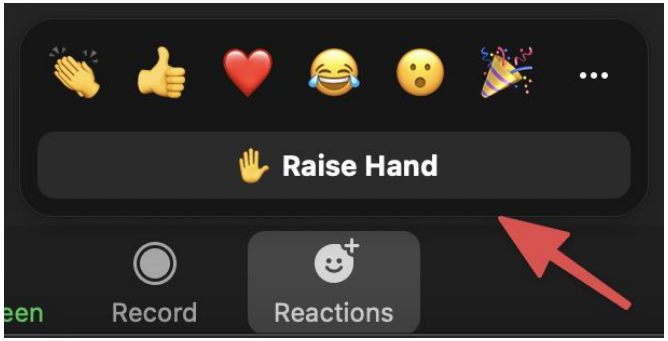
If you're able, please **turn on your camera**!
. . . . It can really make the section come to life!

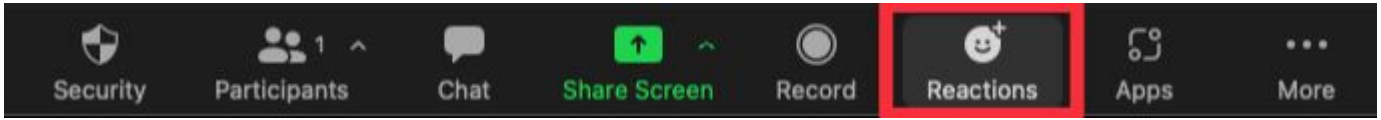


(Image source: https://as.virginia.edu/eight-ways-get-more-out-zoom)

Zoom Reactions

- 👍 **Thumbs Up:** If you understand.
- ✋ **Raise Hand:** If you have a question (or just speak in the mic).





Introductions

Hi, I'm David, your Section Leader!

- Section Leader for Code in Place 2023. Student for CIP 2021.
- Massachusetts Institute of Technology (MIT) - Computer Science
- Worked as a Software Engineer and Product Manager
- Love photography, video games, movies
- Cool superpower I'd like to have:
    - Felix Felicis ("Liquid Luck" potion) from Harry Potter

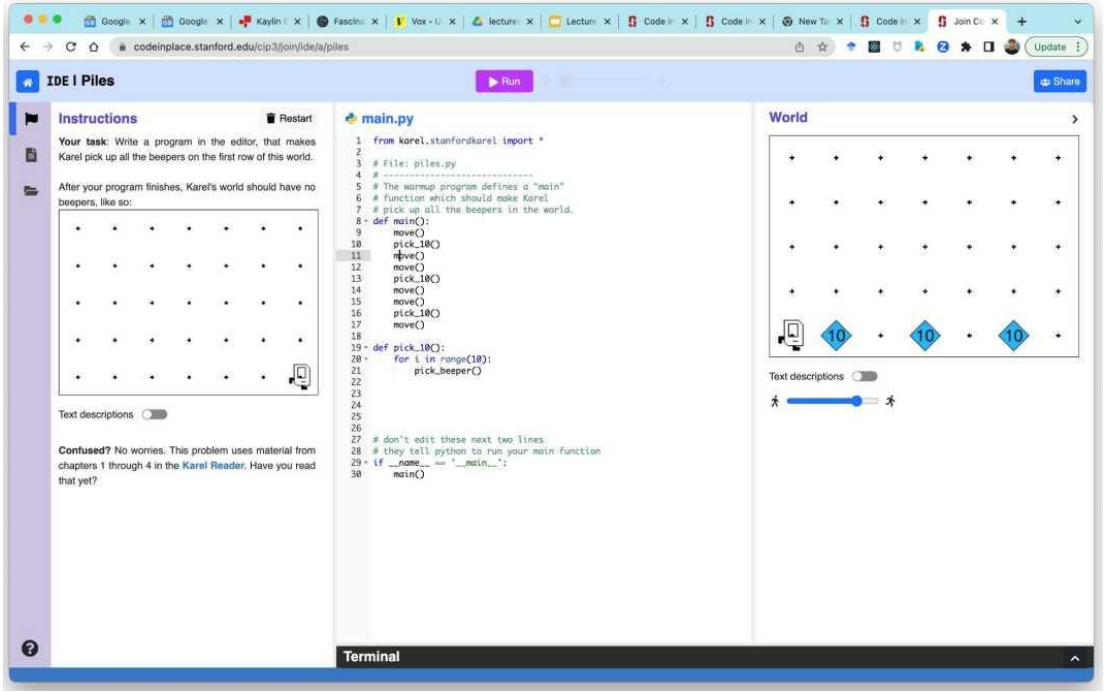
How about you?

- Where are you from?
- Your coding experience
- Cool superpower you'd like to have

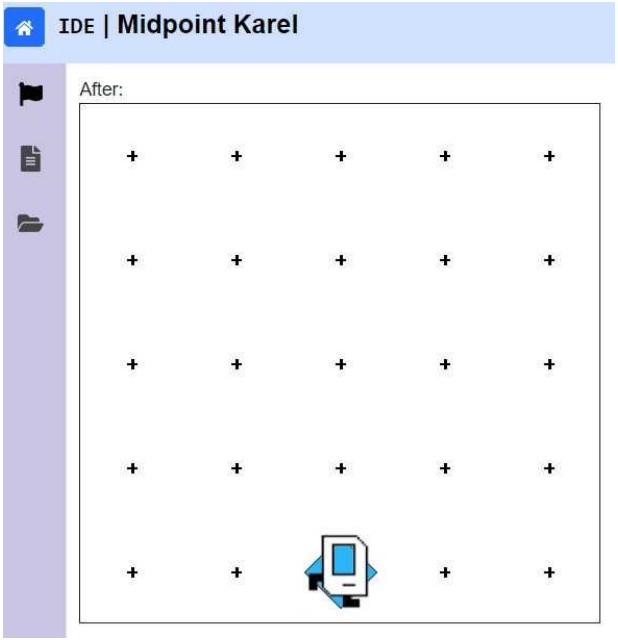
Course Weekly Timeline

Lectures	Section	Assignment
2 Lessons Both released every Monday. ~1 hour per lecture.	**Live Zoom Session** Practice lecture concepts. Prepare you for assignment.	**Coding Challenges** Solidify your understanding. Optional: “Extension” projects

Brief Tour of Course's Web Platform



Some Basic Python Functionality is TURNED OFF….for now!

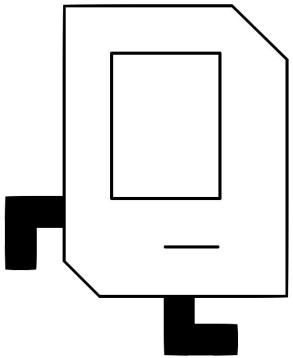


For the duration of Karel unit (Weeks 1 & 2):

- Basic Python functionality is turned off for simplicity
  - Focus on building blocks of Karel commands
- Examples of disabled functionality:
  - print statements
  - conditional keywords (`NOT`, etc.)
  - variables, lists, dictionaries
  - input arguments to functions
  - function return statements

Concepts Review (Lightning Round!)

Karel is like a LEGO set with only 4 types of blocks....but you can do a lot!



Karel only knows four commands at the beginning:

```
move()

turn_left()

put_beeper()

pick_beeper()
```

Helpful website to visualize Karel (by Sophia Westwood):

www.karelhelper.com

Control Flow

`for` **Loops**

`while` **Loops**

`if/else`

for **Loop**

```
for i in range(count):
    statements                  # note indenting


# Example:
def turn_right():
    for i in range(3):
        turn_left()             # note indenting
```

`while` Loop

```
while condition:
    statements                  # note indenting
```

```
# Example:
def move_to_wall():
    while front_is_clear():
        move()                  # note indenting
```

Conditions Karel Can Check For

Test	*Opposite*	*What it checks*
`front_is_clear()`	`front_is_blocked()`	Is there a wall in front of Karel?
`left_is_clear()`	`left_is_blocked()`	Is there a wall to Karel's left?
`right_is_clear()`	`right_is_blocked()`	Is there a wall to Karel's right?
`beepers_present()`	`no_beepers_present()`	Are there beepers on this corner?
`beepers_in_bag()`	`no_beepers_in_bag()`	Any there beepers in Karel's bag?
`facing_north()`	`not_facing_north()`	Is Karel facing north?
`facing_east()`	`not_facing_east()`	Is Karel facing east?
`facing_south()`	`not_facing_south()`	Is Karel facing south?
`facing_west()`	`not_facing_west()`	Is Karel facing west?

Check out "Karel Reader", Chapter 10 for full reference

Which Type of Loop Should You Use?

`for` Loop

You know exactly how many times to repeat (definite loop)

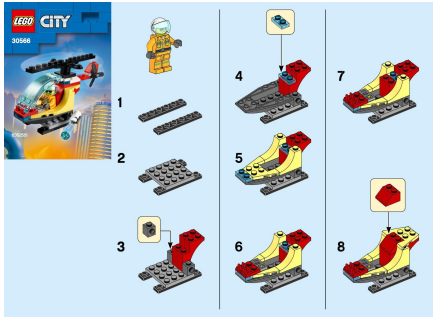
`while` Loop

You don't know exactly how many times to repeat (indefinite loop)

`if-else` Statement

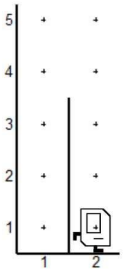
```
if condition:
    statements                  # note indenting
else:
    statements


# Example:
def invert_beepers():
    if beepers_present():
        pick_beeper()           # note indenting
    else:
        put_beeper()            # note indenting
```

Decomposition



Break down a problem into more manageable sub-problems

- "Divide and conquer" approach
- Which sorts of tasks should be decomposed?
- Rule of Thumb: Each function should execute a single purpose.
- Code becomes easier to read! For both you and everyone else.




```
turn_left()
while right_is_blocked():
      move()
turn_right()
move()
turn_right()
move_to_wall()
turn_left()
```

```
ascend_hurdle()
move()
descend_hurdle()
```

Section Exercise: “Hospital Karel”