# Towards Smart Mentor Dispatch

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TFPIE

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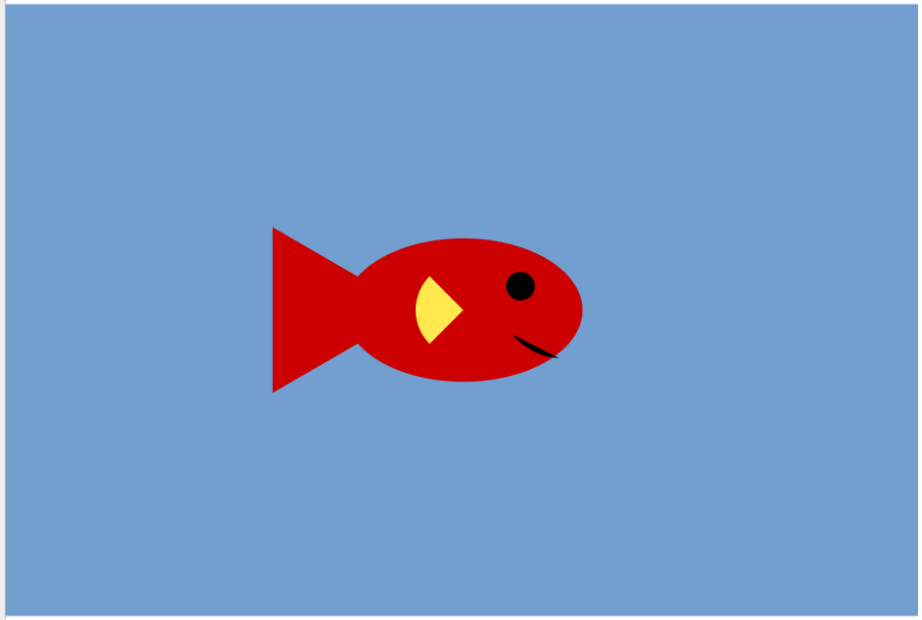
# Macoutreach.rocks!

Compile

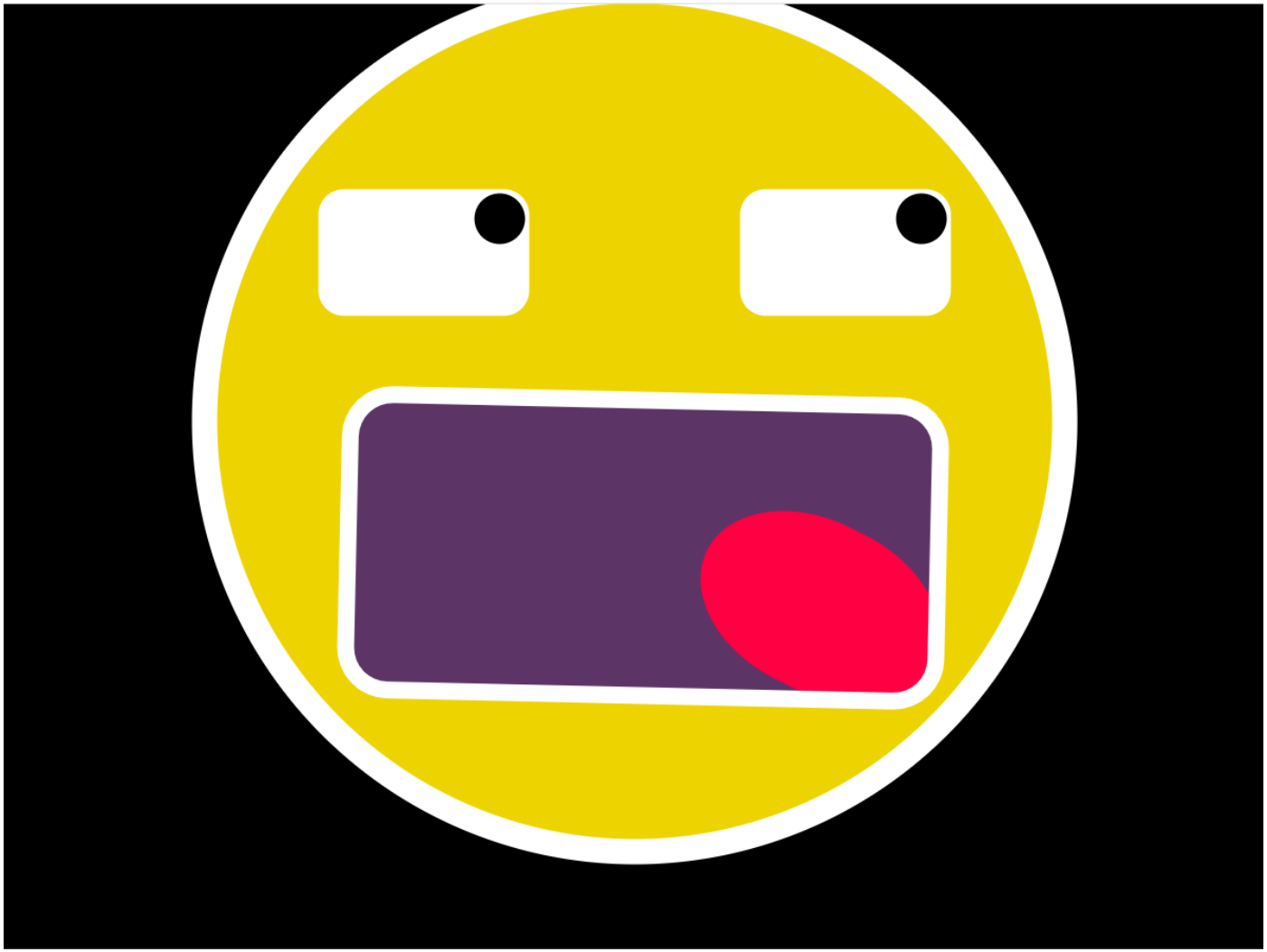
MacOutreach.Rocks! with GraphicSVG, Shape Creator, Colours, Game Examples and Cool Demos.
Animation Slot: Make your own animation here! (last saved just now)

Share

```
myShapes model = [   square 3000
        |> filled lightBlue
    ,   oval 50 30
        |> filled red
    ,   ngon 3 20
        |> filled red
        |> move (-30,0)
    ,   curve (0,0) [Pull (10,0) (20,-10)]
        |> filled black
        |> scale 0.5
        |> rotate (degrees 180)
        |> move (20,-10)
    ,   circle 3
        |> filled black
        |> move (12,5)
    ,   wedge 10 0.25
        |> filled lightYellow
        |> rotate (degrees 180)
    ]
```



# Macoutreach.rocks Example



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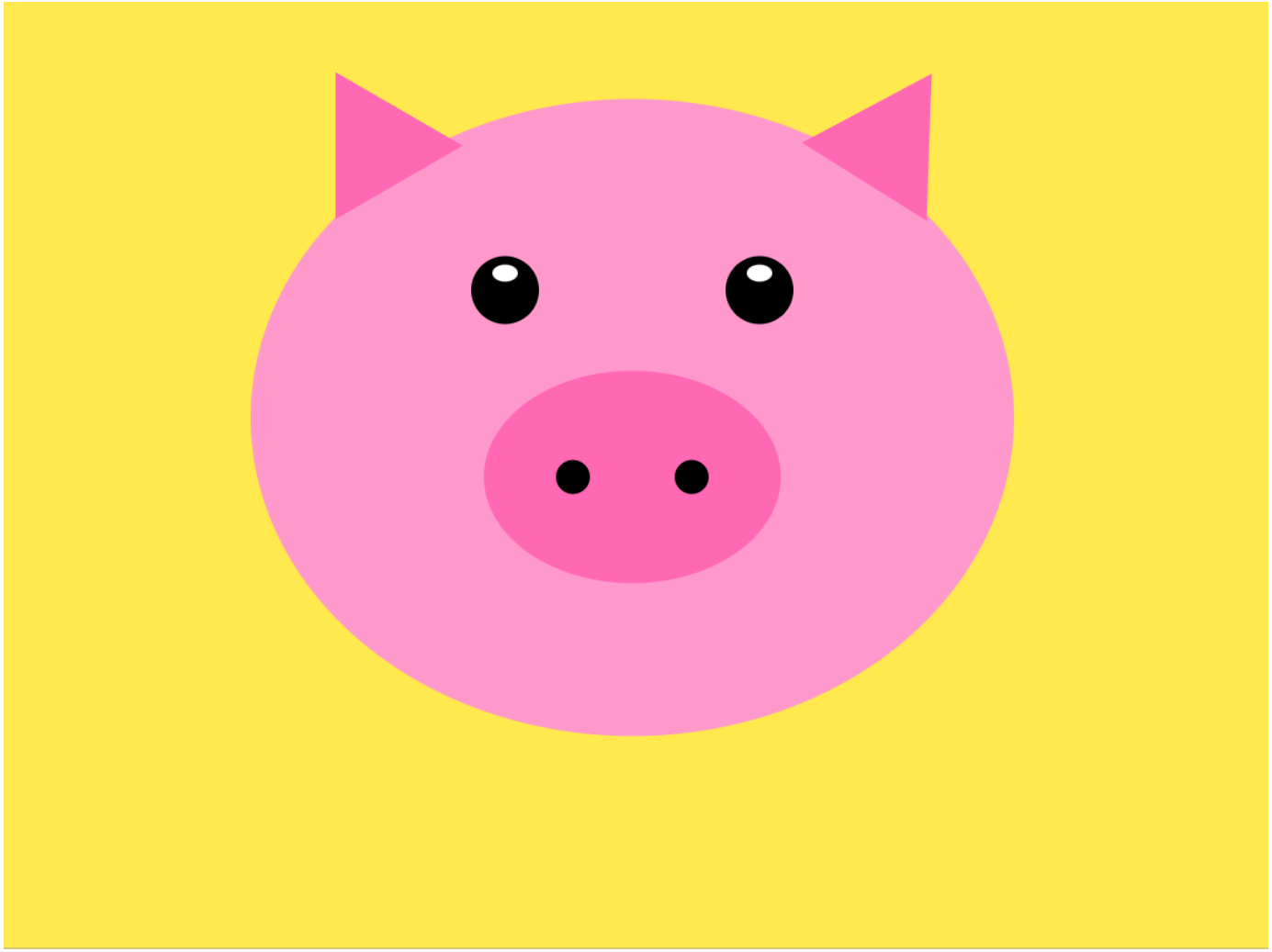
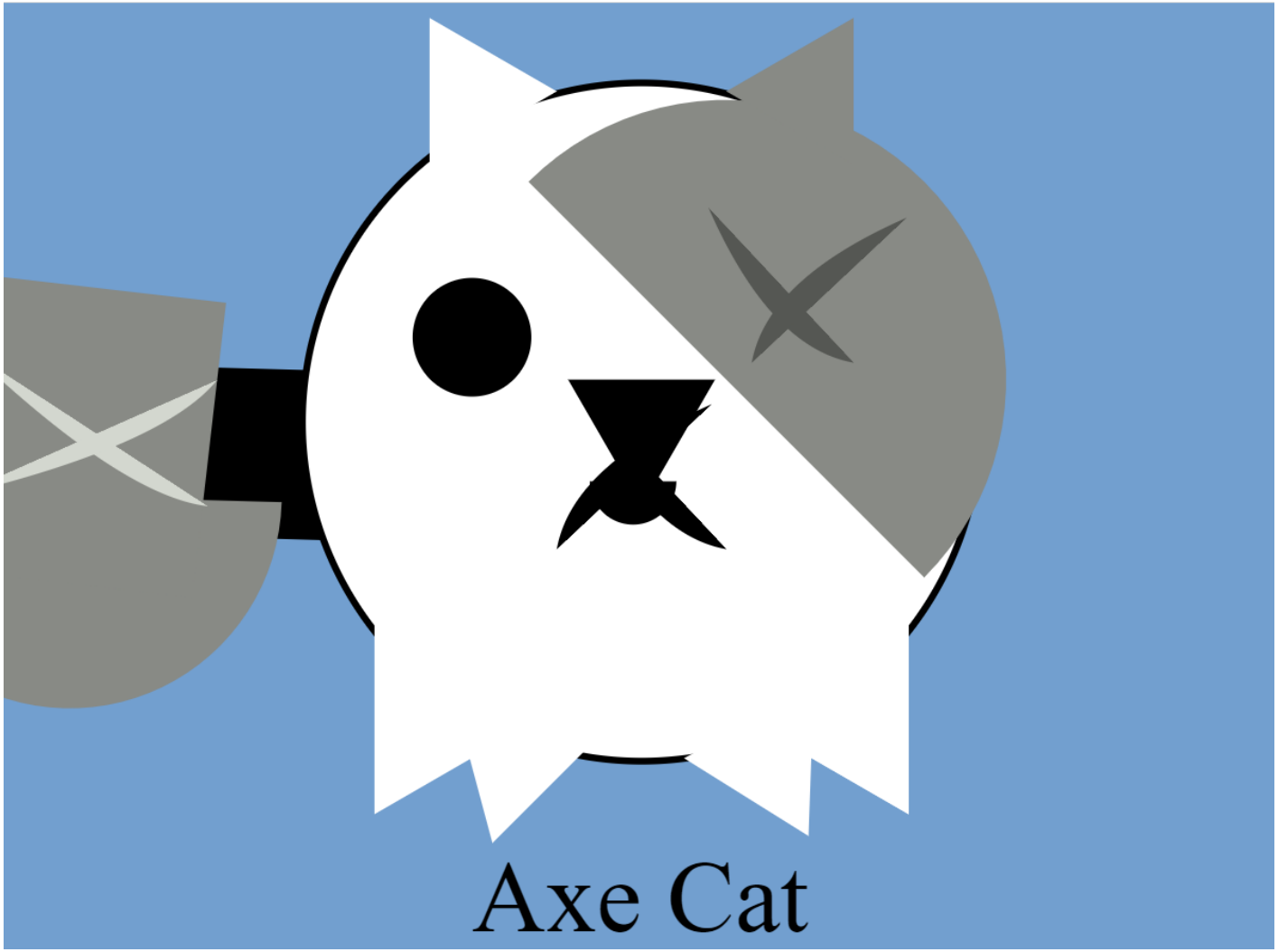
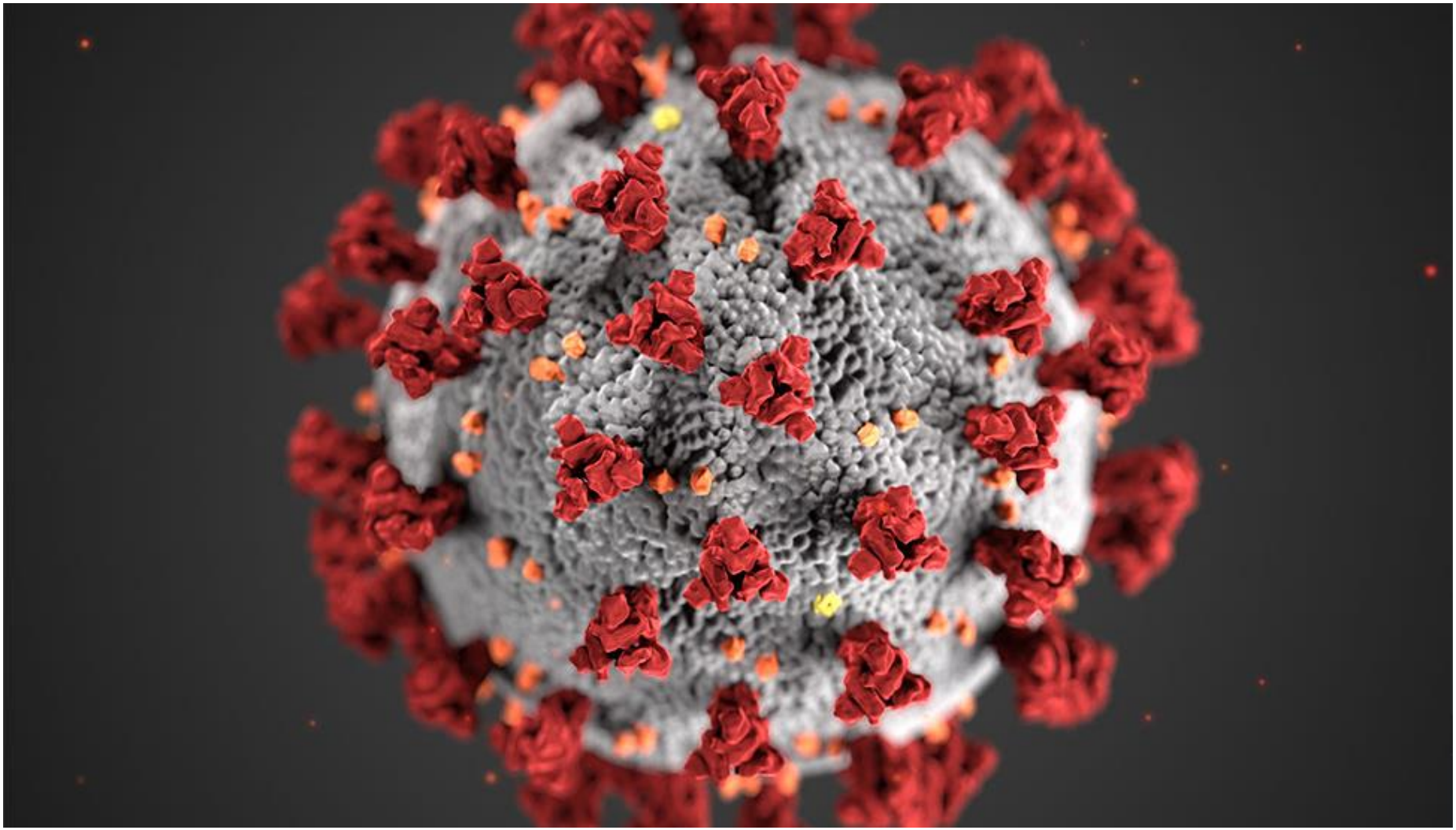


# Macoutreach.rocks Example



# In-person class visit

# Pandemic!



How can we identify which students need help based on their interaction with the WebIDE?

How can we empower mentors to help students when they need it the most?

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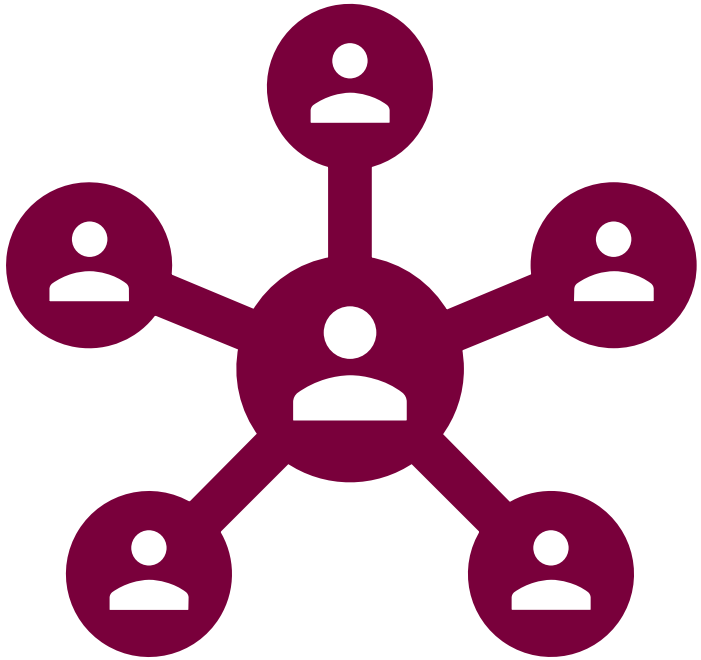
How can we empower mentors to help students when they need it the most?

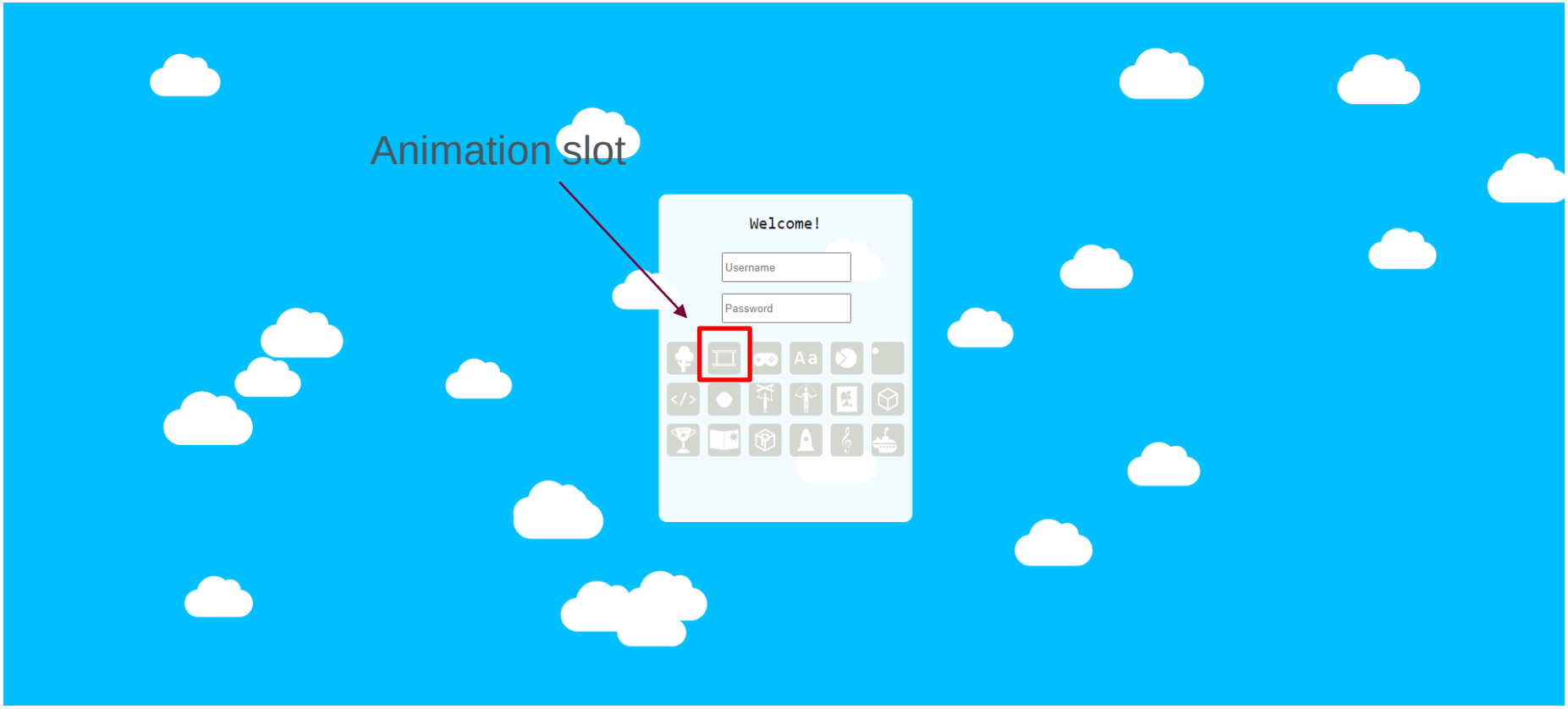
# Towards Smart Mentor Dispatch

How can we address our concerns?

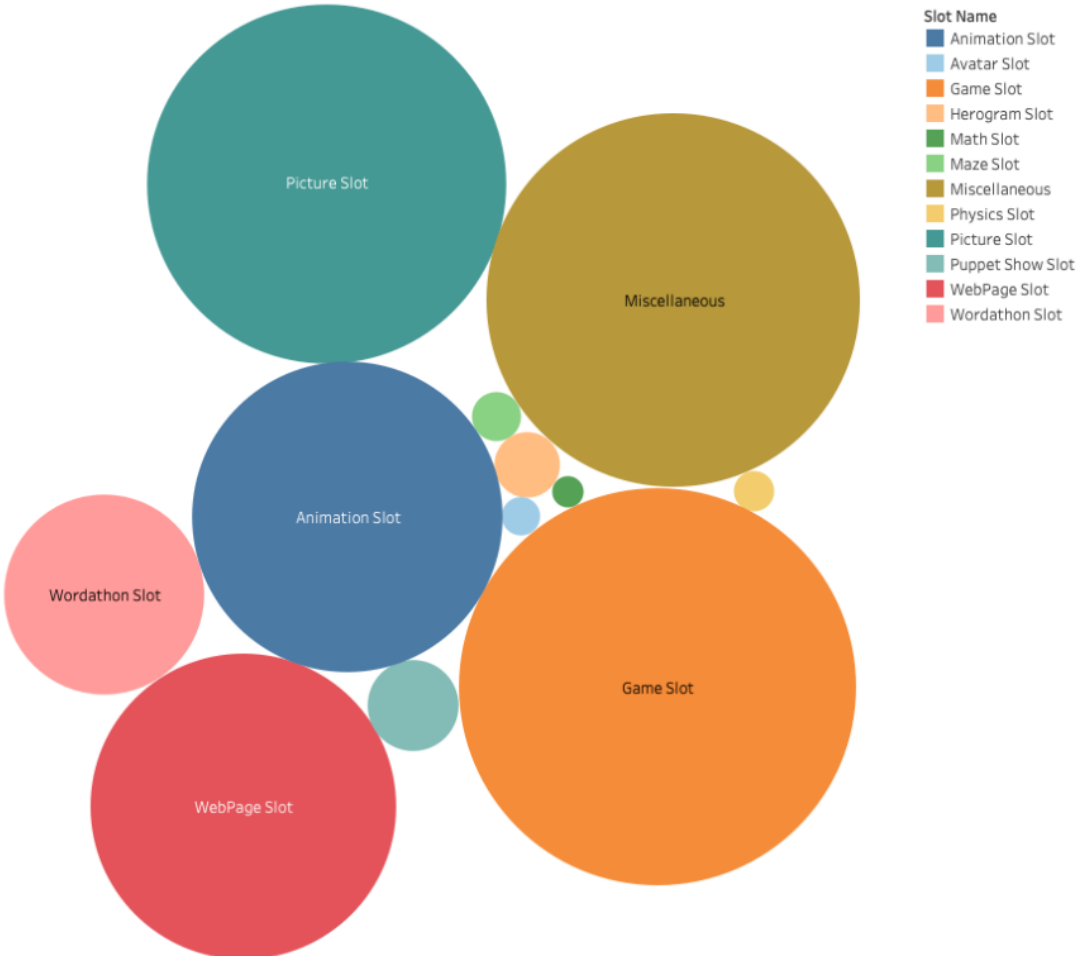
- Give mentors access to real-time insights from students' code
  - Dataset of compilations and errors
  - Predicting time to resolve an error
  - Cluster groups of students struggling with similar problems



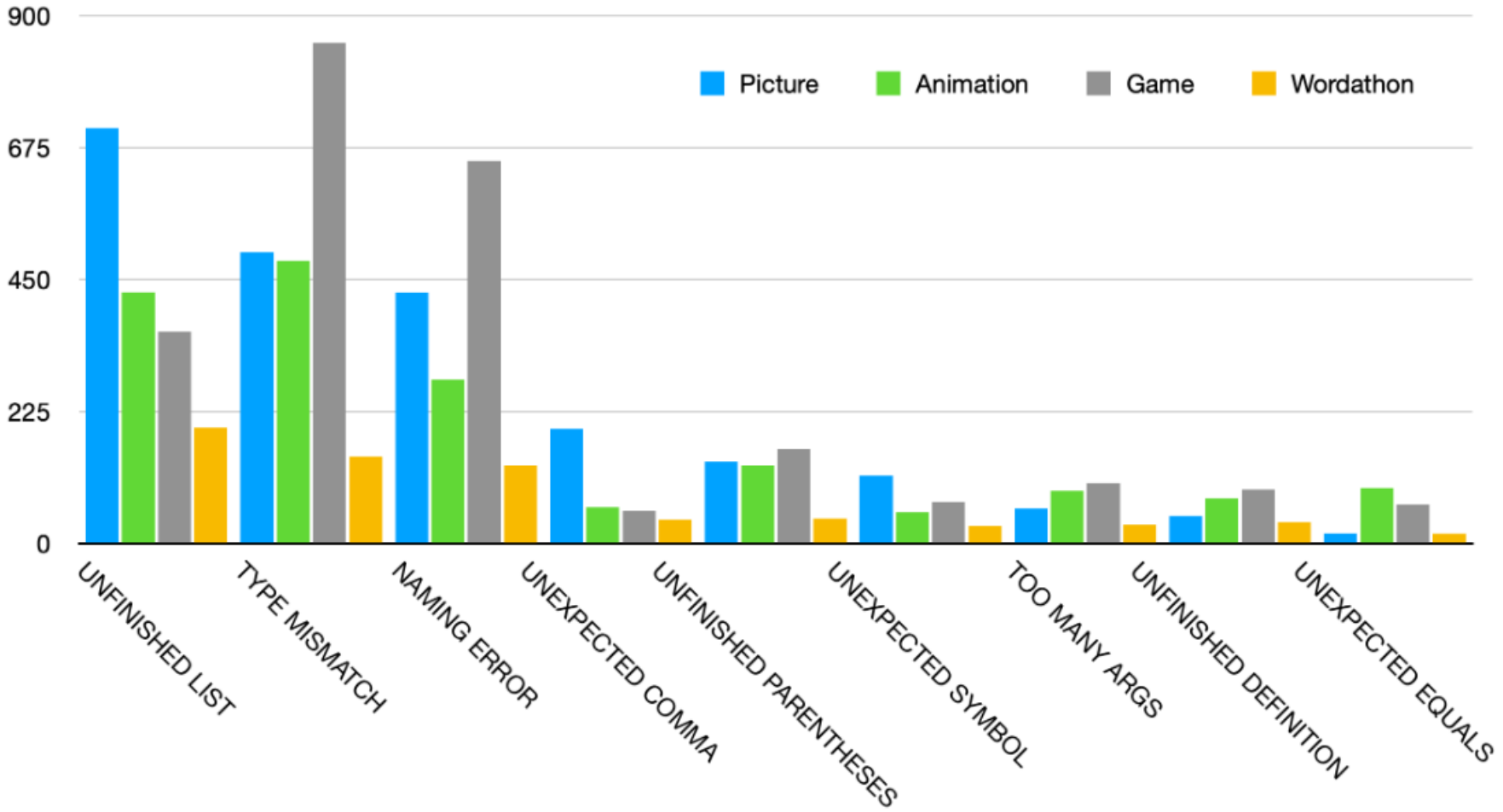
# MOR Homepage with Slots



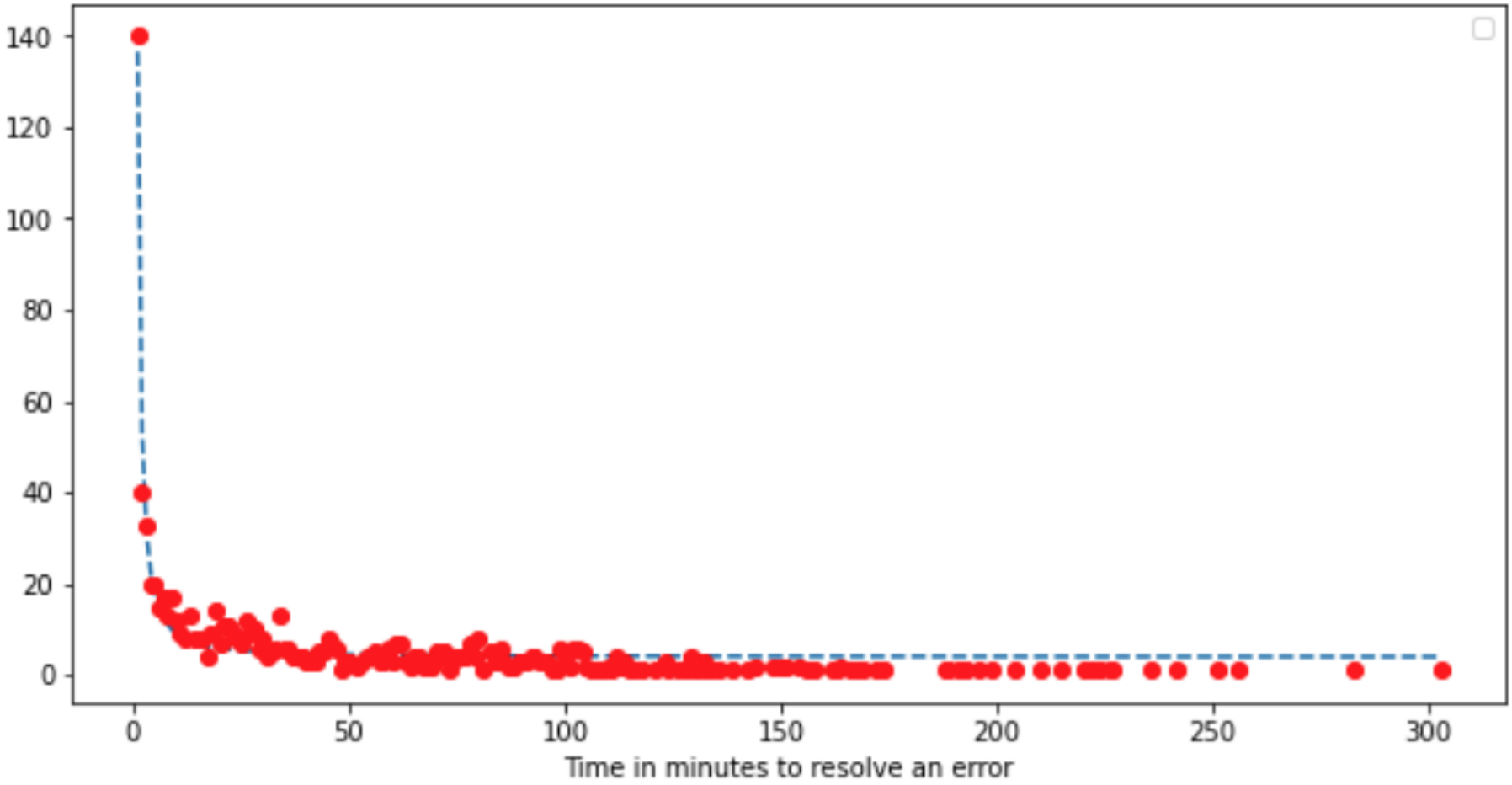
# Relative Number of Compilations in Slots



# Dataset of Errors

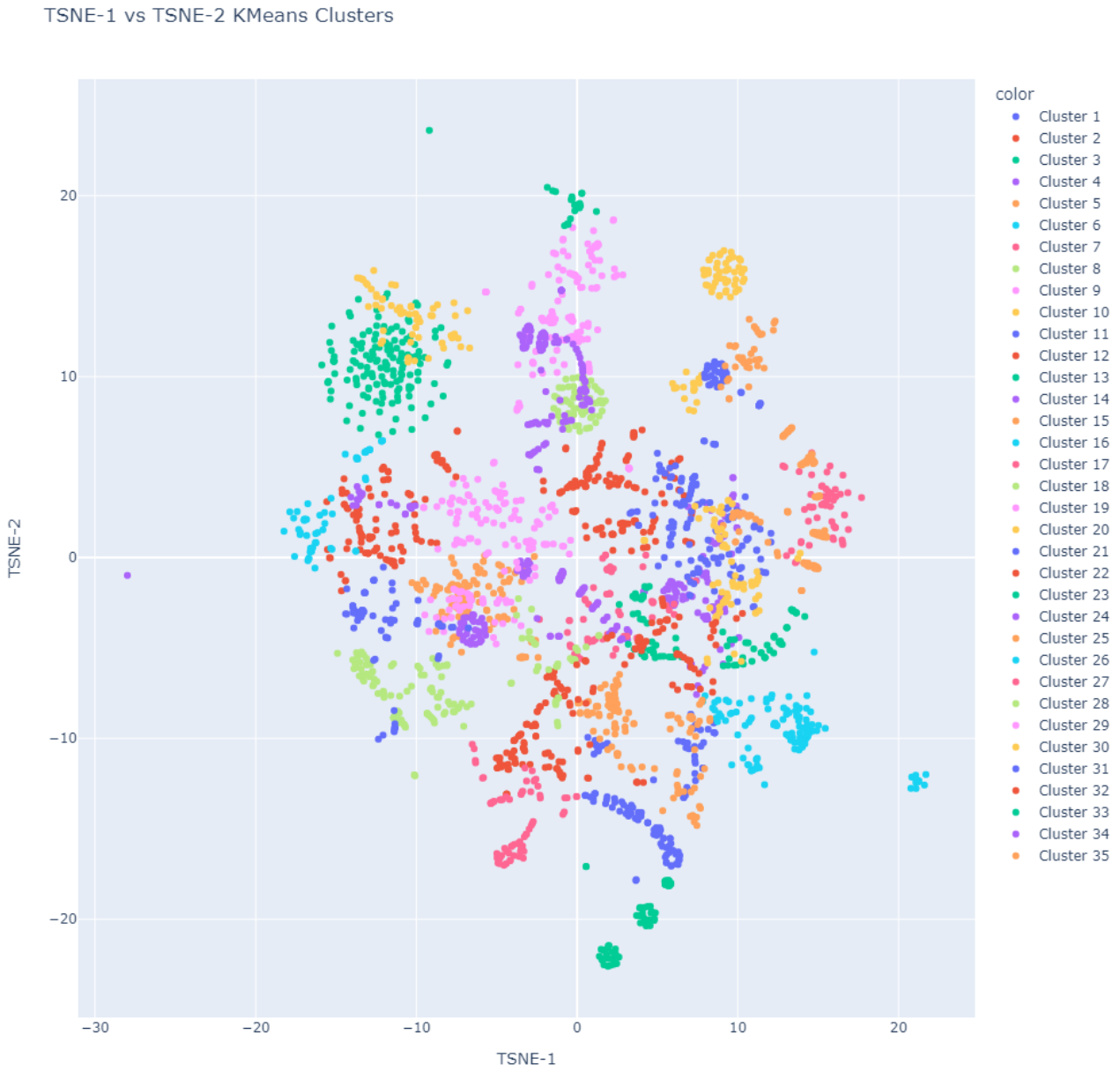


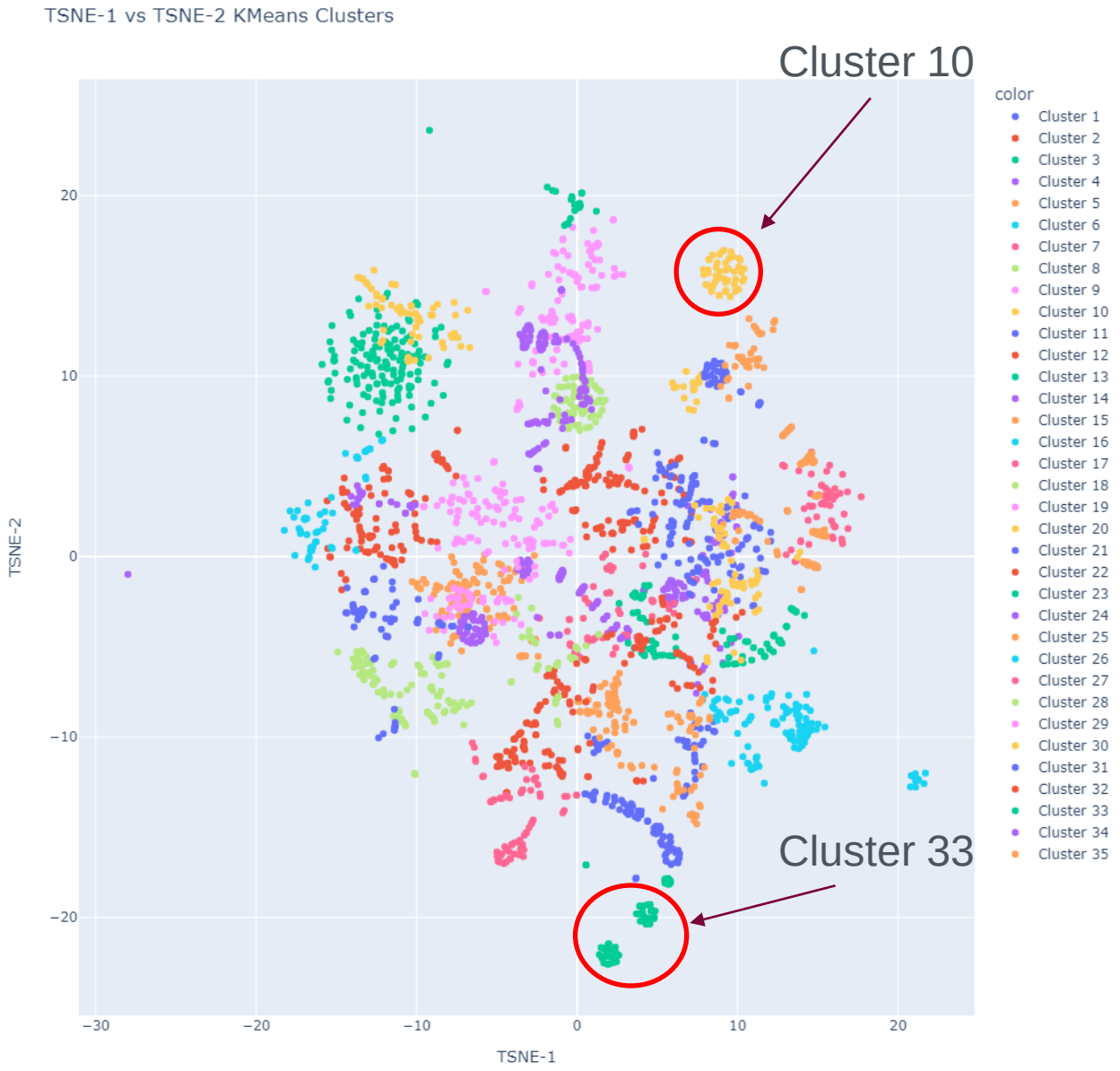
# Predicting Time to Resolve an Error

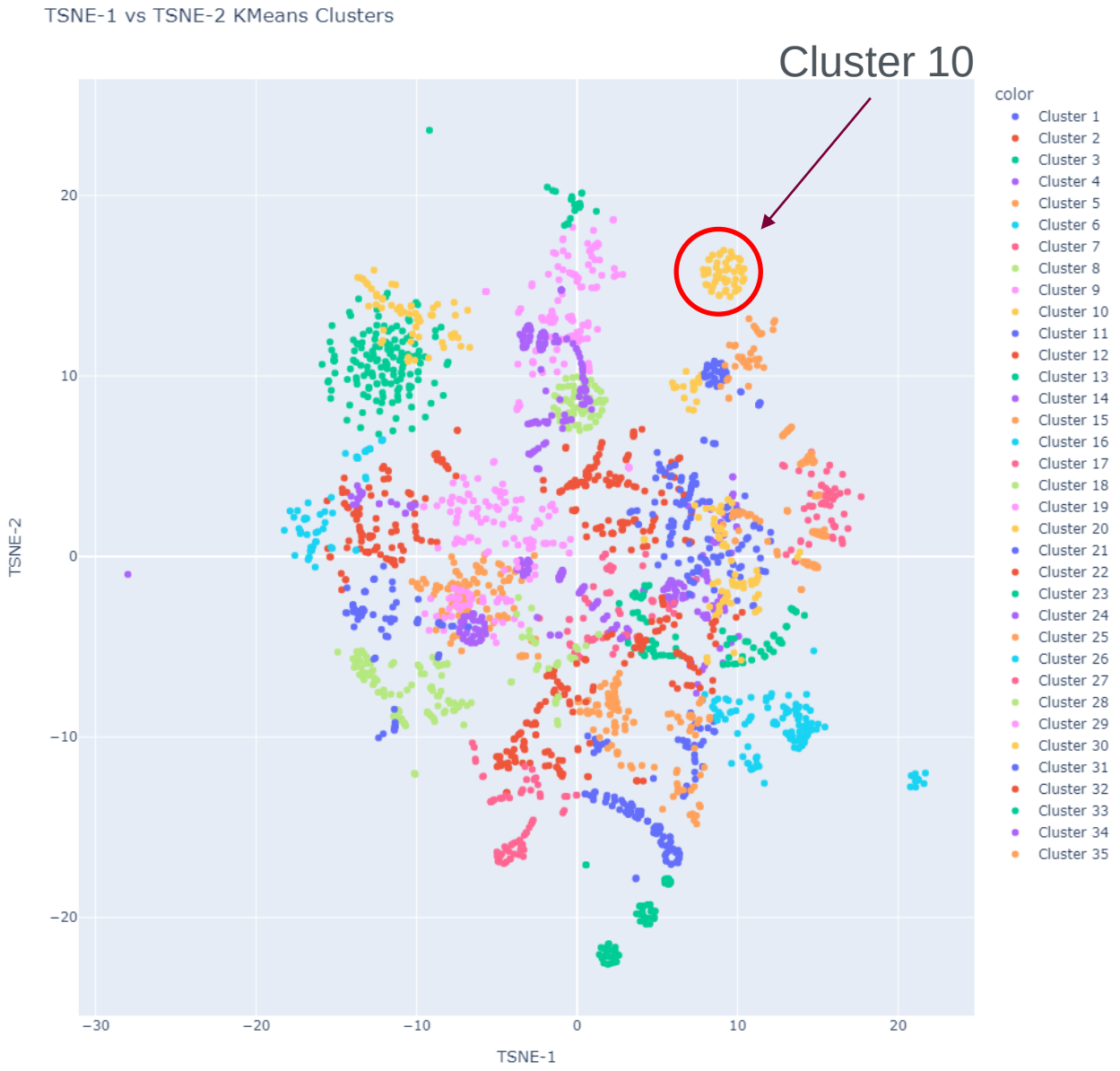


# TSNE + K-Means

## Clusters




TSNE-1 vs TSNE-2 KMeans Clusters
Cluster 10
Cluster 33
color
Cluster 1
Cluster 2
Cluster 3
Cluster 4
Cluster 5
Cluster 6
Cluster 7
Cluster 8
Cluster 9
Cluster 10
Cluster 11
Cluster 12
Cluster 13
Cluster 14
Cluster 15
Cluster 16
Cluster 17
Cluster 18
Cluster 19
Cluster 20
Cluster 21
Cluster 22
Cluster 23
Cluster 24
Cluster 25
Cluster 26
Cluster 27
Cluster 28
Cluster 29
Cluster 30
Cluster 31
Cluster 32
Cluster 33
Cluster 34
Cluster 35
TSNE-2
20
10
0
−10
−20
−30
−20
−10
0
10
20
TSNE-1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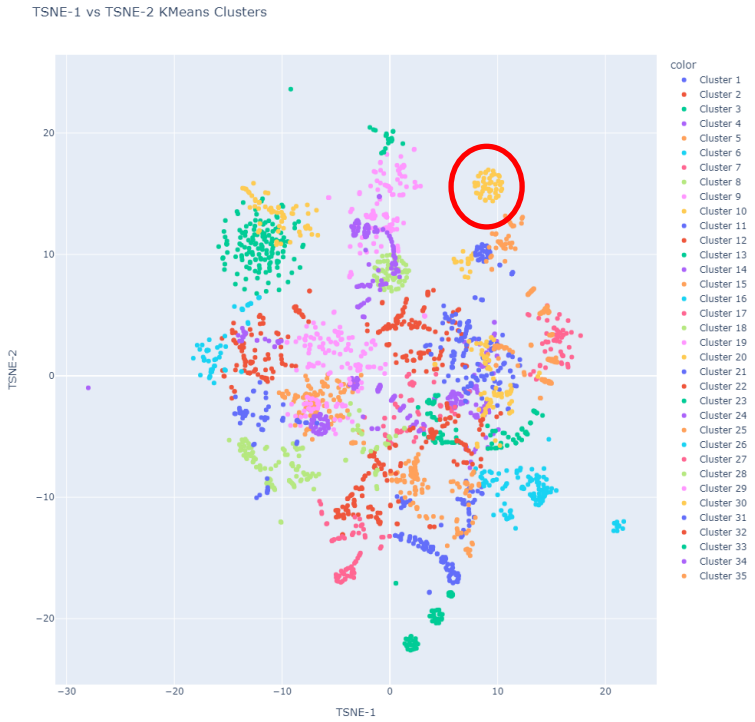
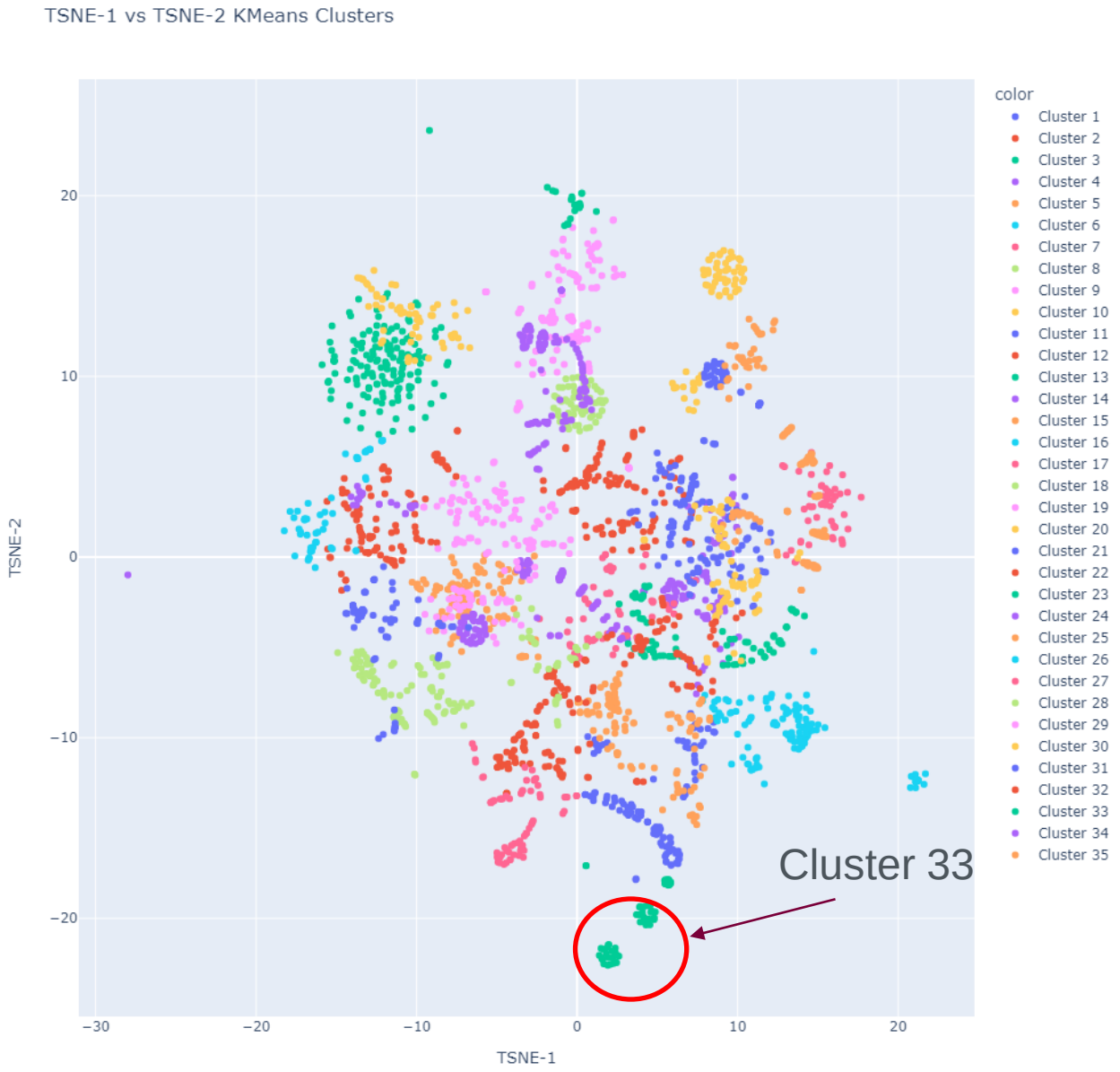
Cluster 13
Cluster 14
Cluster 15
Cluster 16
Cluster 17
Cluster 18
Cluster 19
Cluster 20
Cluster 21
Cluster 22
Cluster 23
Cluster 24
Cluster 25
Cluster 26
Cluster 27
Cluster 28
Cluster 29
Cluster 30
Cluster 31
Cluster 32
Cluster 33
Cluster 34
Cluster 35
TSNE-2
20
10
0
−10
−20
−30
−20
−10
0
10
20
TSNE-1

# Cluster 10 Characteristics

- 37 Students
- 100% has successful final compile
- 99% successful compile rate
- Common errors:
  - Missing Single Quote
  - Type Mismatch
  - Unfinished List




TSNE-1 vs TSNE-2 KMeans Clusters
color
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Cluster 7
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Cluster 10
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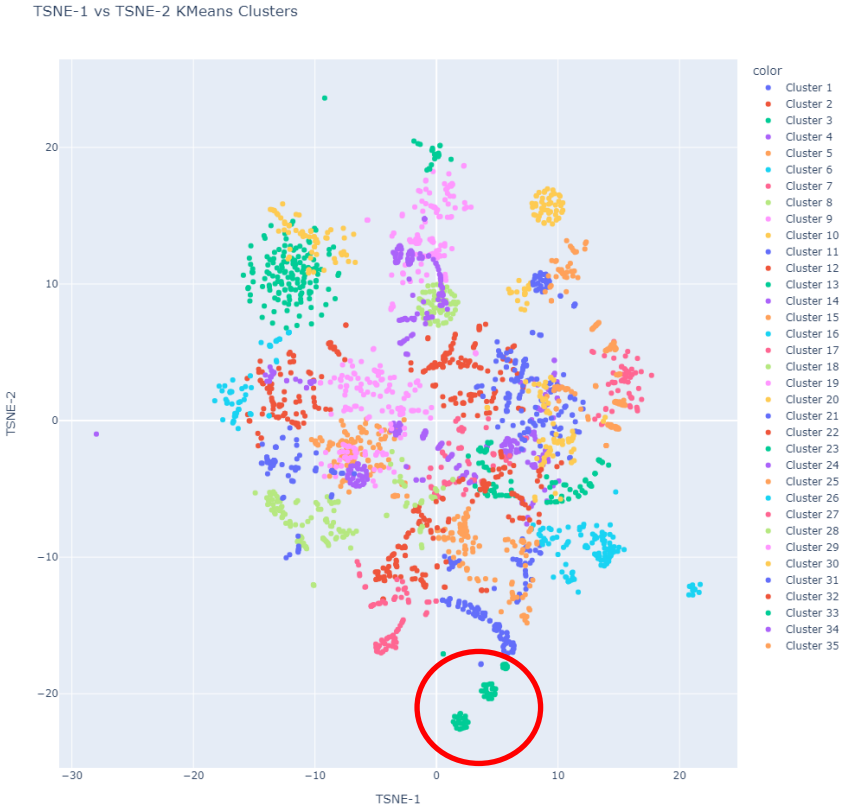
Cluster 14
Cluster 15
Cluster 16
Cluster 17
Cluster 18
Cluster 19
Cluster 20
Cluster 21
Cluster 22
Cluster 23
Cluster 24
Cluster 25
Cluster 26
Cluster 27
Cluster 28
Cluster 29
Cluster 30
Cluster 31
Cluster 32
Cluster 33
Cluster 34
Cluster 35
Cluster 33
TSNE-2
TSNE-1
20
10
0
−10
−20
−30
−20
−10
0
10
20

# Cluster 33 Characteristics

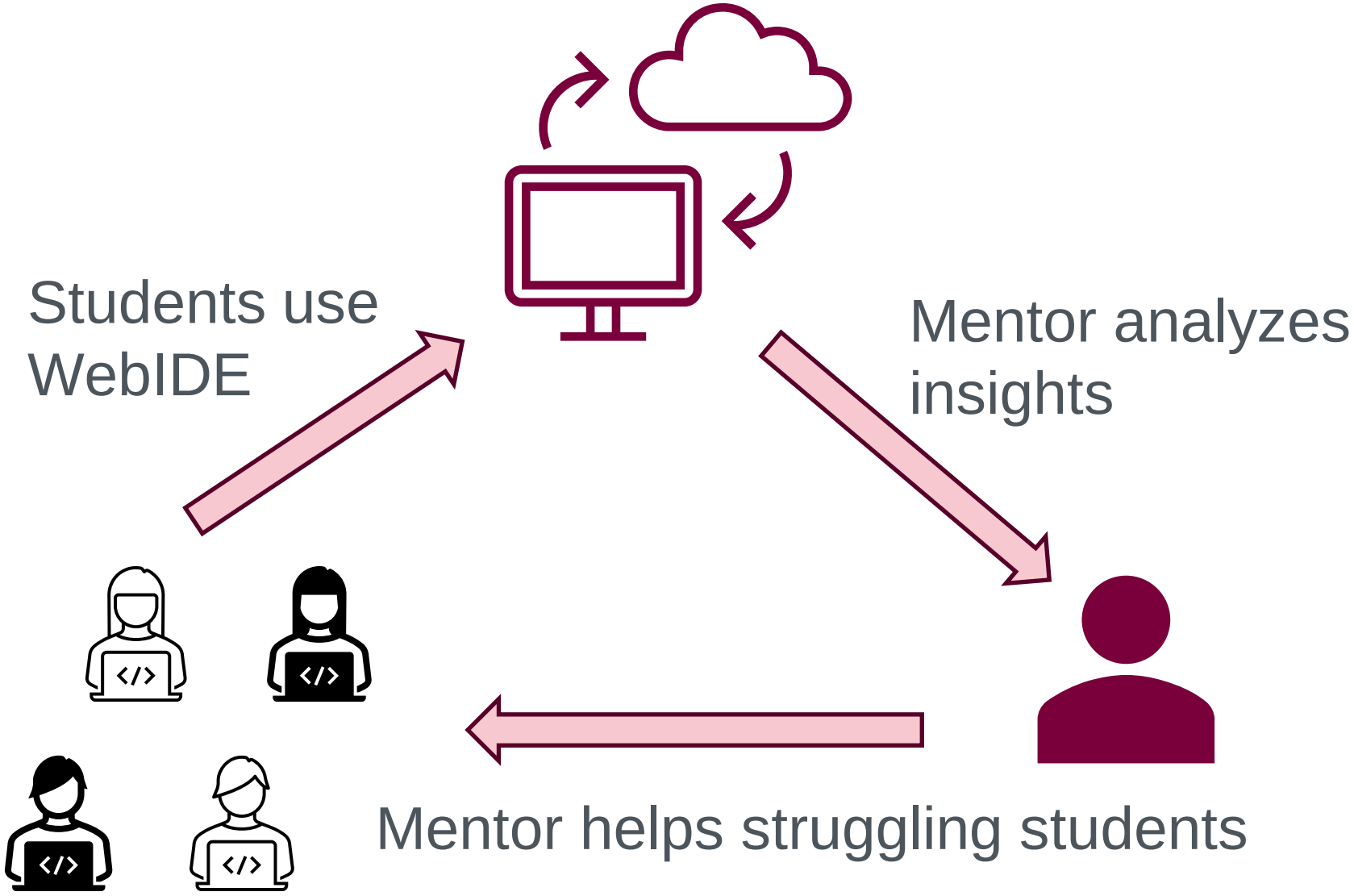
- 26 Students
- 57% has successful final compile
- 97% successful compile rate
- Common errors:
  - Missing Single Quote
  - Naming Error
  - Type Mismatch
  - Unfinished List



# Deep Dive of Code from Cluster 33

```
-- NAMING ERROR ---------- Q1100_16085_160331896651.elm

I cannot find a `spot` variable:

22|     , spot  |>clip (moon)
          ^^^^
These names seem close though:

    spots
    not
    sqrt
    stop

Hint: Read <https://elm-lang.org/0.19.1/imports> to see how `import`
declarations work in Elm.
```

```
myShapes model =
  [
   square 1000
  |> filled black
   , spot  |>clip (moon)
  ]

spots = group [
   circle 10
  |> filled darkGray
  |>move (-35, 10)

  ,

   circle 10
  |> filled darkGray
  |>move (-10, -20)

  ,

    circle 10
  |> filled darkGray
  |>move (15, 0)

  ,

    circle 10
  |> filled darkGray
  |>move (0, 30)

  ]
moon = group [
 circle 60
  |> filled white


 ]
```


Students use WebIDE
Mentor analyzes insights
Mentor helps struggling students

# Outcomes

Mentors would analyze clusters and help students ad-hoc

Quickly identify whether new students are struggling or not

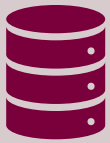
Develop preventative measures to ensure student success

Identify root cause of problems in clusters of students

# Future Work

Develop a dashboard to identify struggling students right away

Develop a system to automate insight generation



Develop a system to automatically predict dropout