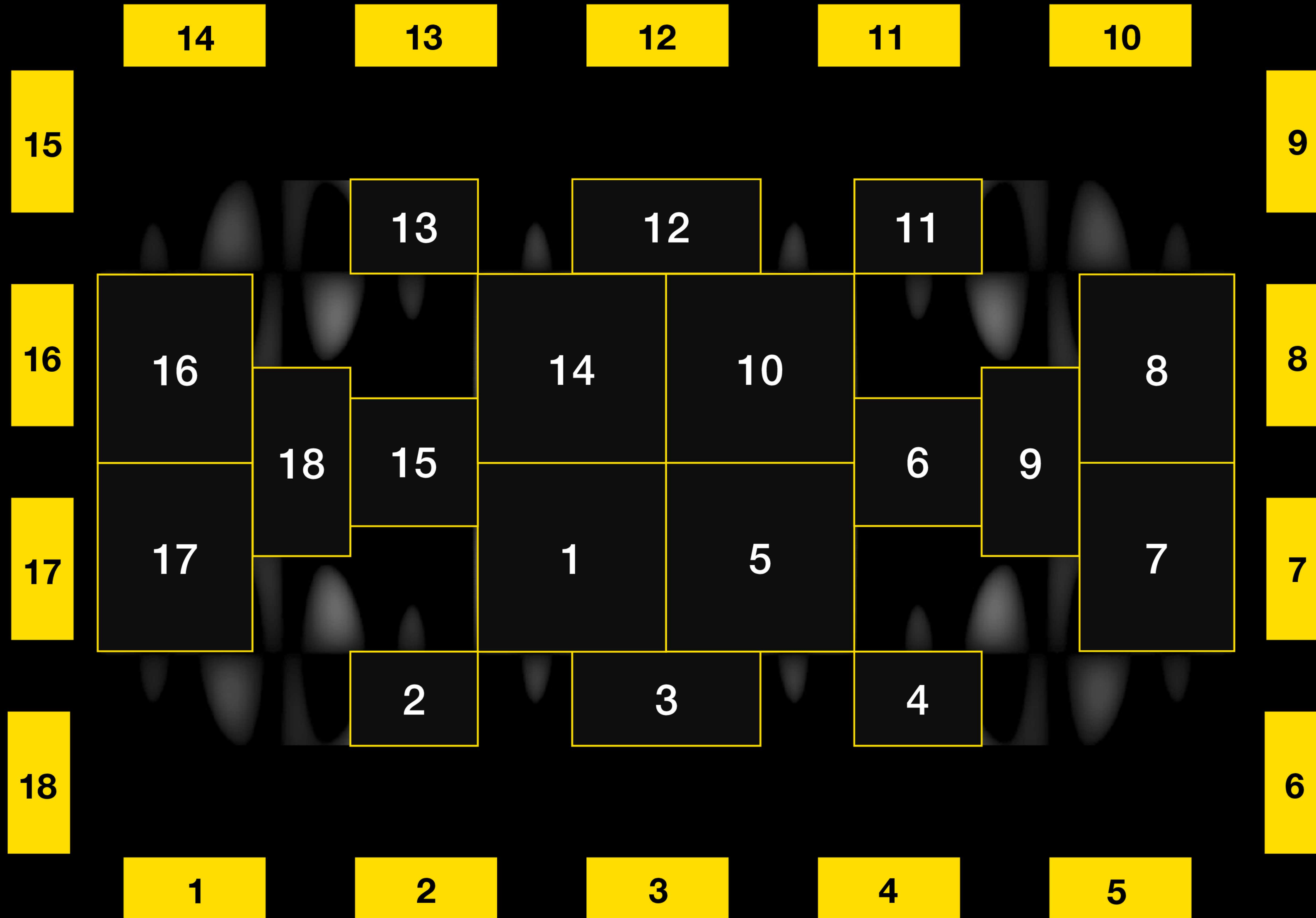


Stage

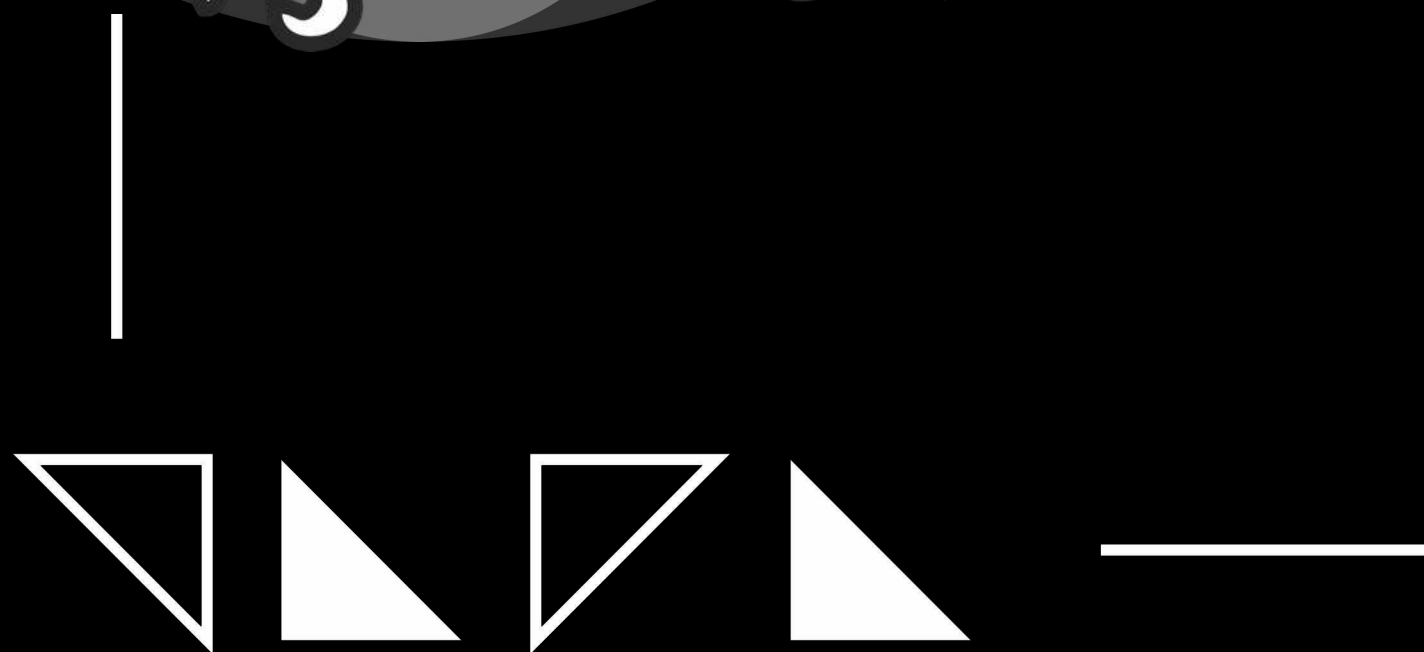
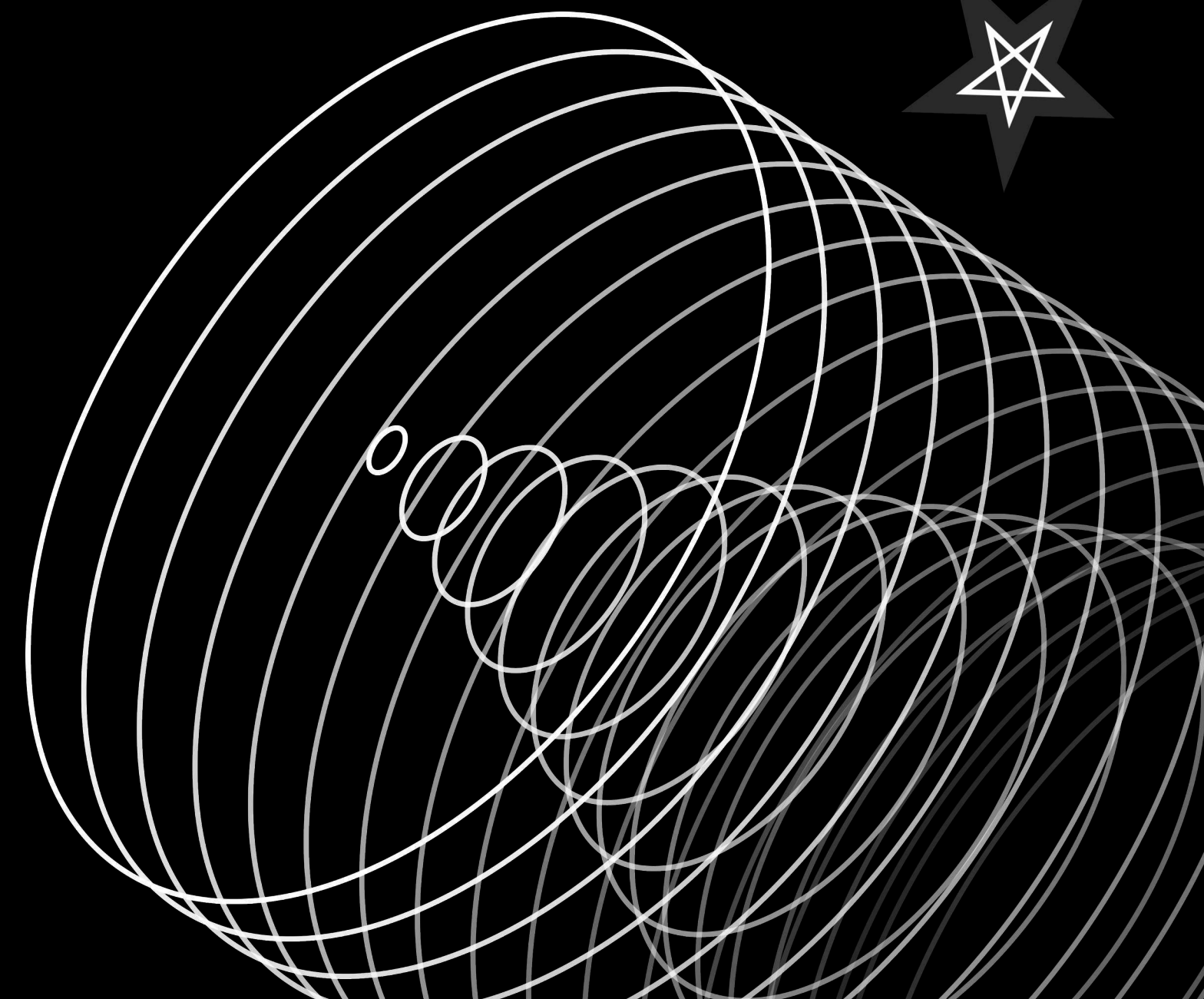
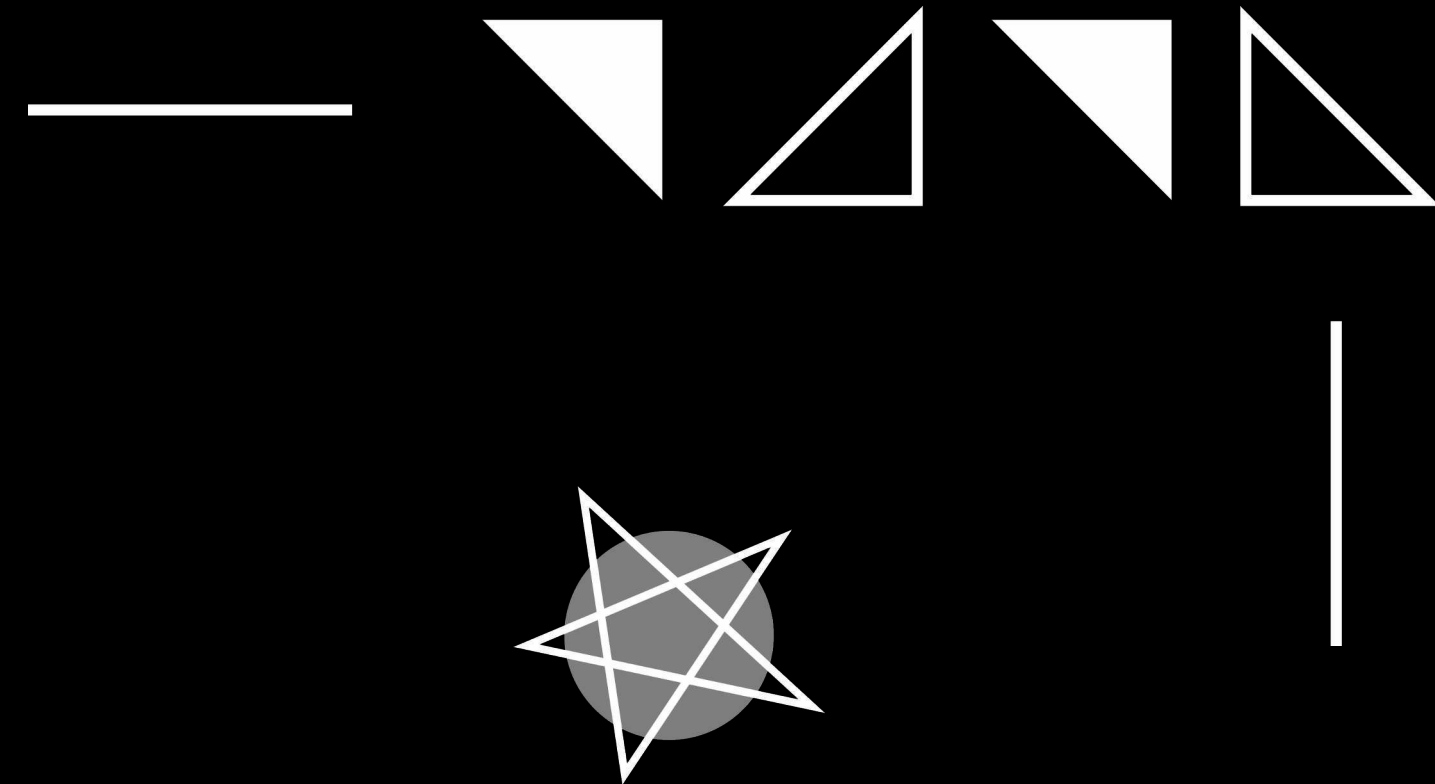


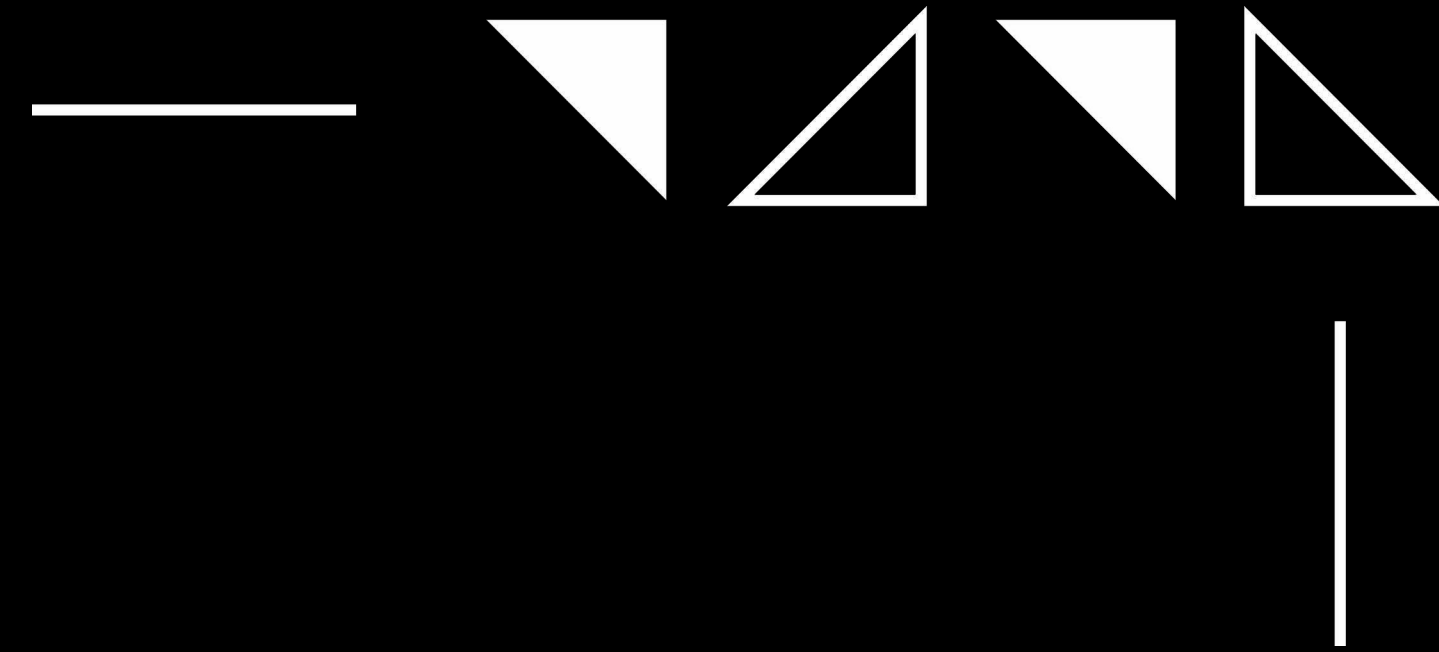
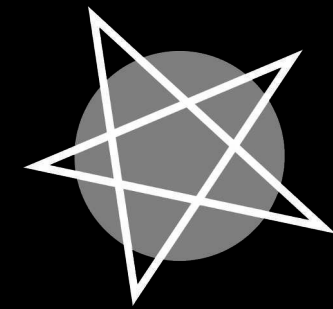


科学

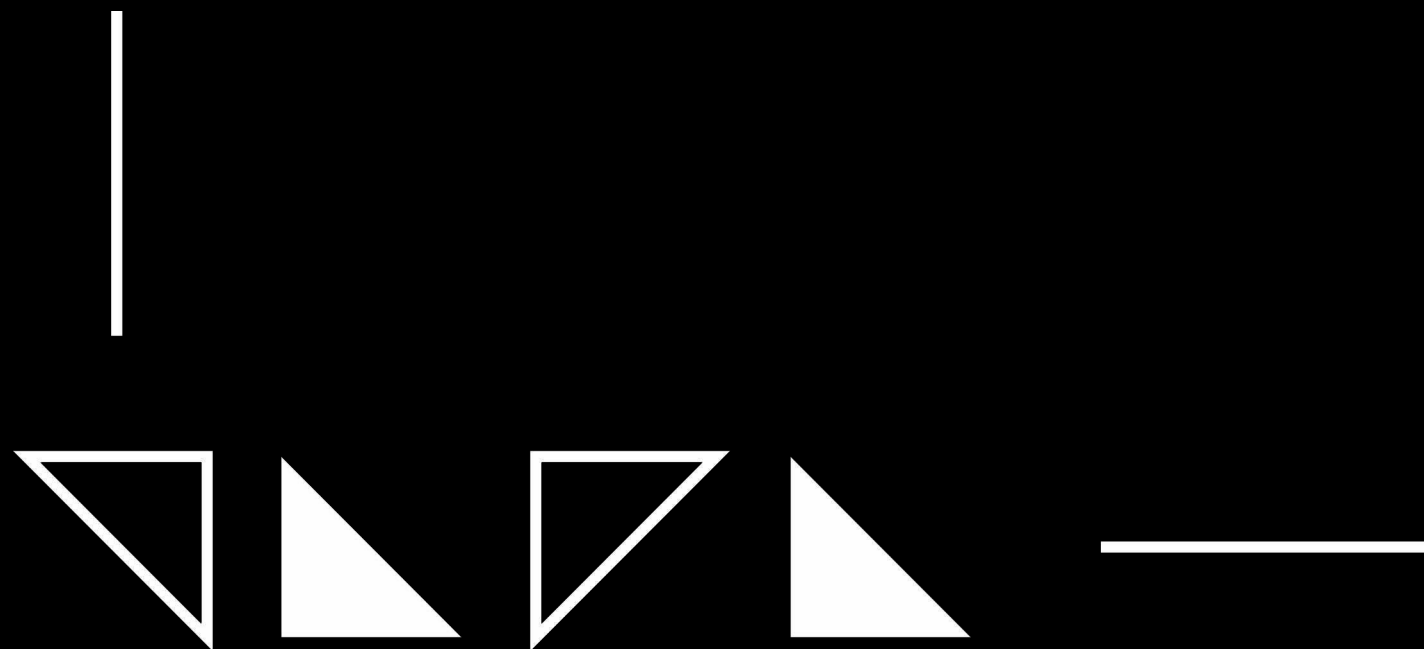
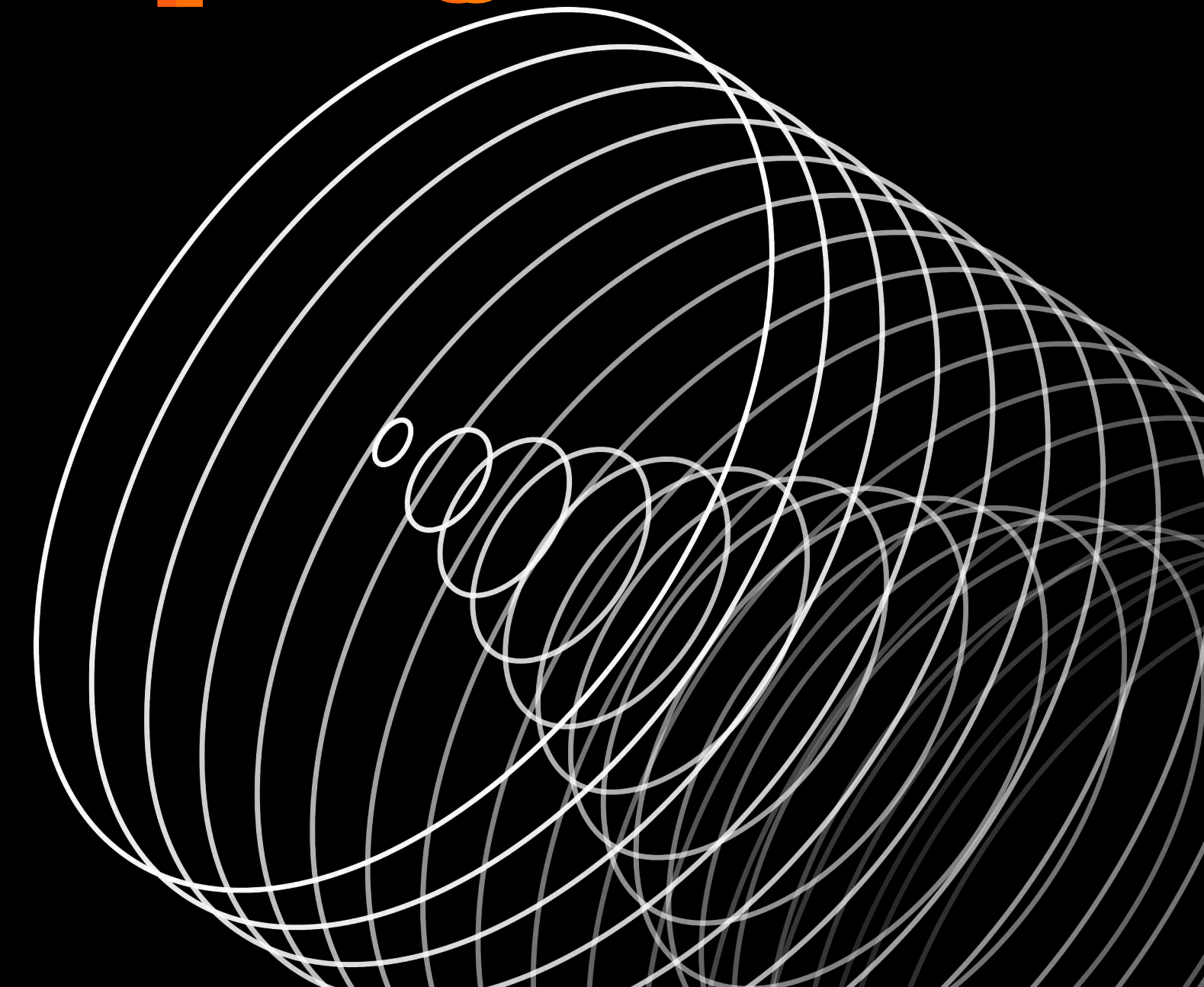
2025

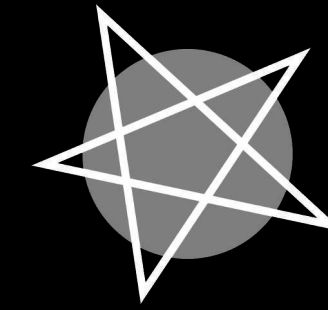
Science Competition





Do you know about the **EHT project?**





EHT project

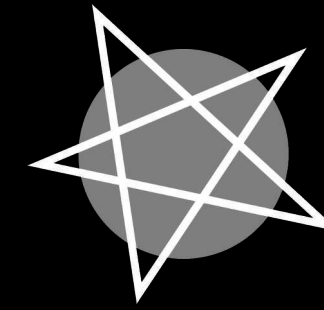
The **Event Horizon Telescope (EHT)** is an international collaboration

Launched in 2012 to capture an image of a black hole.

In 2017, it **directly confirmed the existence** of a black hole

at the center of a galaxy 55 million light-years away.

On April 10, 2019, the EHT team revealed **the first-ever image** of a black hole.



EHT project

The **EHT** connected telescopes worldwide using **VLBI**.

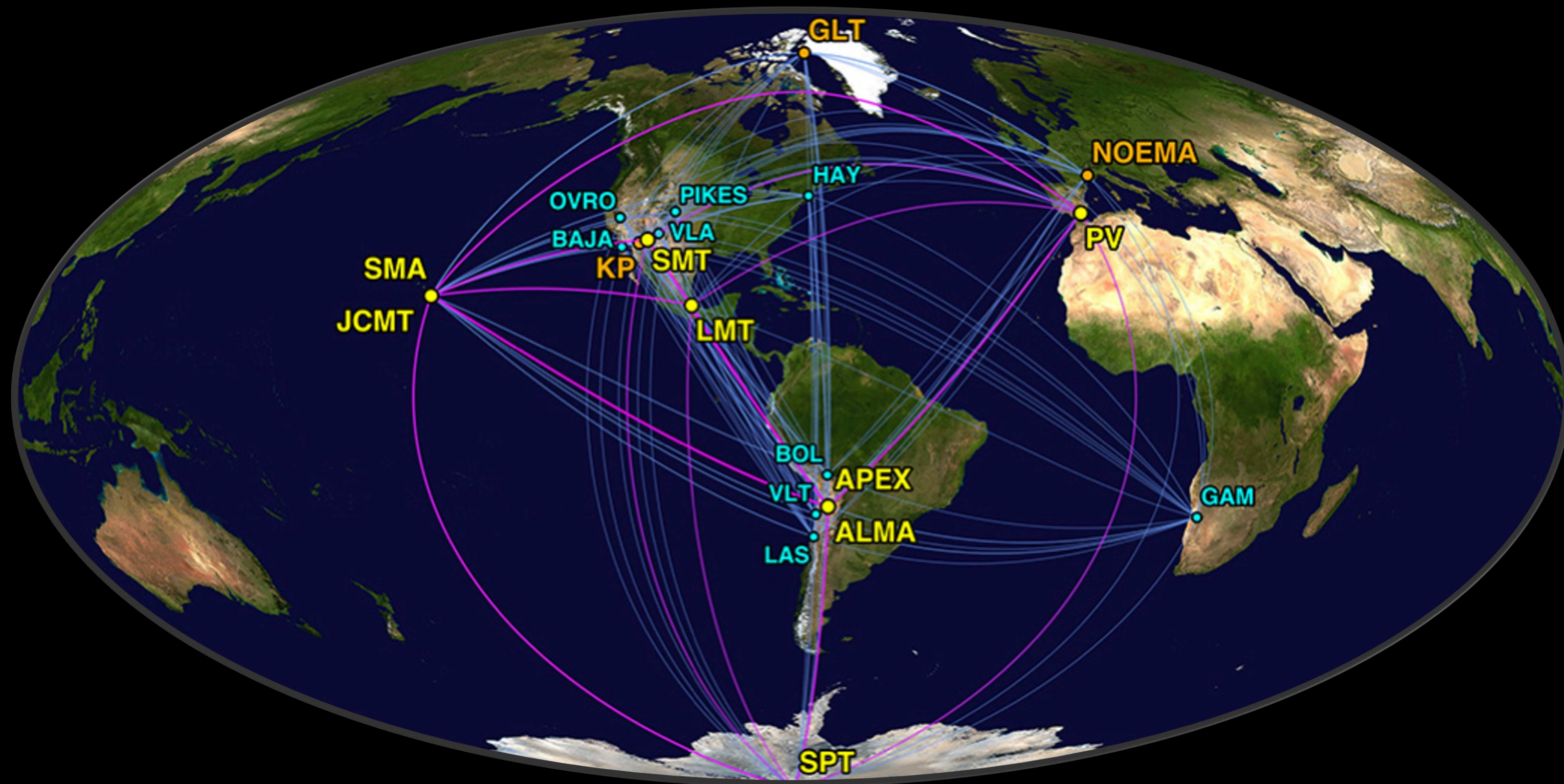
It recorded **radio waves** from the black hole.

Using interference data and **Fourier transforms**,

they created the image of a blackhole named **M87**.

*VLBI: Very Long Baseline Interferometry

EHT project



8 telescopes

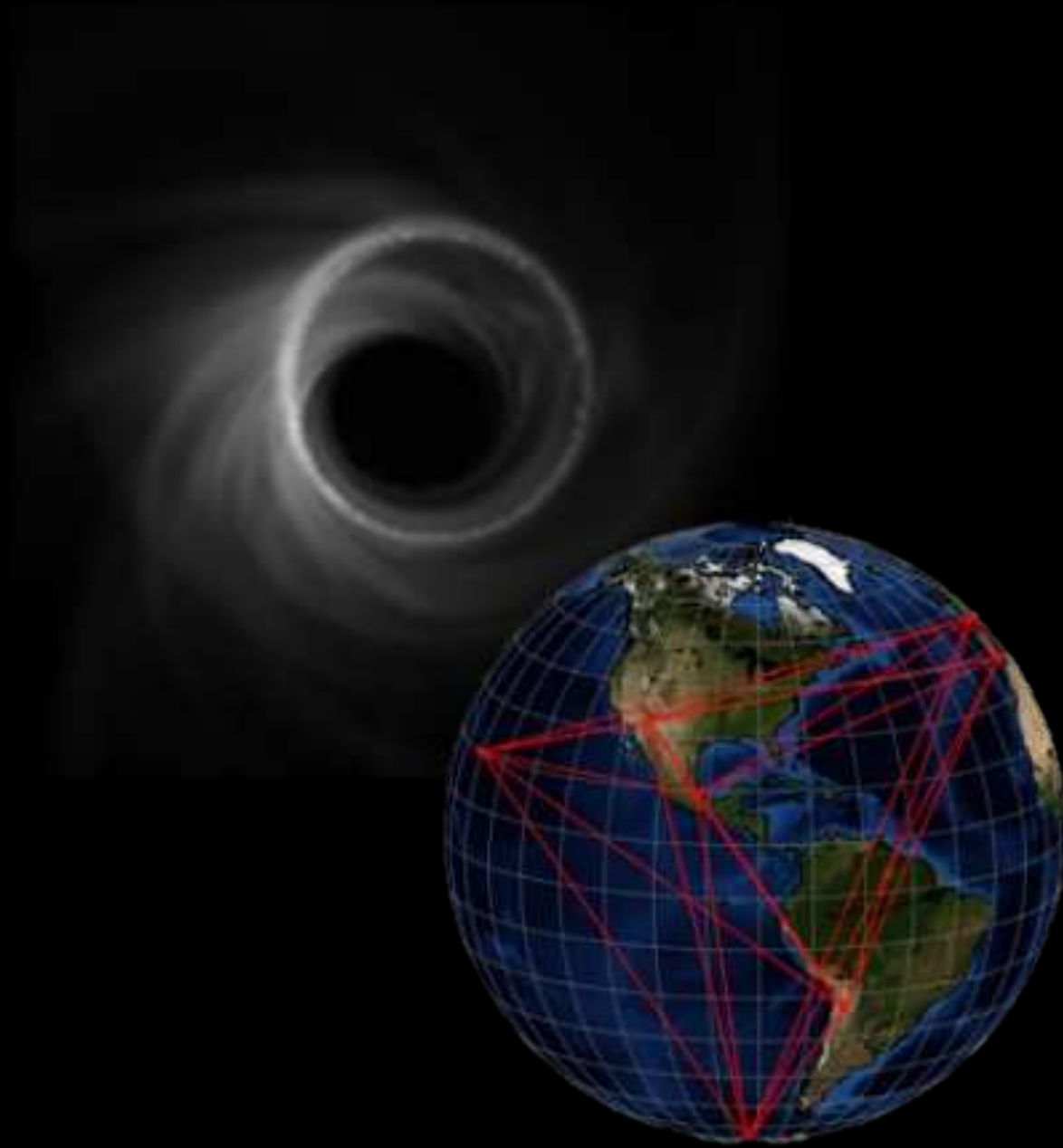
200+ researchers

20+ institutions

1 black hole image

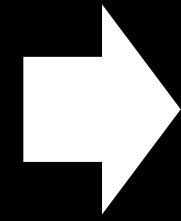
One goal, one global team.

How It works

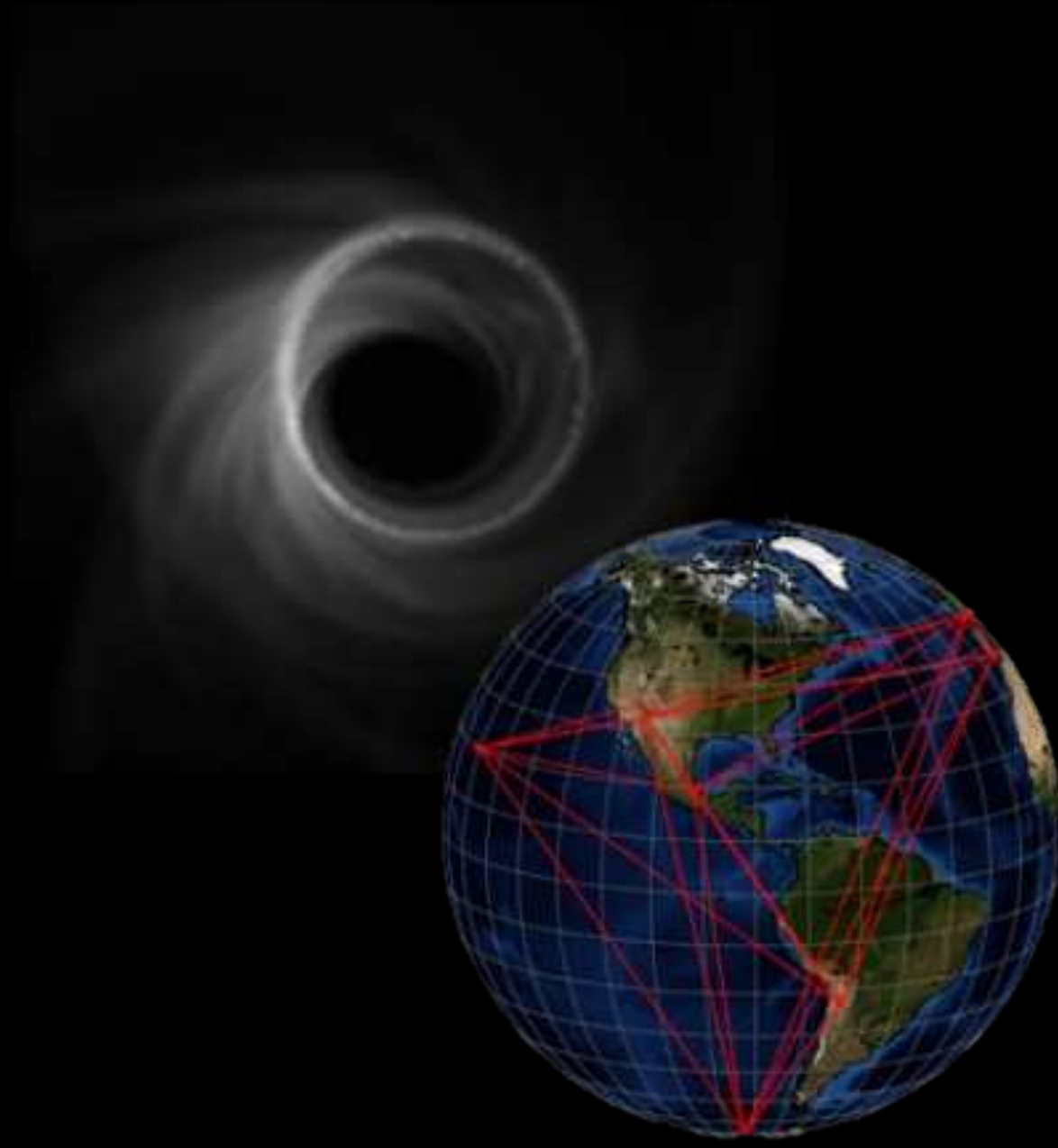


Collecting information
with telescopes

Reverse
conversion

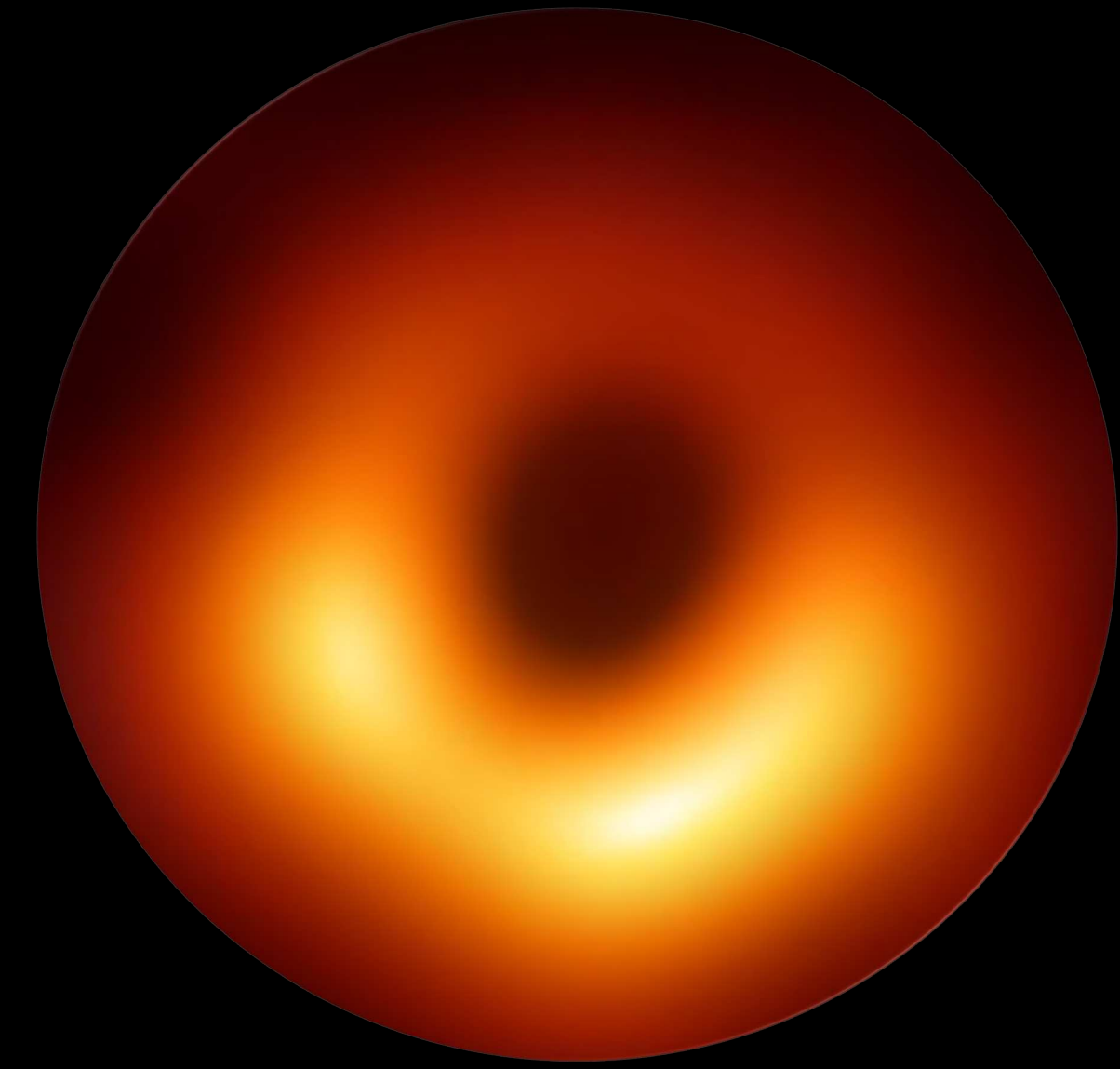


How It works



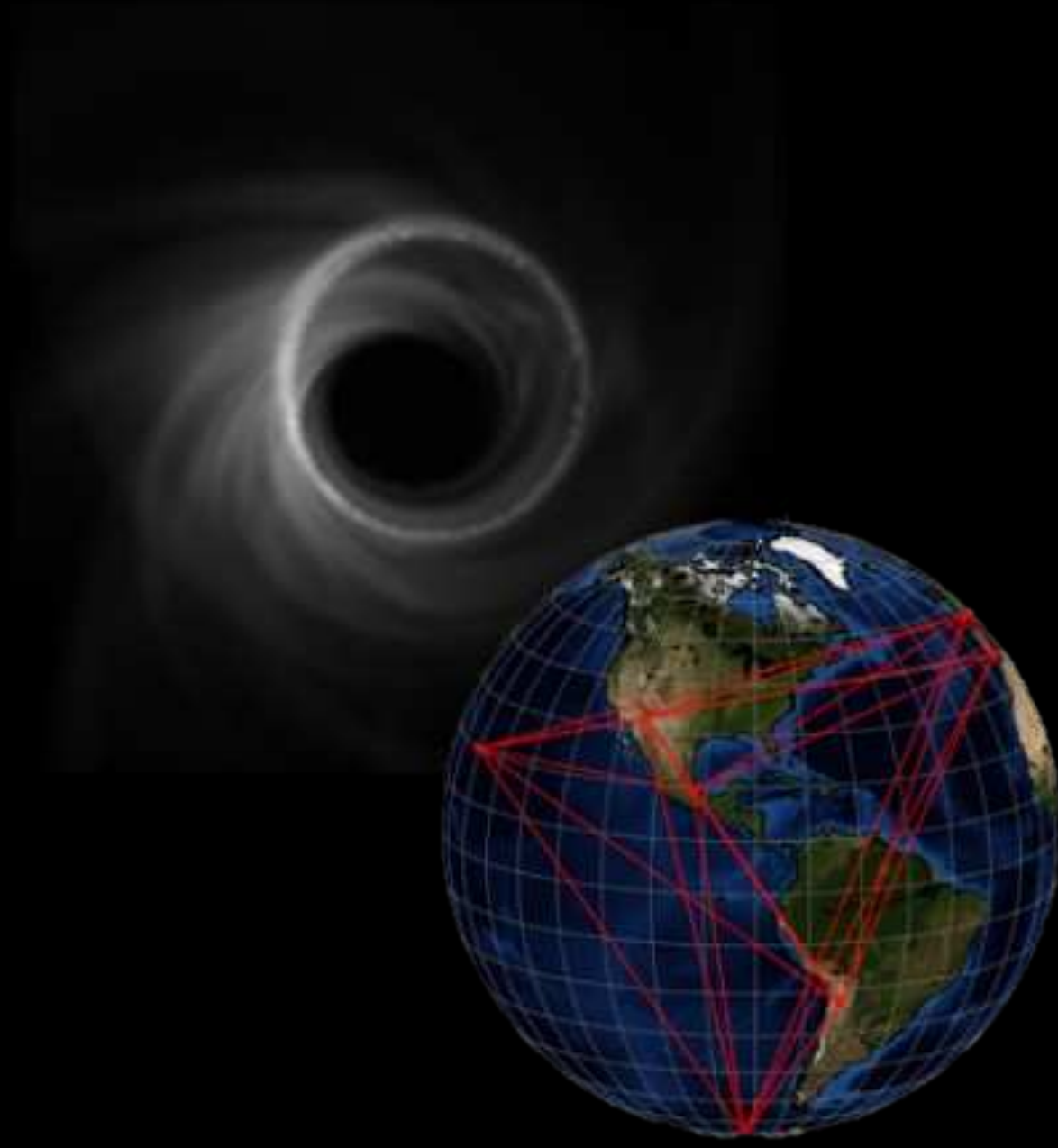
Collecting information
with telescopes

Reverse
conversion



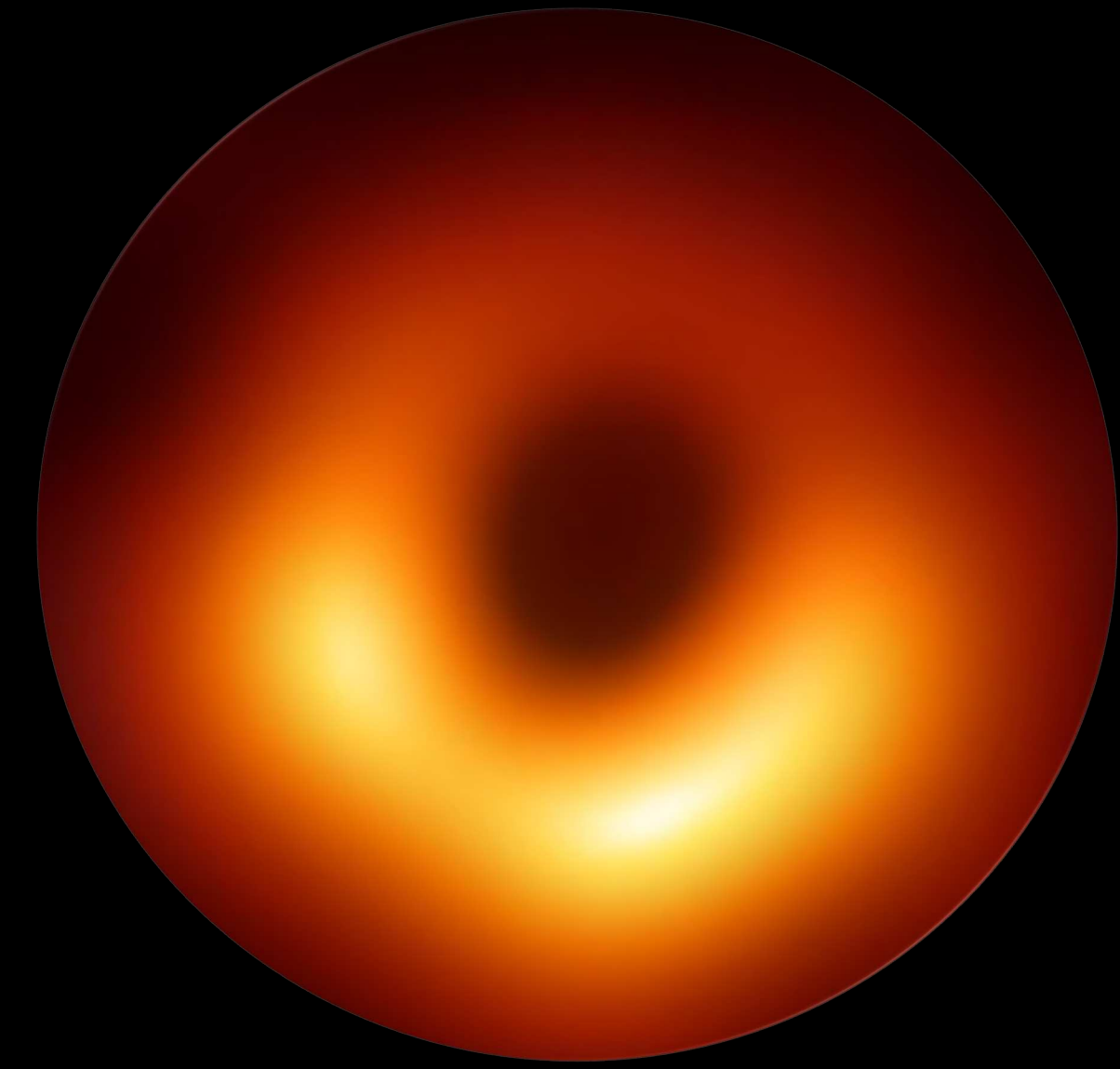
Guess the blackhole image

How It works



Collecting information
with telescopes

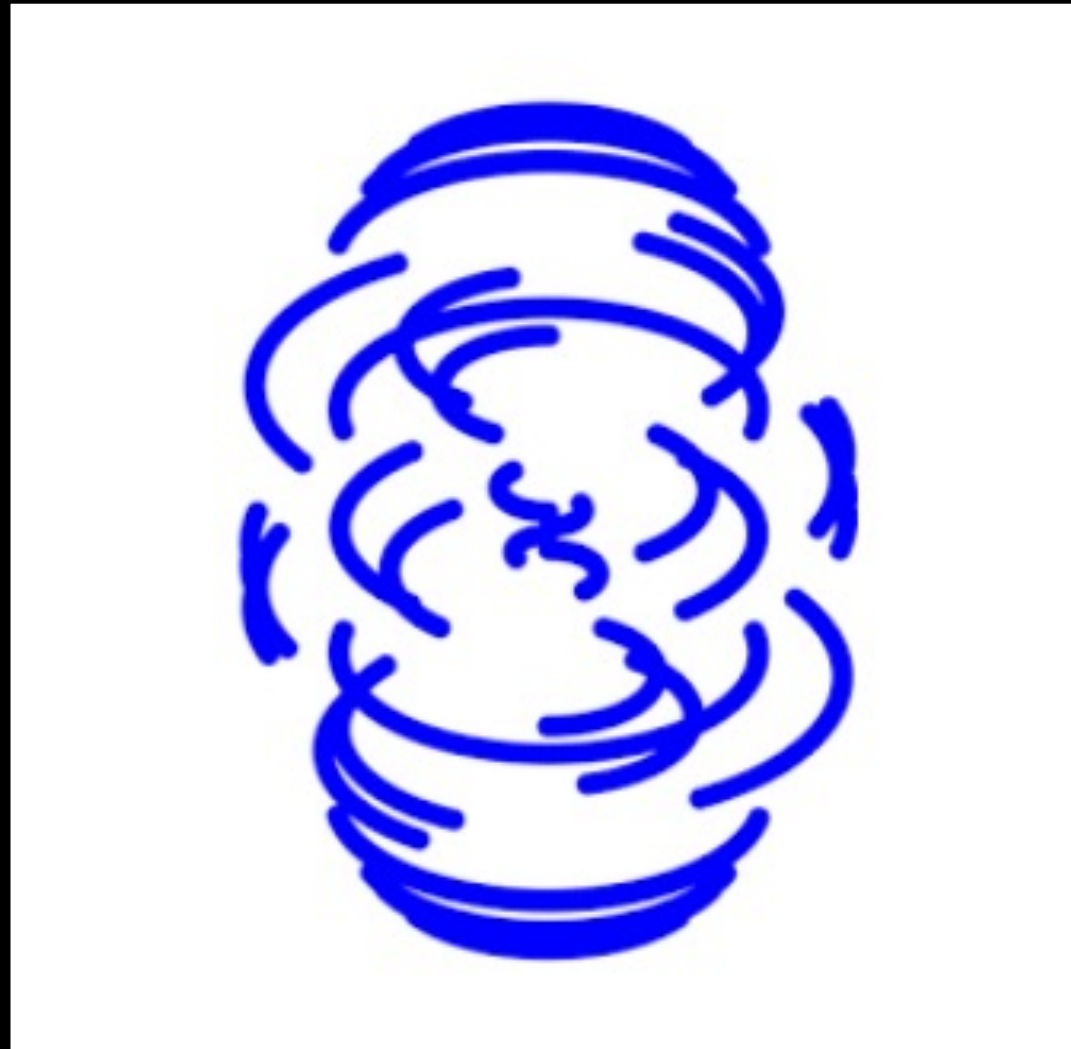
Reverse
conversion



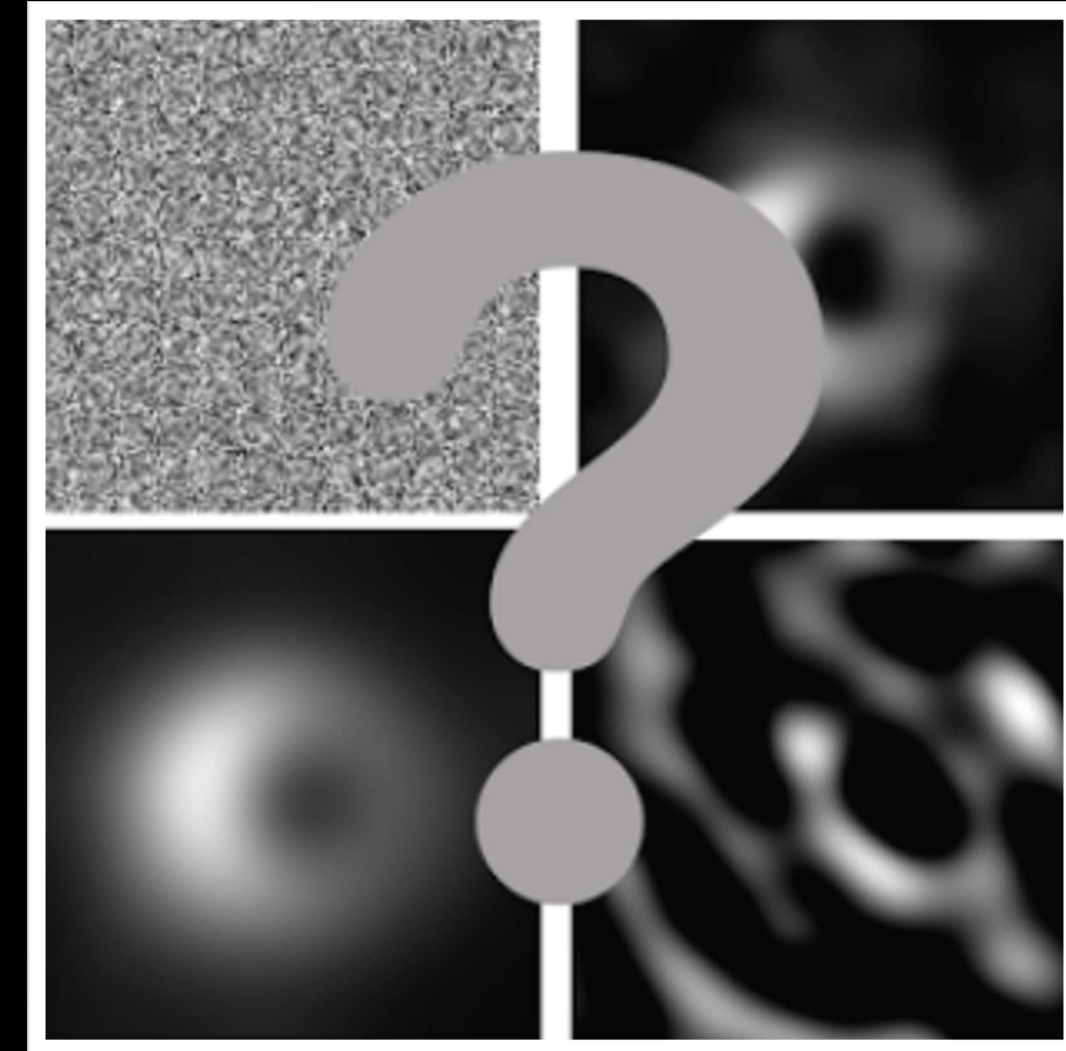
Guess the blackhole image

How It works

Reverse conversion



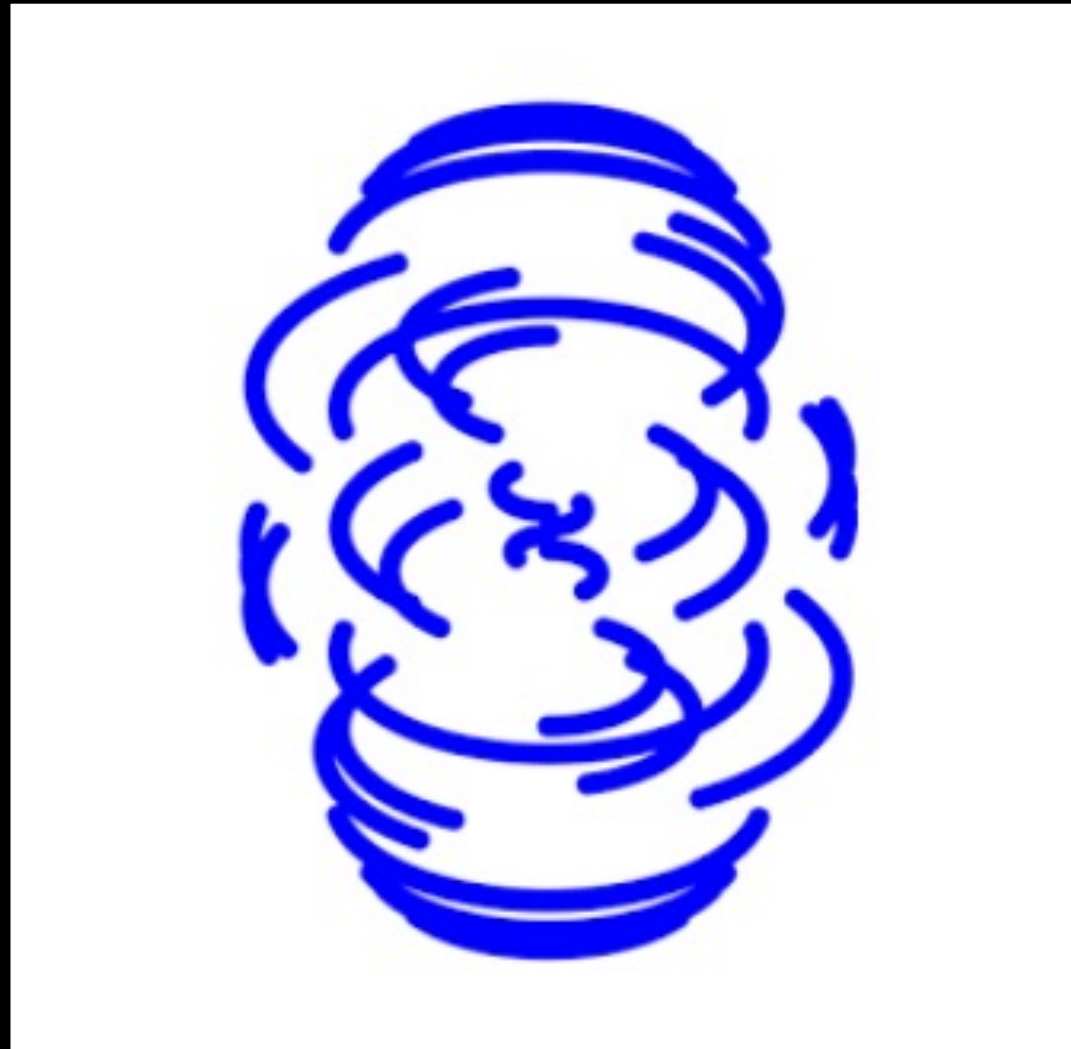
Measurement



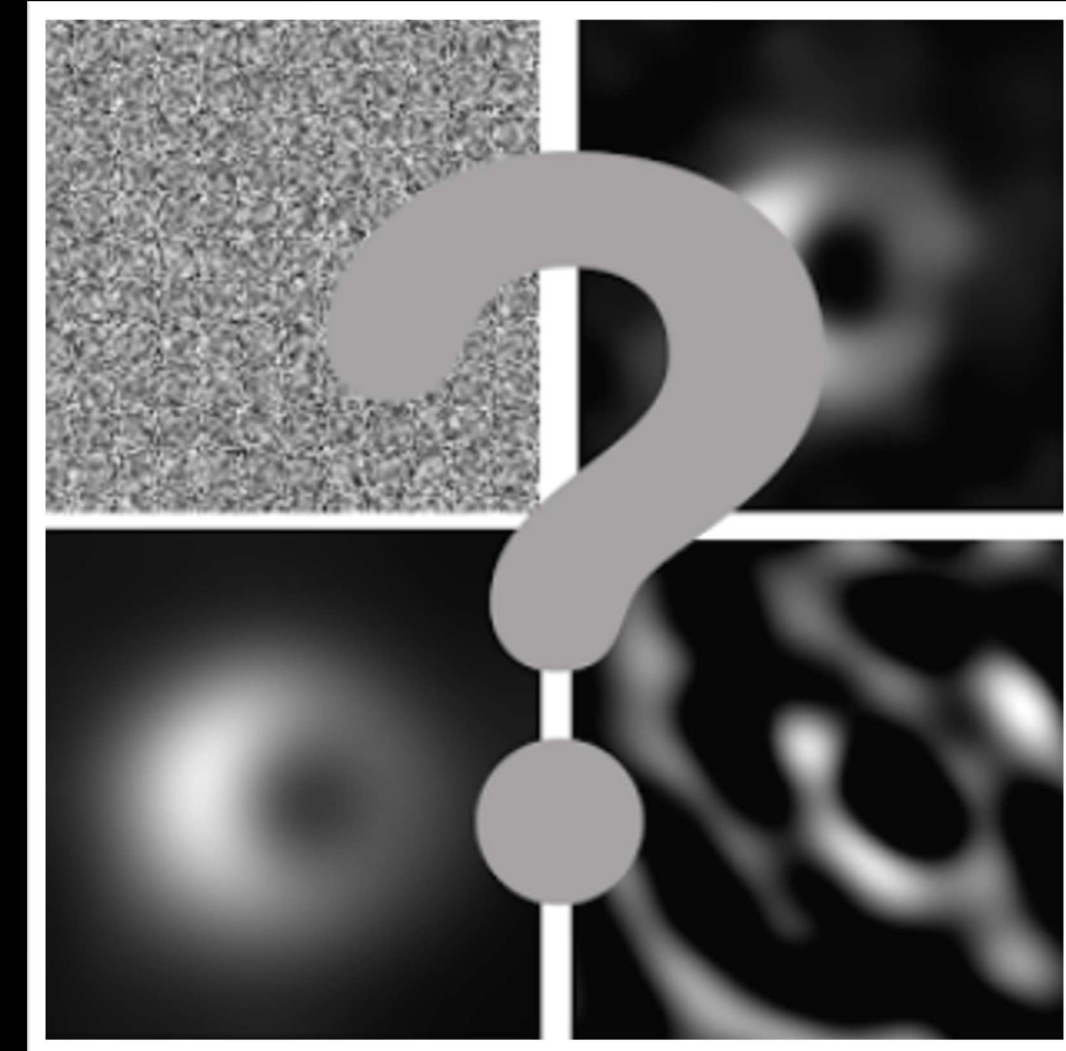
Infinite Number of Possibilities

How It works

Reverse conversion



Measurement

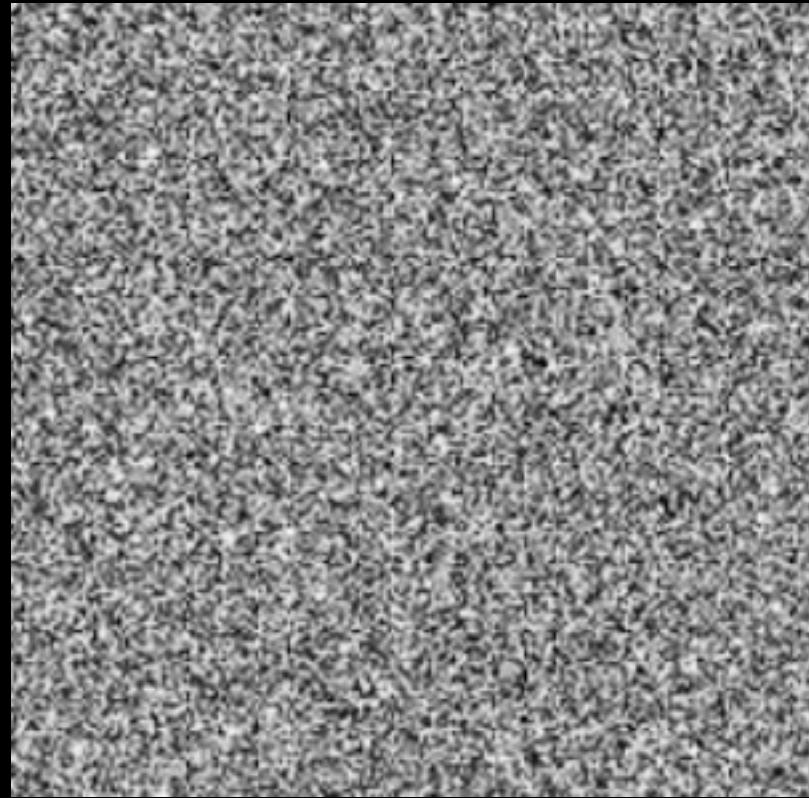


Infinite Number of Possibilities

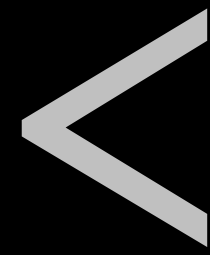
Significant data loss increases uncertainty,
making true images harder to distinguish.

How It works

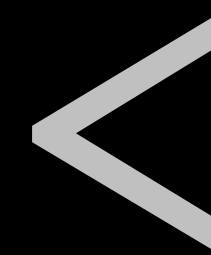
Reverse conversion



Unlikely



More Likely



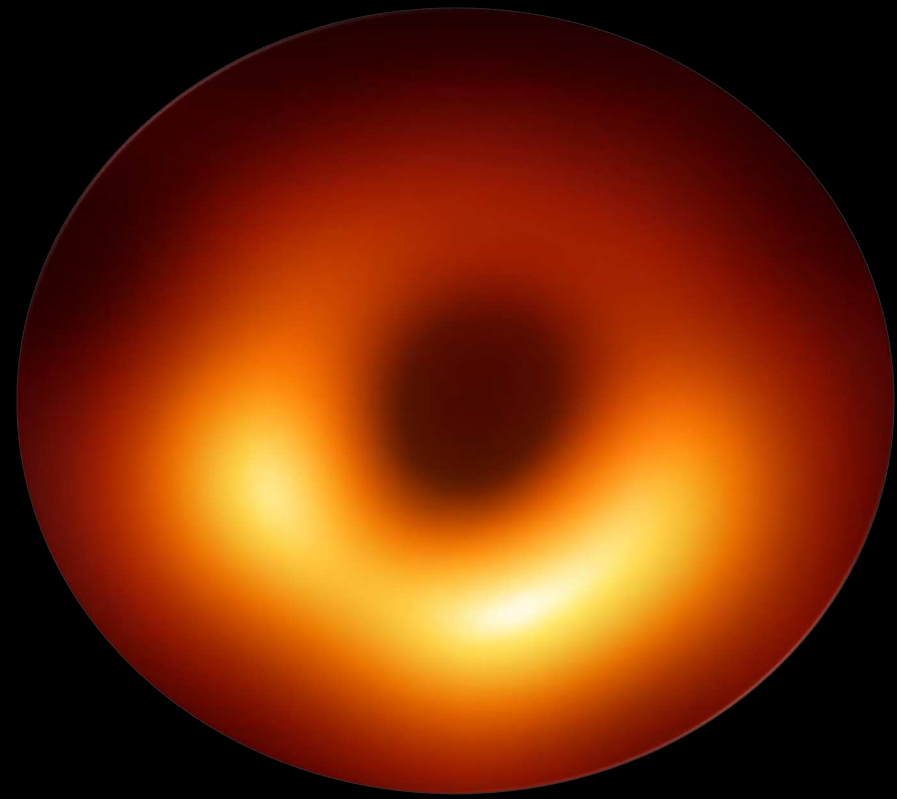
Very Likely

We rank all possible images that fit the data by how plausible they appear and select the most reasonable one.

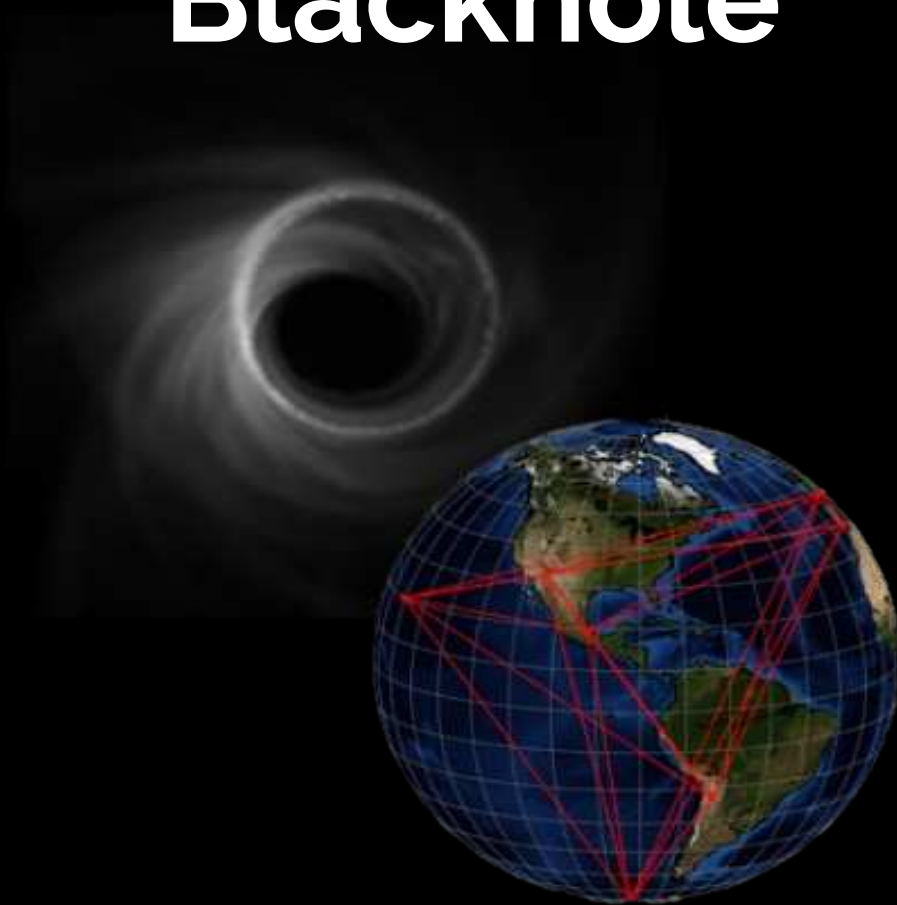
KSASF Science Competition

Just like the EHT, our activity also relies on teamwork
to reconstruct an invisible target.

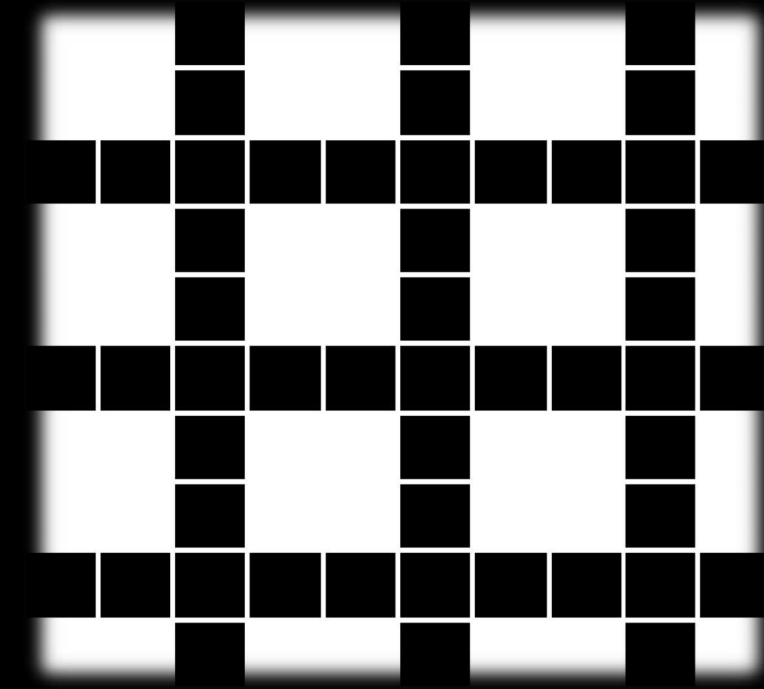
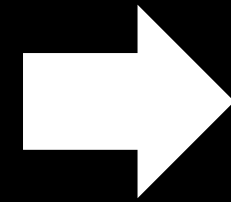
For activity



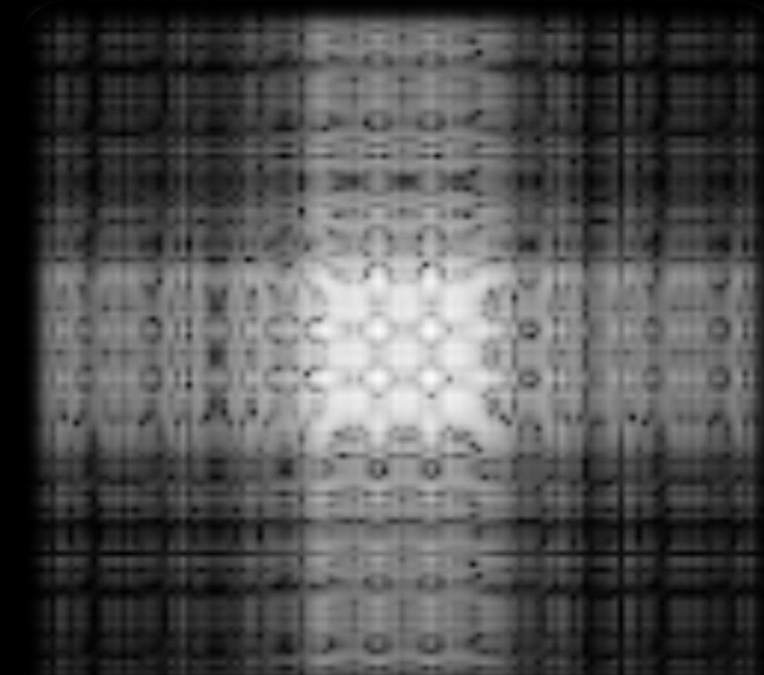
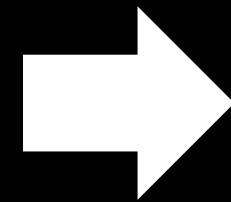
Blackhole



**Collecting
information**

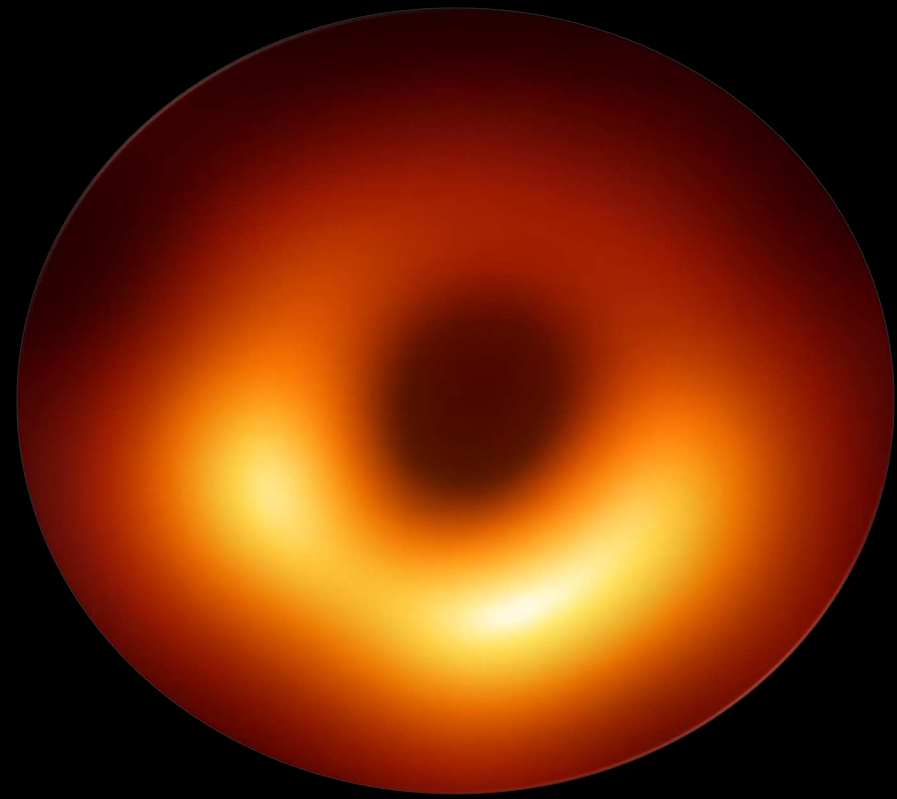


Slit

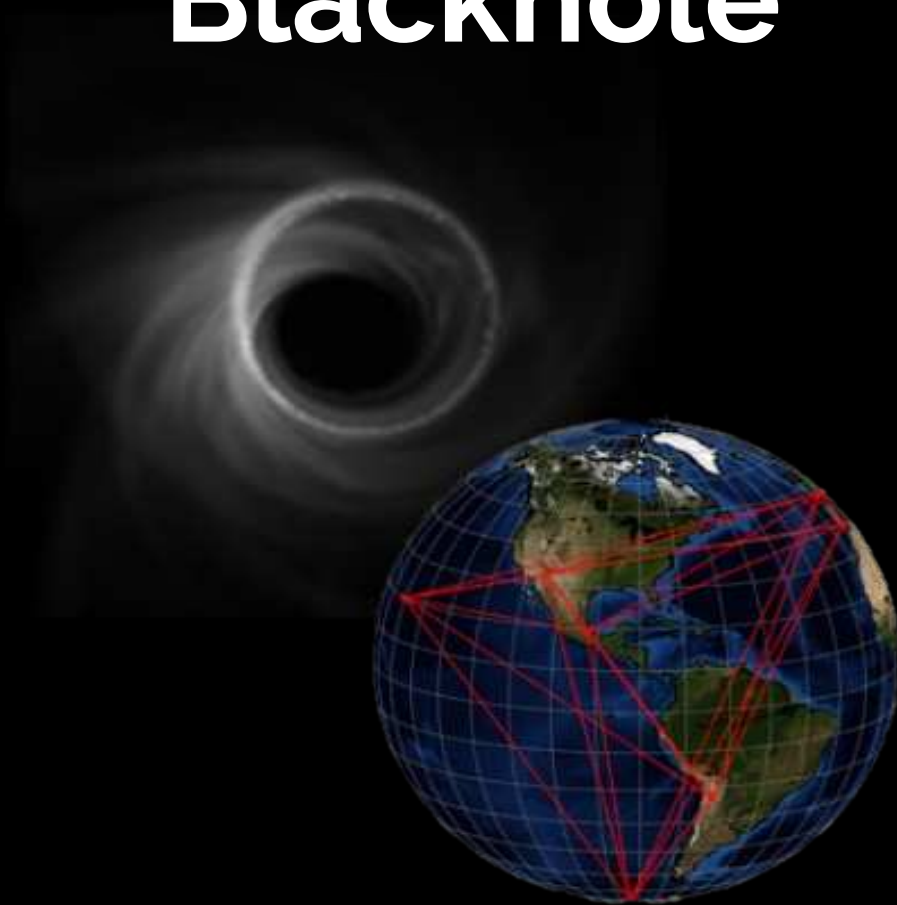


**Diffraction
pattern**

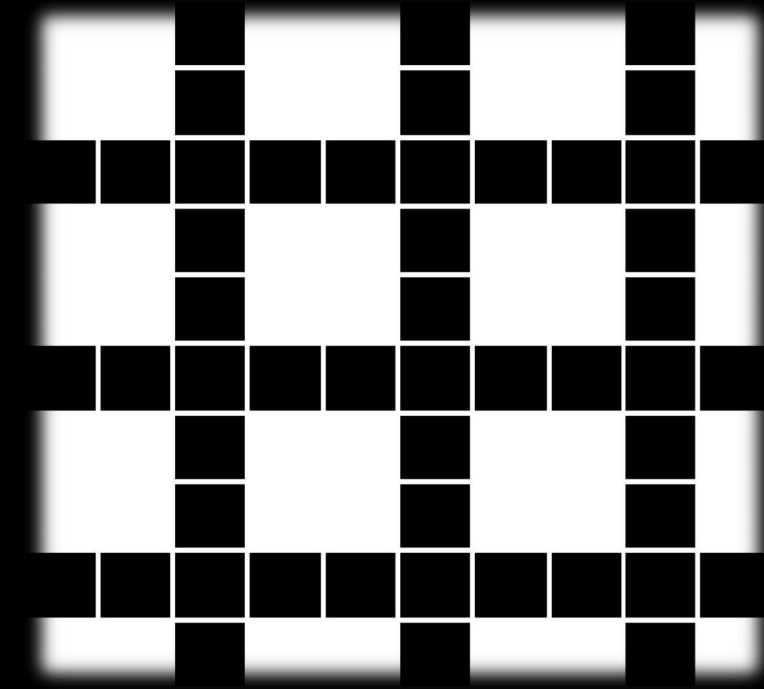
For activity



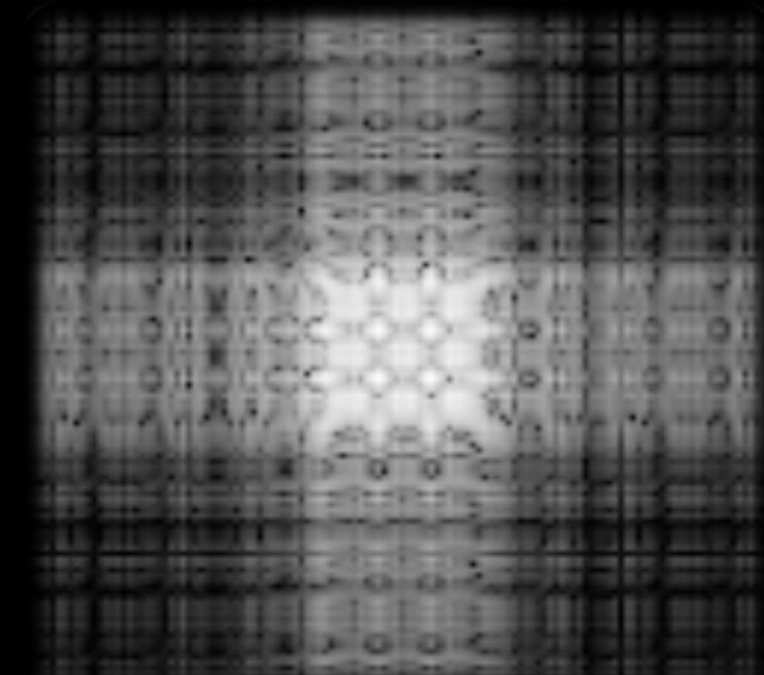
Blackhole



**Collecting
information**

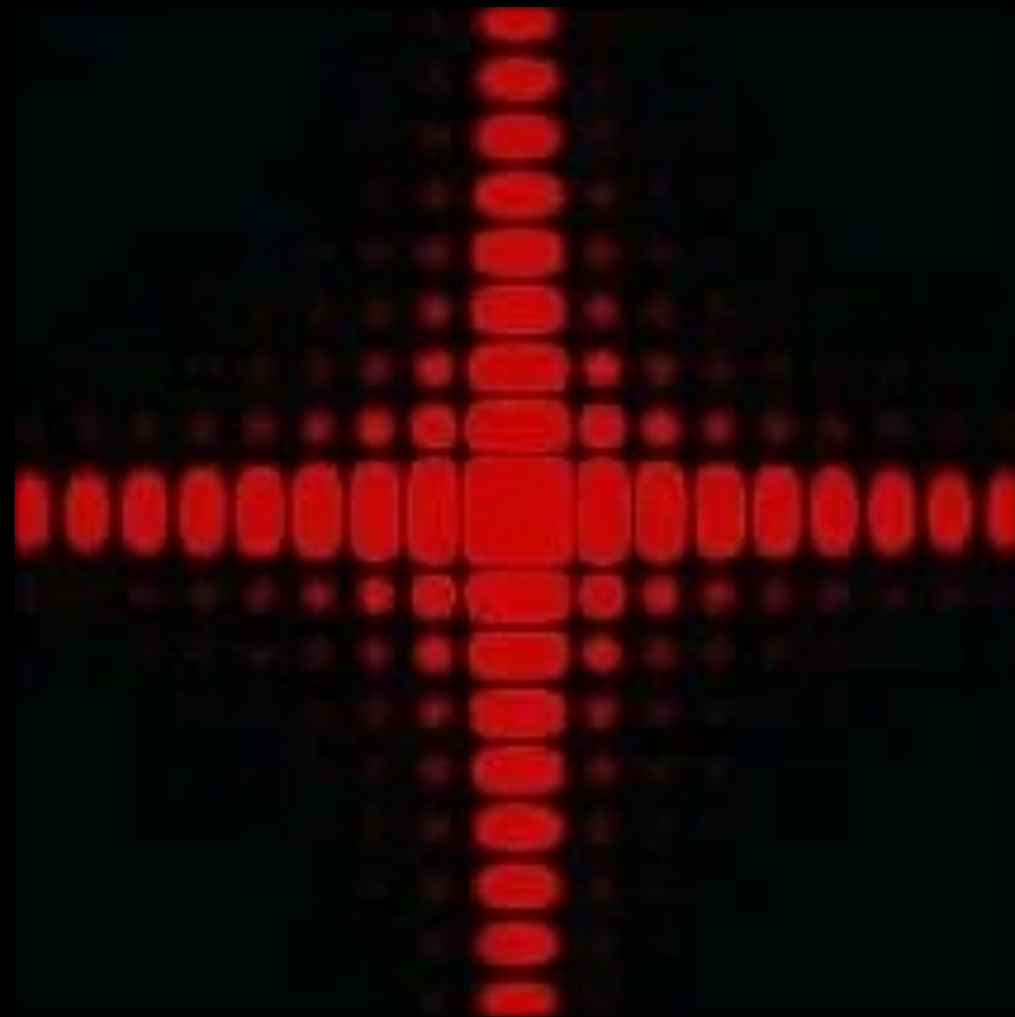


Slit



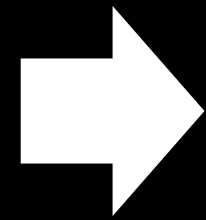
**Diffraction
pattern**

How Activity works

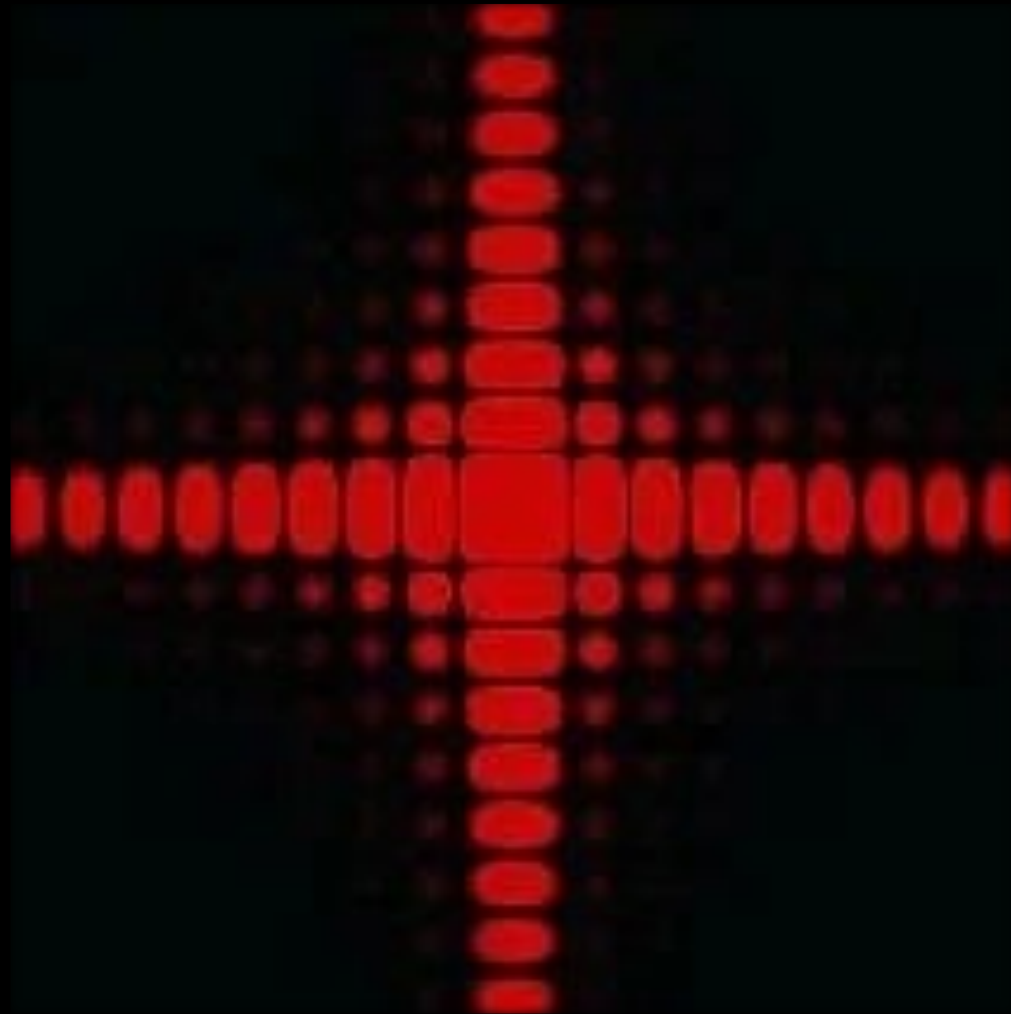


Collecting diffraction
pattern at floor

reverse
conversion

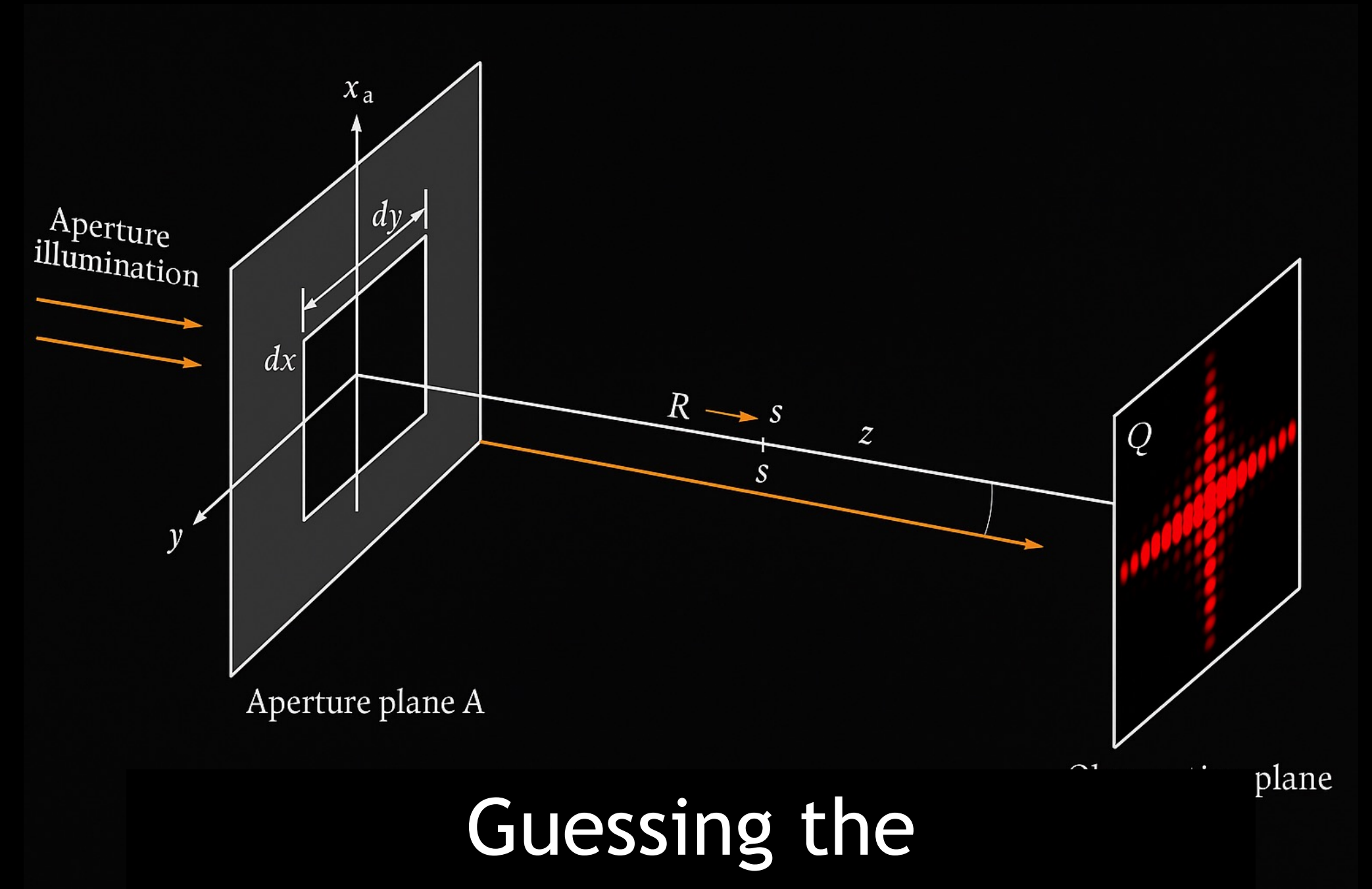


How Activity works



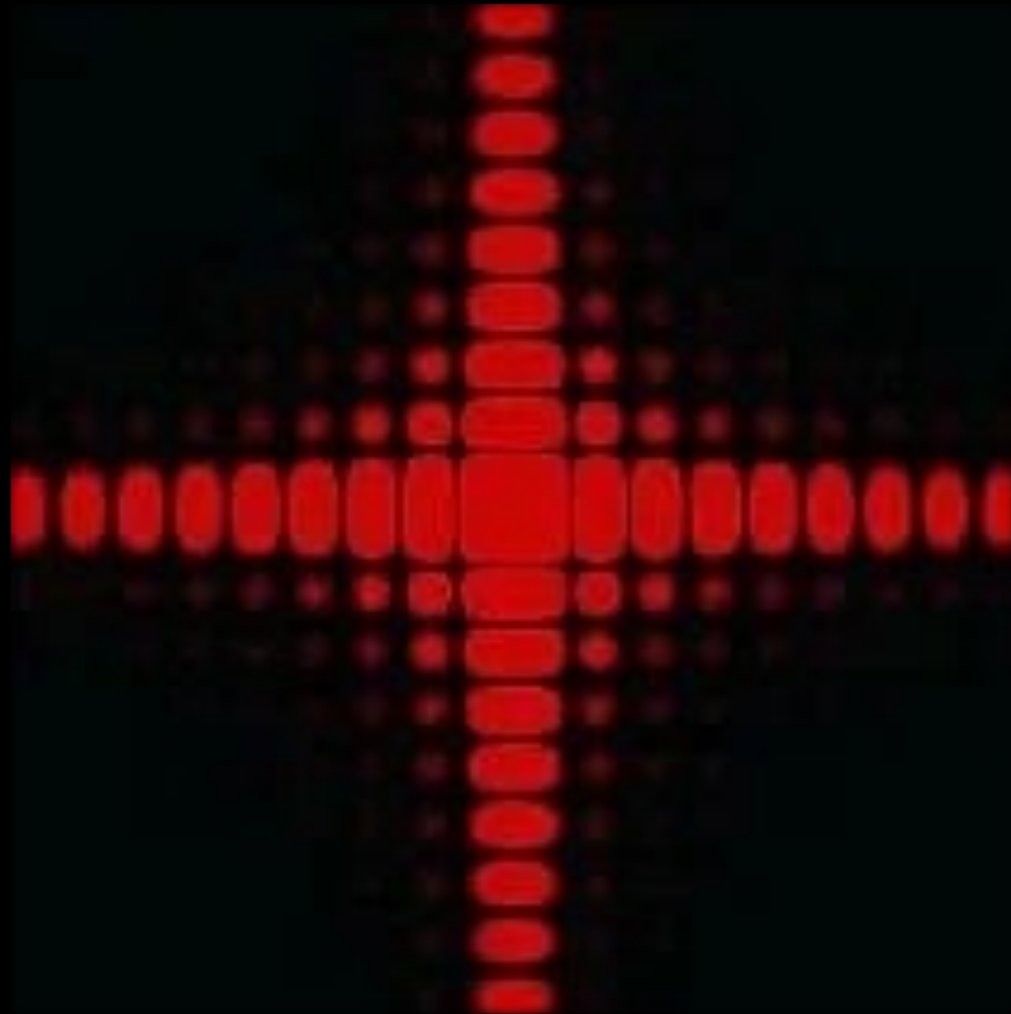
Collecting diffraction
pattern at floor

reverse
conversion



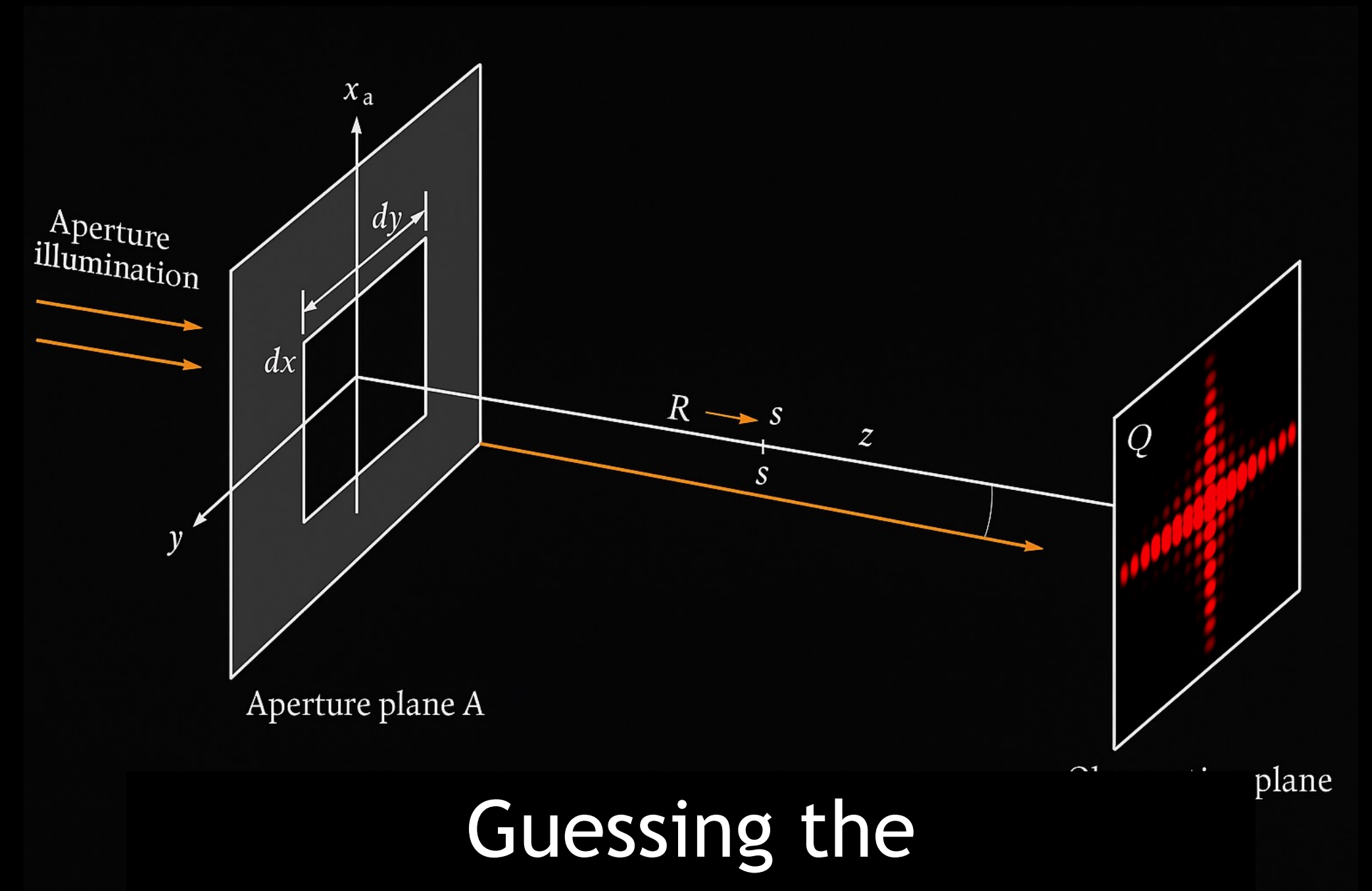
Guessing the
original slit shape

How Activity works



Collecting diffraction
pattern at floor

reverse
conversion



Guessing the
original slit shape

Experiencing EHT at KSA

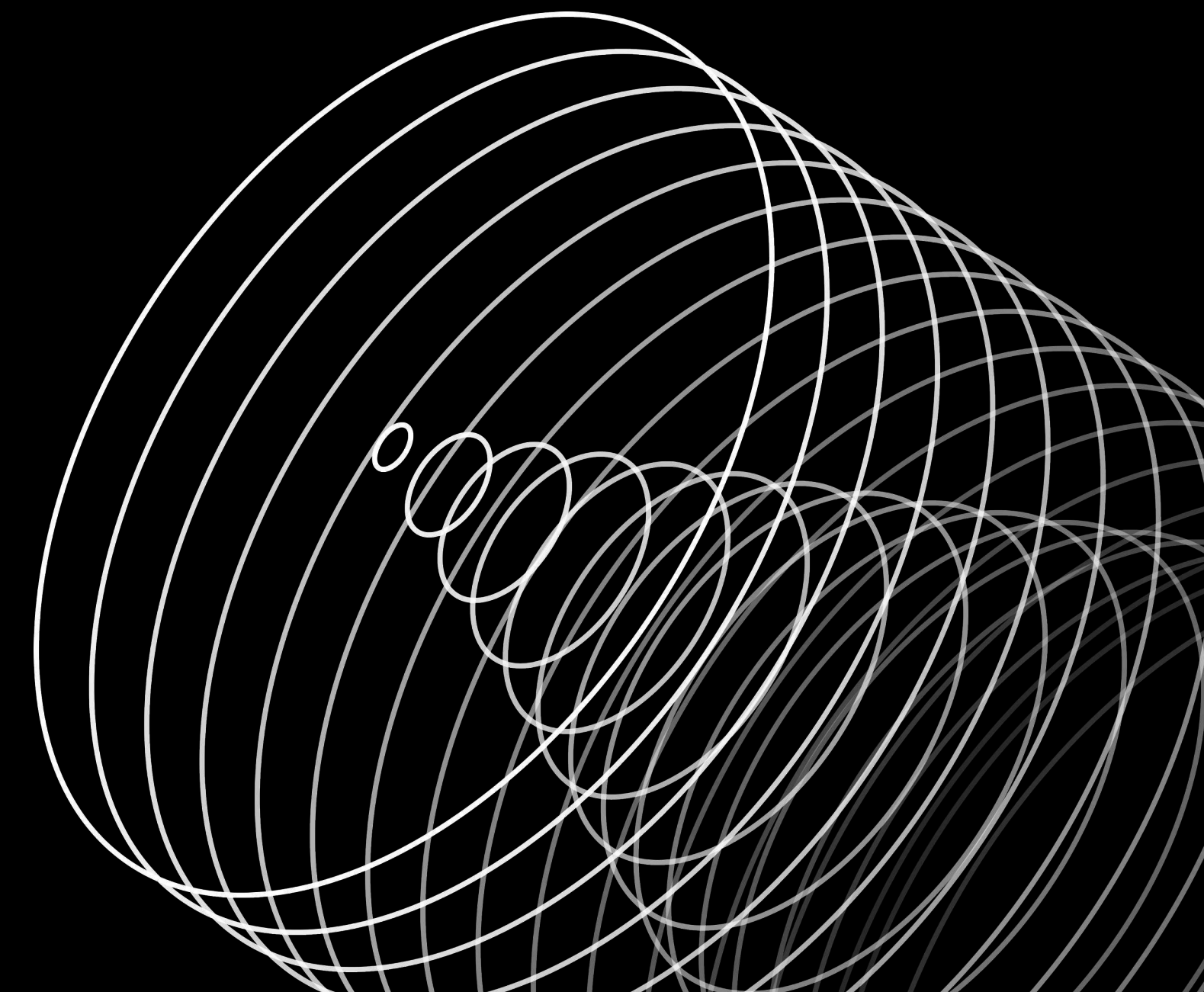
Time table

α -phase : Uploading Photos (~09:50)

β -phase : Problem Solving (~10:20)

γ -phase : Answer Submit (~11:10)

δ -phase : Selecting Best Answer (~11:50)



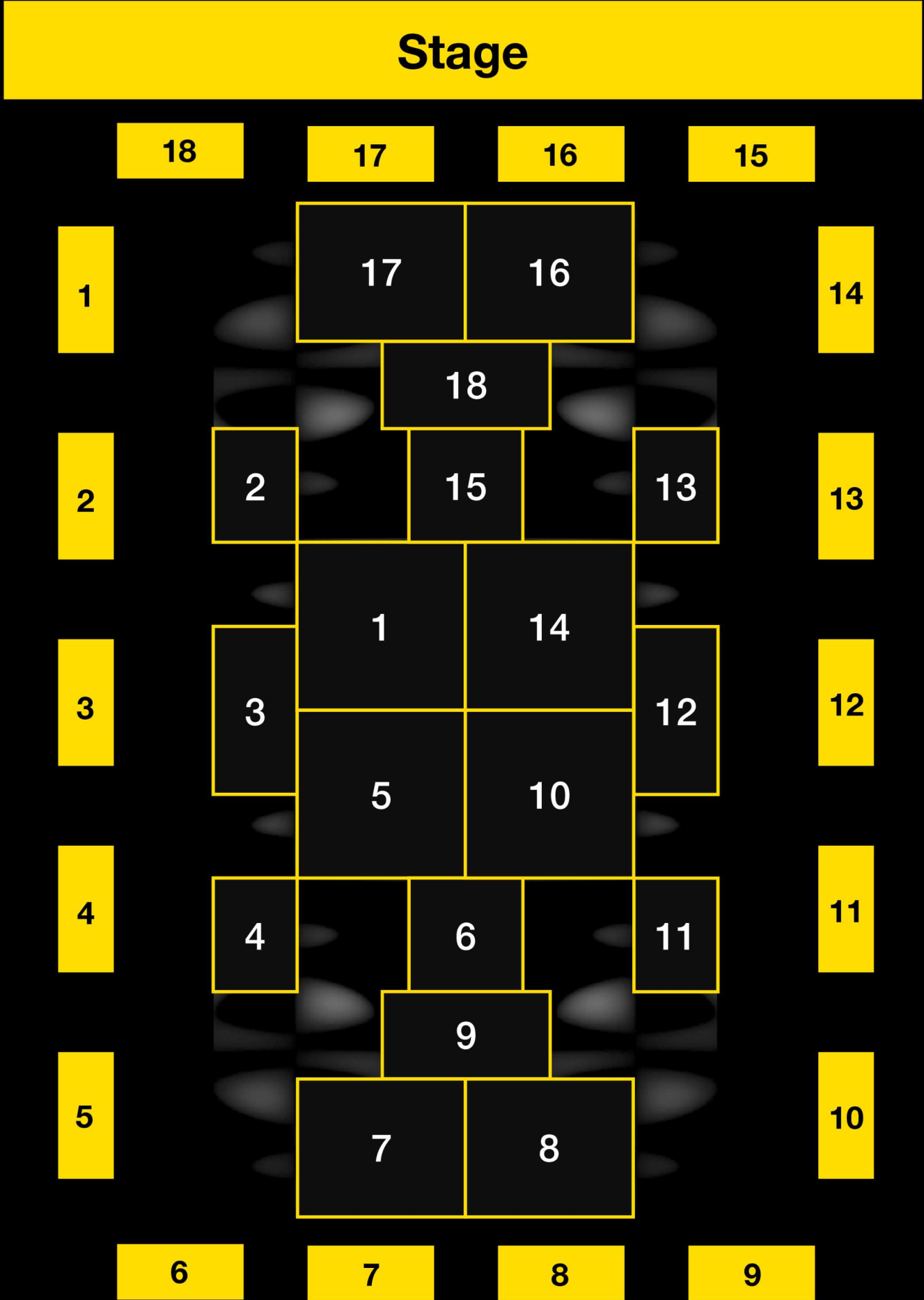
α-phase

Uploading Photos

β-phase : Problem Solving (~10:20)

γ-phase : Answer Submit (~11:10)

δ-phase : Selecting Best Answer (~11:50)



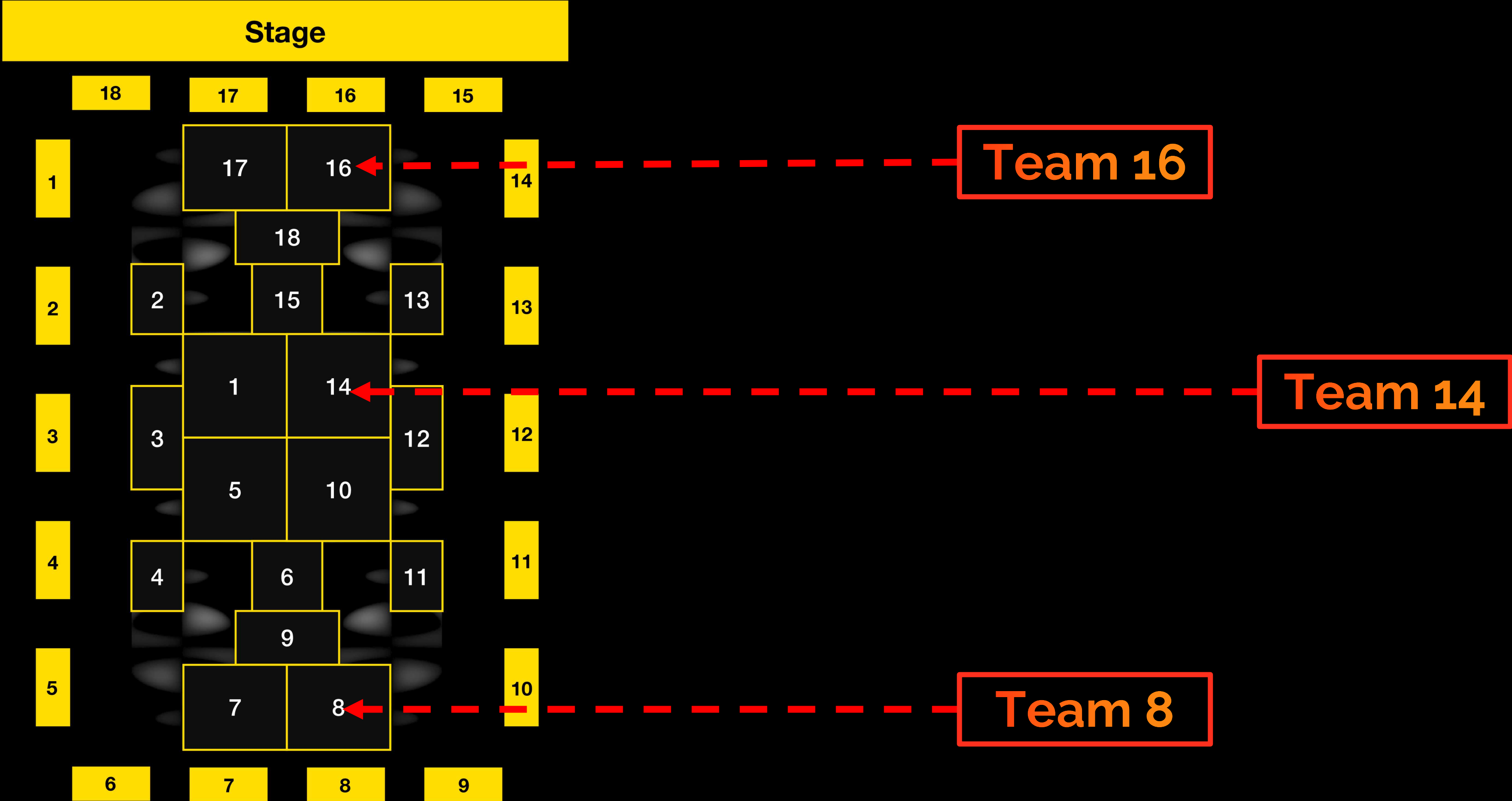
α-phase

Uploading Photos

β-phase : Problem Solving (~10:20)

γ-phase : Answer Submit (~11:10)

δ-phase : Selecting Best Answer (~11:50)



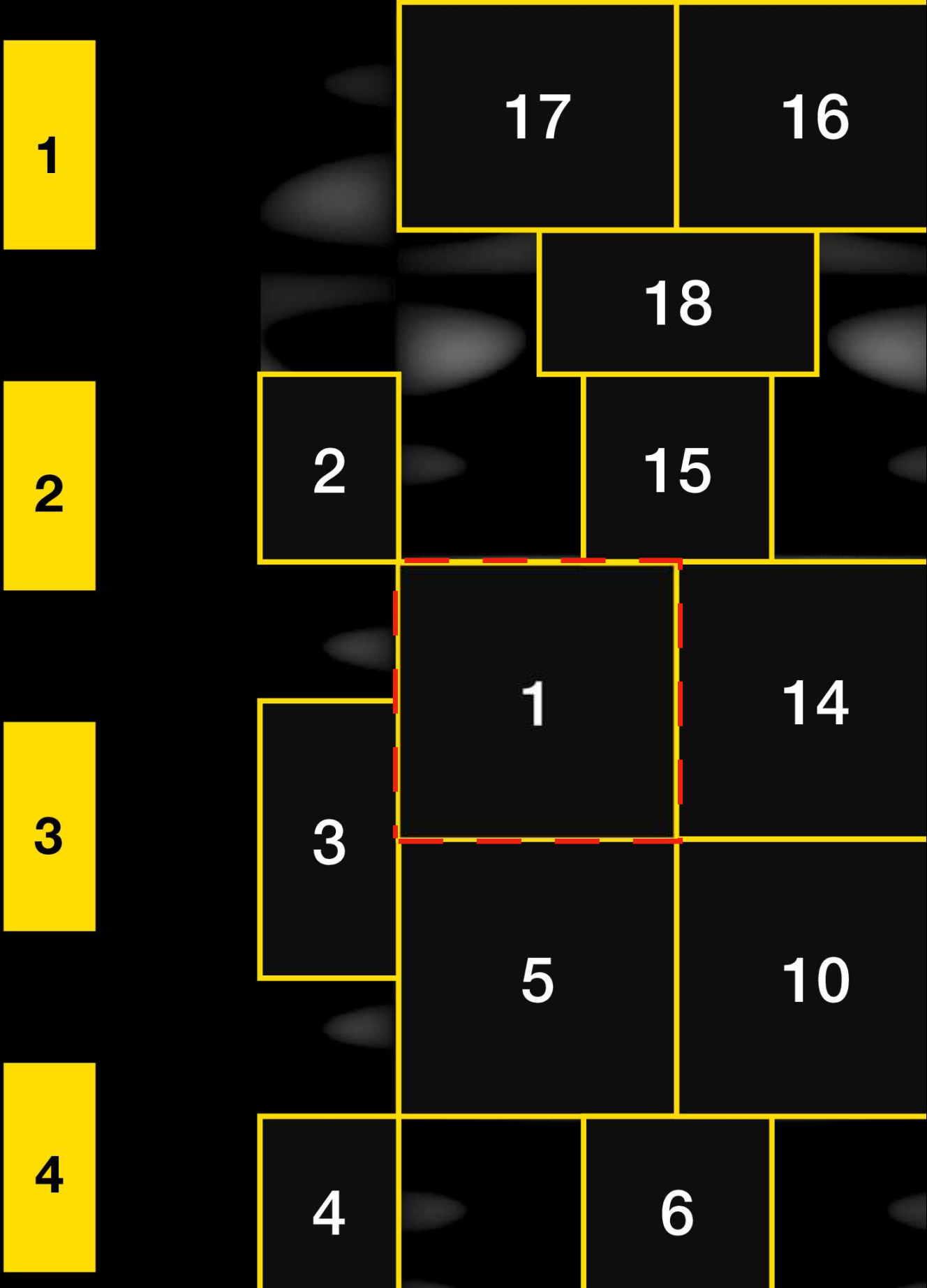
α -phase

Uploading Photos

β -phase : Problem Solving (~10:20)

γ -phase : Answer Submit (~11:10)

δ -phase : Selecting Best Answer (~11:50)



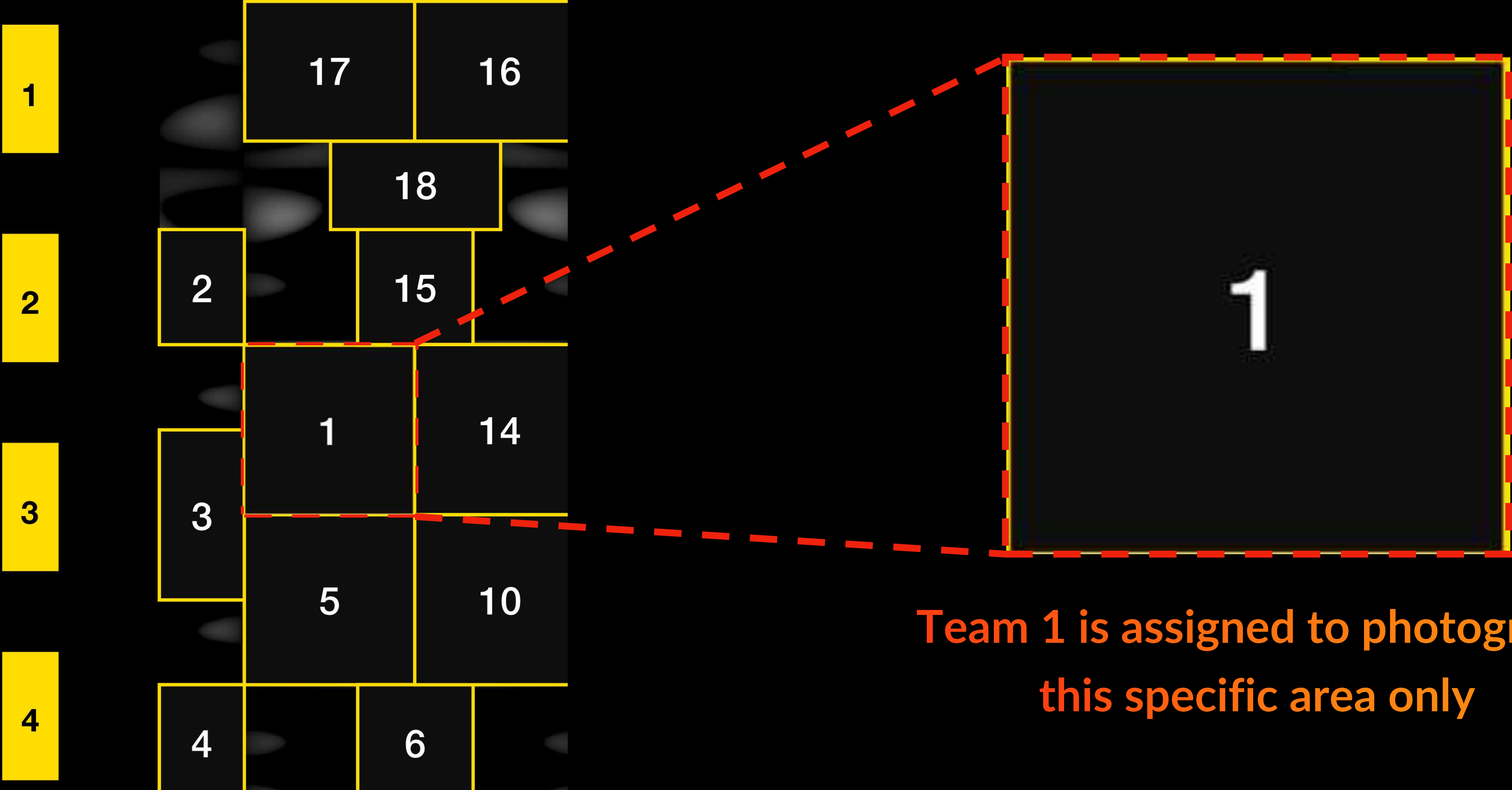
α -phase

Uploading Photos

β -phase : Problem Solving (~10:20)

γ -phase : Answer Submit (~11:10)

δ -phase : Selecting Best Answer (~11:50)



Team 1 is assigned to photograph
this specific area only

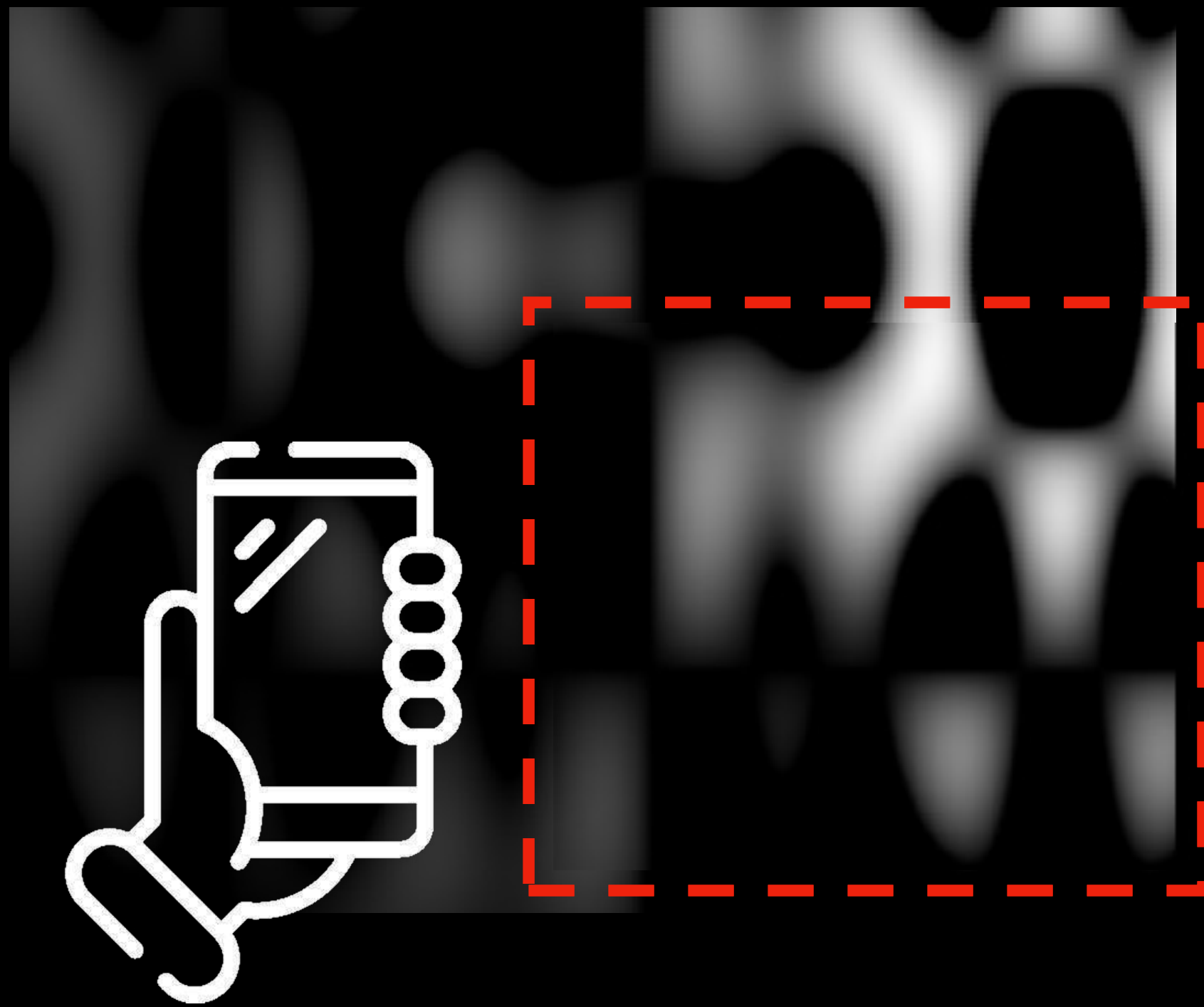
α -phase

Uploading Photos

β -phase : Problem Solving (~10:20)

γ -phase : Answer Submit (~11:10)

δ -phase : Selecting Best Answer (~11:50)



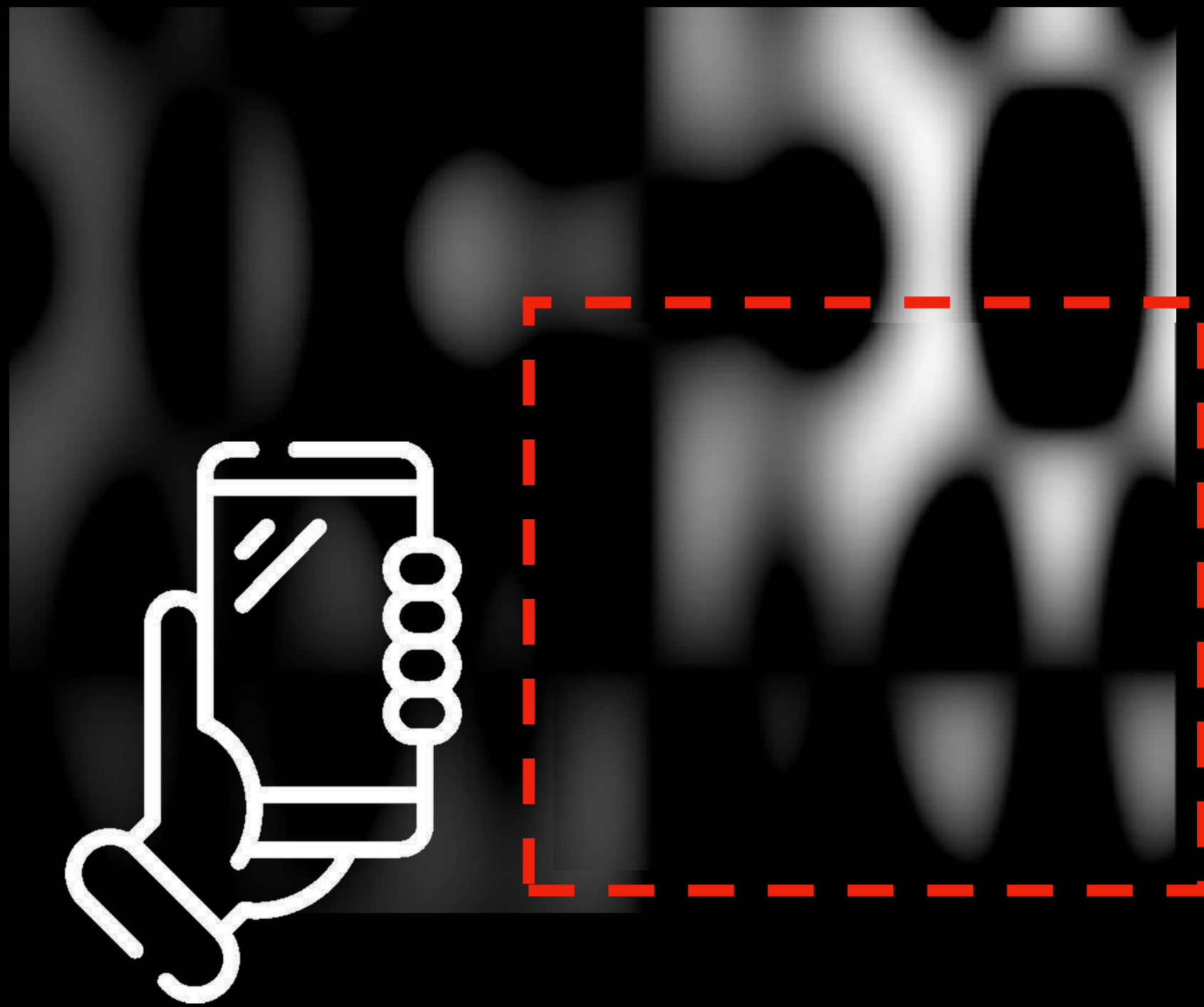
α -phase

Uploading Photos

β -phase : Problem Solving (~10:20)

γ -phase : Answer Submit (~11:10)

δ -phase : Selecting Best Answer (~11:50)



Capture the diffraction
pattern at floor

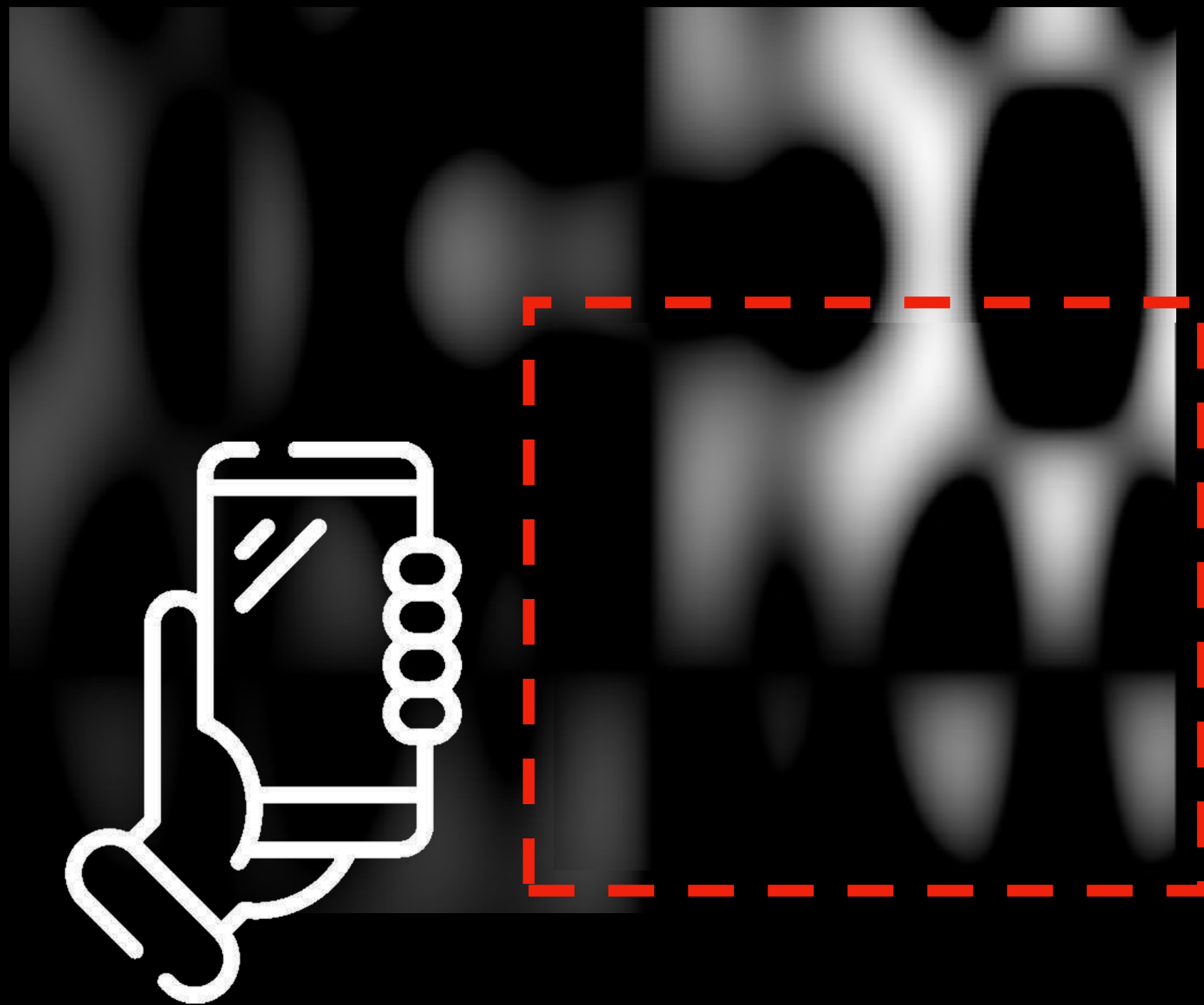
α -phase

Uploading Photos

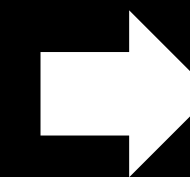
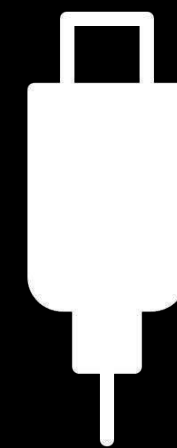
β -phase : Problem Solving (~10:20)

γ -phase : Answer Submit (~11:10)

δ -phase : Selecting Best Answer (~11:50)



Capture the diffraction pattern on the floor



If USB-C available

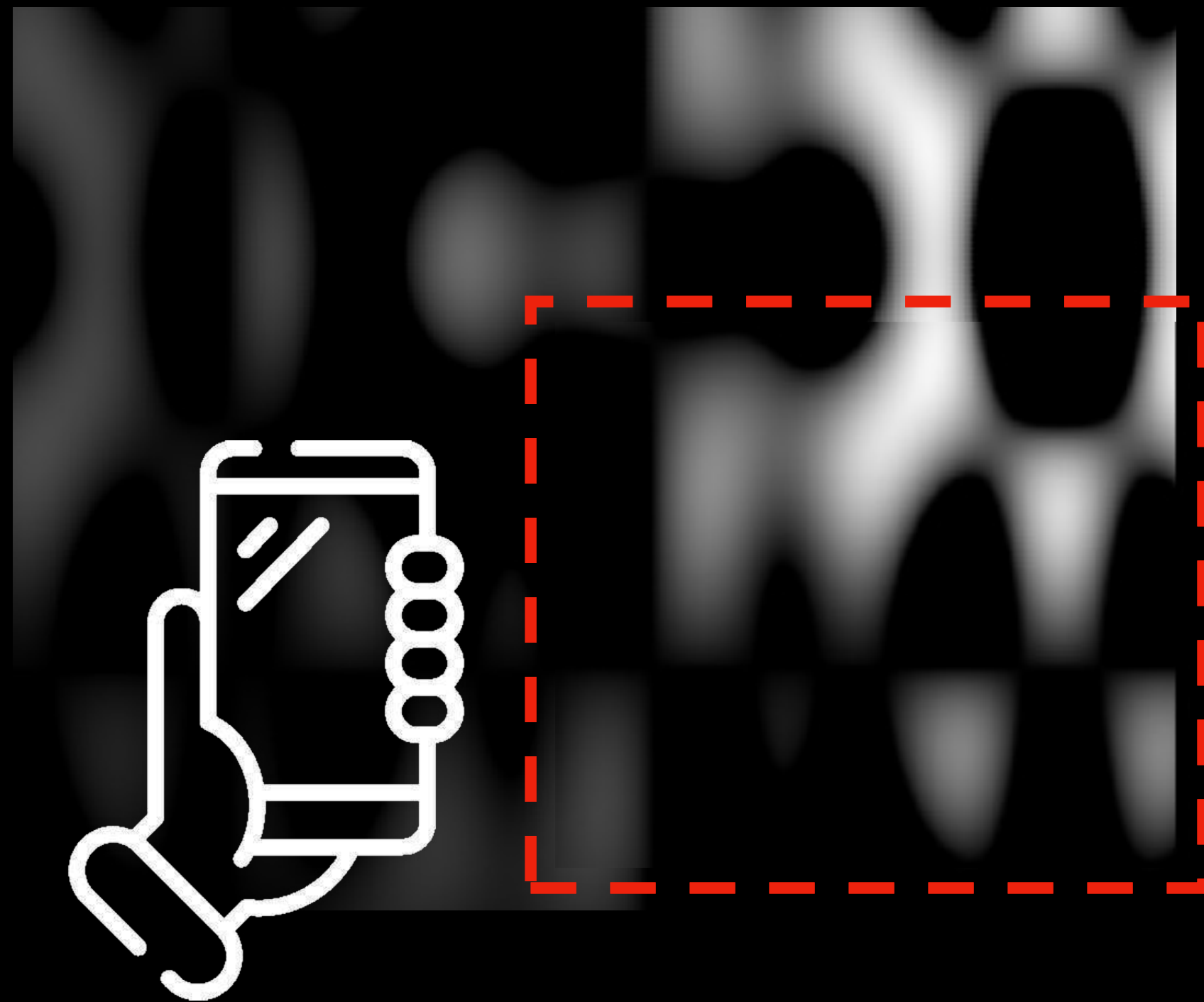
α -phase

Uploading Photos

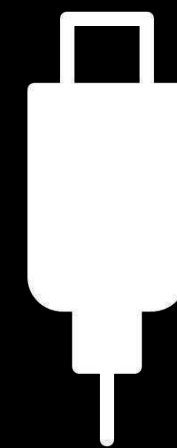
β -phase : Problem Solving (~10:20)

γ -phase : Answer Submit (~11:10)

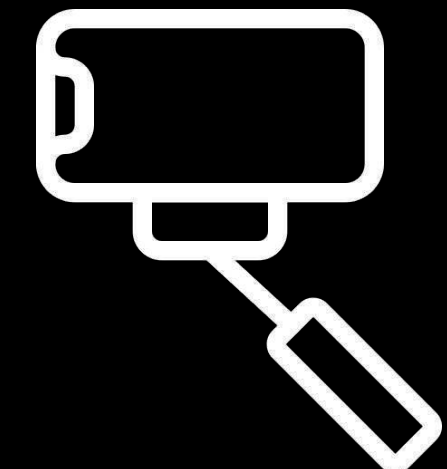
δ -phase : Selecting Best Answer (~11:50)



Capture the diffraction pattern on the floor



If USB-C available



Use selfie stick

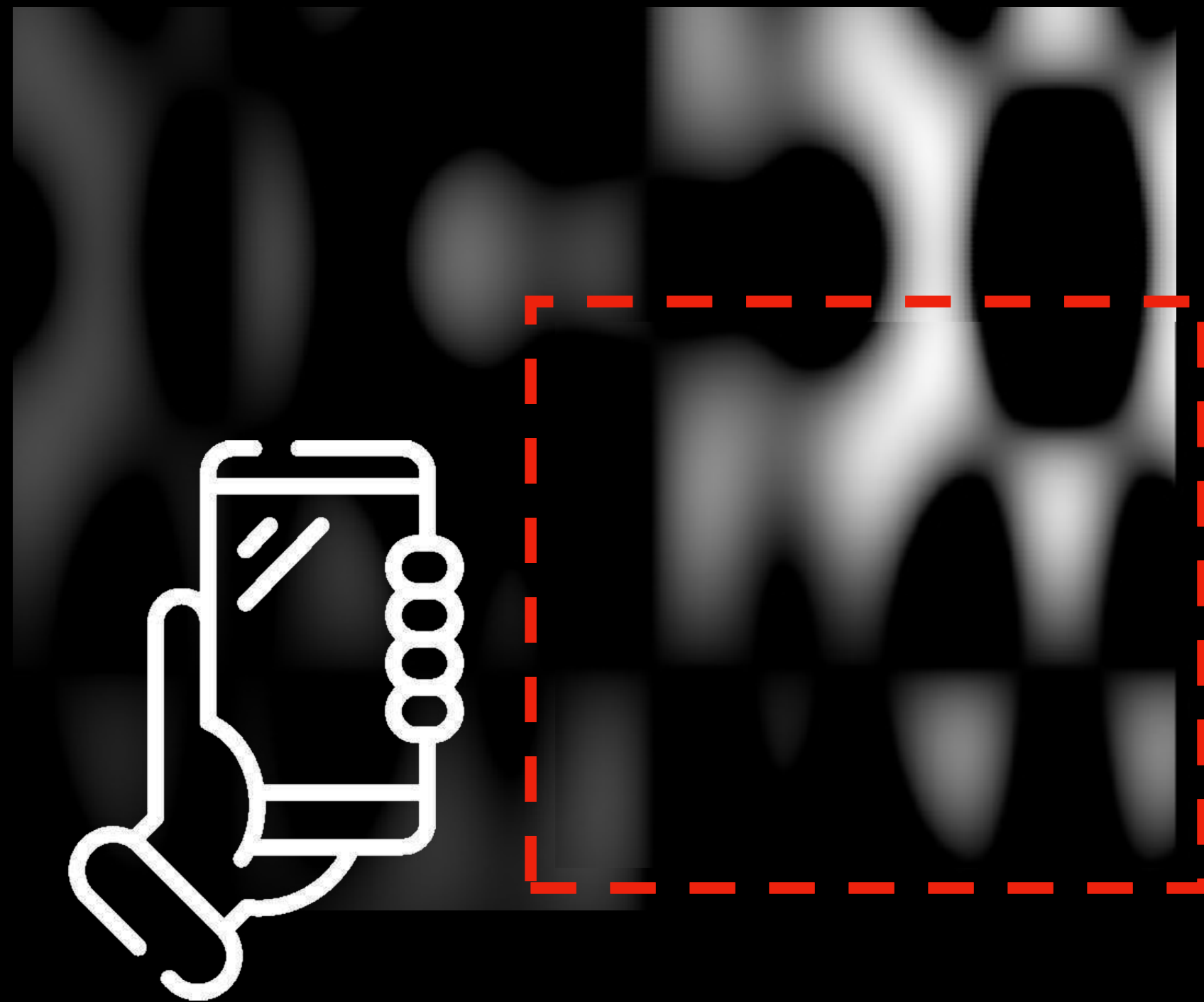
α -phase

Uploading Photos

β -phase : Problem Solving (~10:20)

γ -phase : Answer Submit (~11:10)

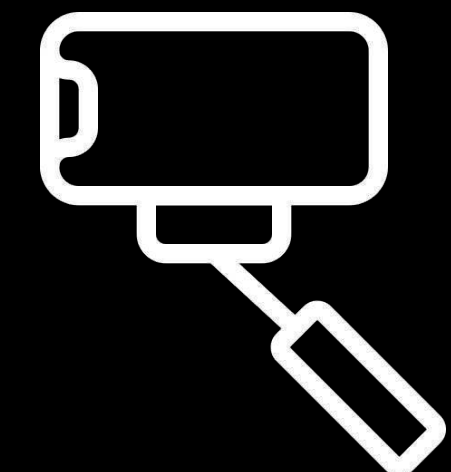
δ -phase : Selecting Best Answer (~11:50)



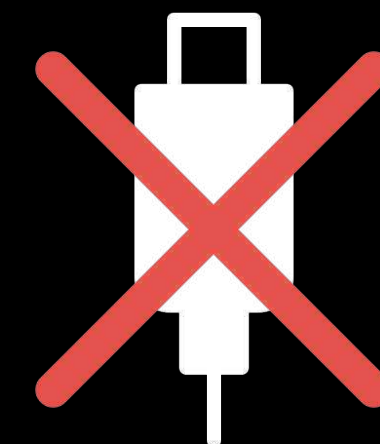
Capture the diffraction pattern on the floor



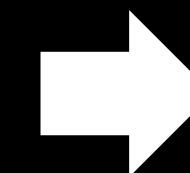
If USB-C available



Use selfie stick



If USB-C unavailable



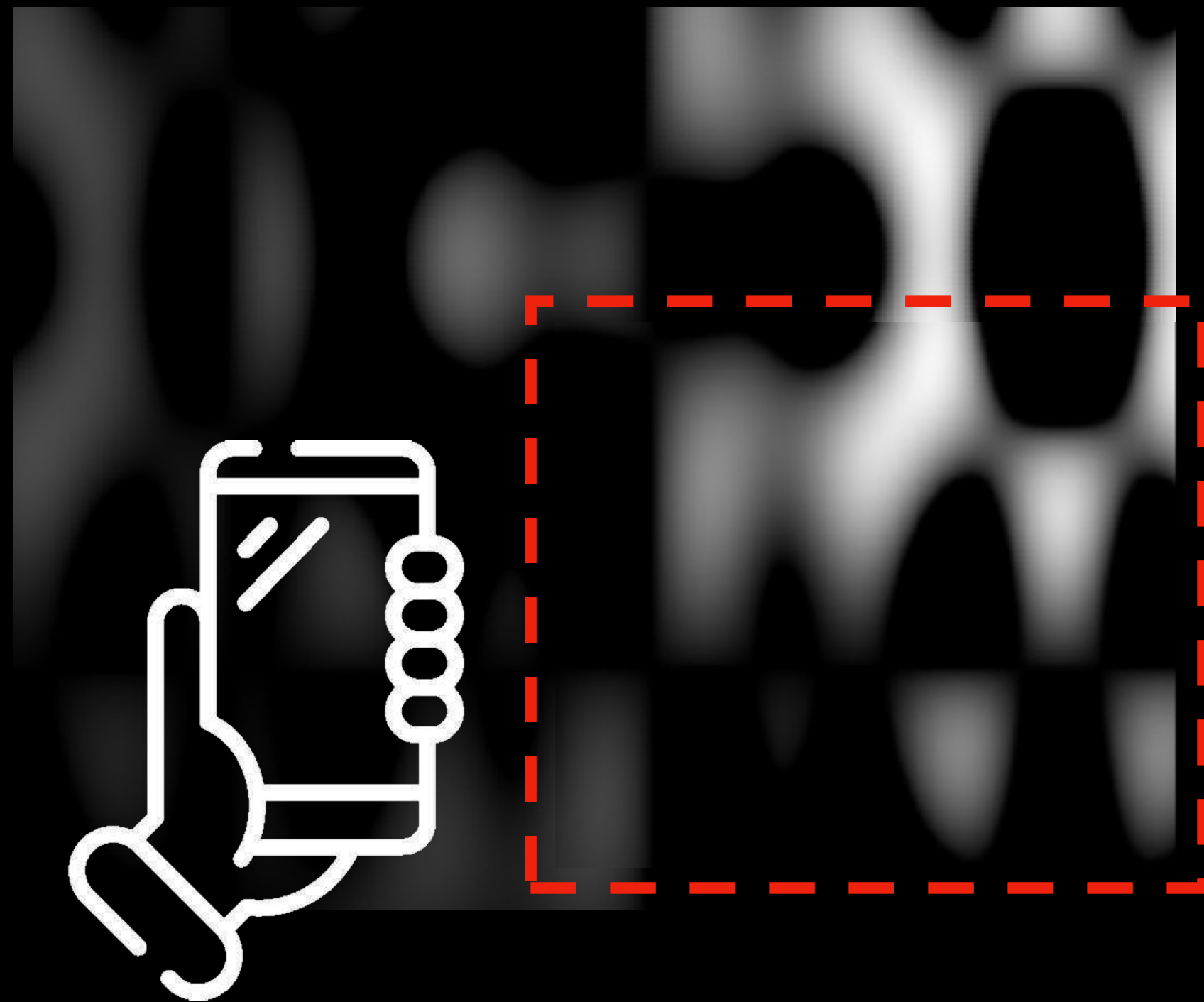
α -phase

Uploading Photos

β -phase : Problem Solving (~10:20)

γ -phase : Answer Submit (~11:10)

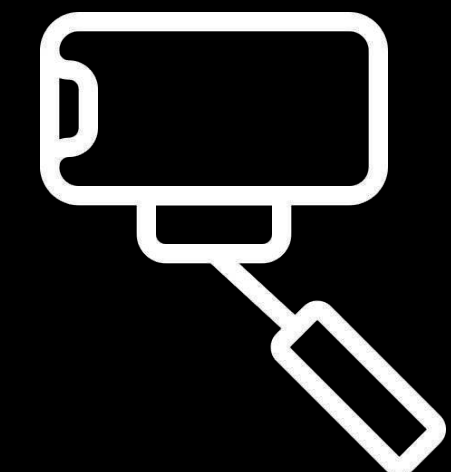
δ -phase : Selecting Best Answer (~11:50)



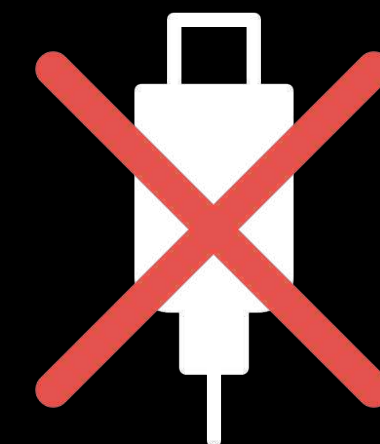
Capture the diffraction pattern on the floor



If USB-C available



Use selfie stick



If USB-C unavailable



Use timer function

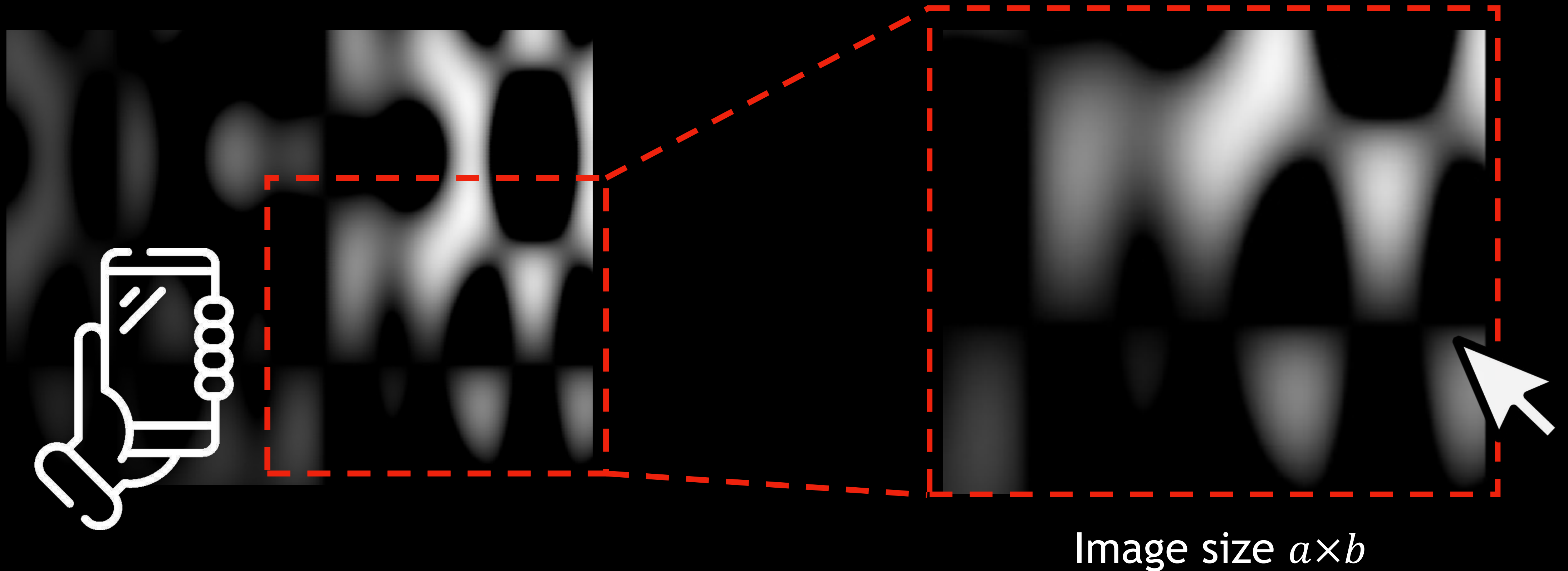
α -phase

Uploading Photos

β -phase : Problem Solving (~10:20)

γ -phase : Answer Submit (~11:10)

δ -phase : Selecting Best Answer (~11:50)



α -phase

Uploading Photos

β -phase : Problem Solving (~10:20)

γ -phase : Answer Submit (~11:10)

δ -phase : Selecting Best Answer (~11:50)

Image Upload

Drag and drop or browse your images to uploading tools. You can also zoom through the mouse scroll.



Upload the photo

α-phase

Uploading Photos β-phase : Problem Solving (~10:20) γ-phase : Answer Submit (~11:10) δ-phase : Selecting Best Answer (~11:50)

Item Permission	Photo Uploading	Reverse/Forward Conversion
Check	O	X

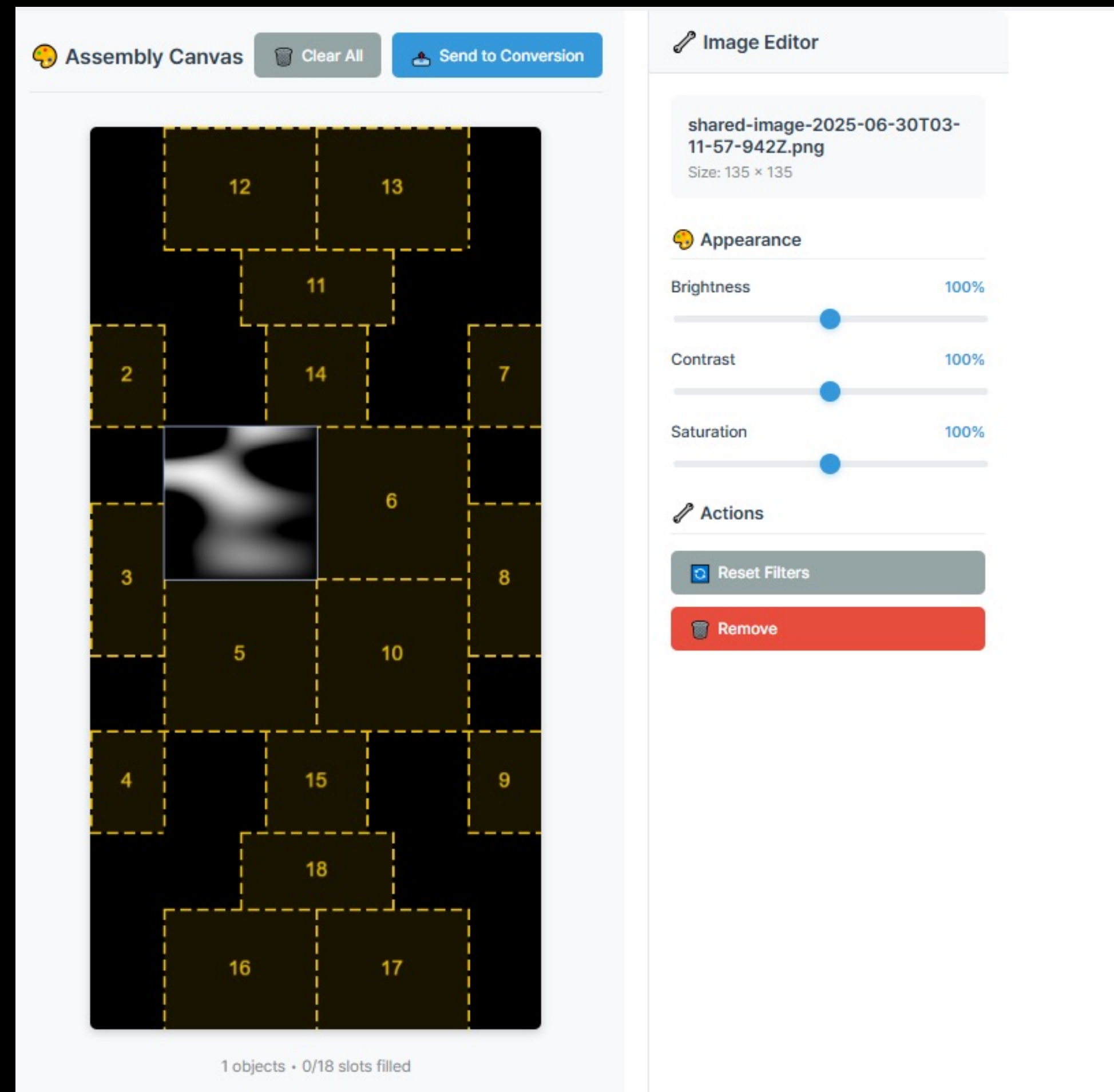
β-phase

Problem Solving

γ-phase : Answer Submit (~11:10)

δ-phase : Selecting Best Answer (~11:50)

Photo Uploading



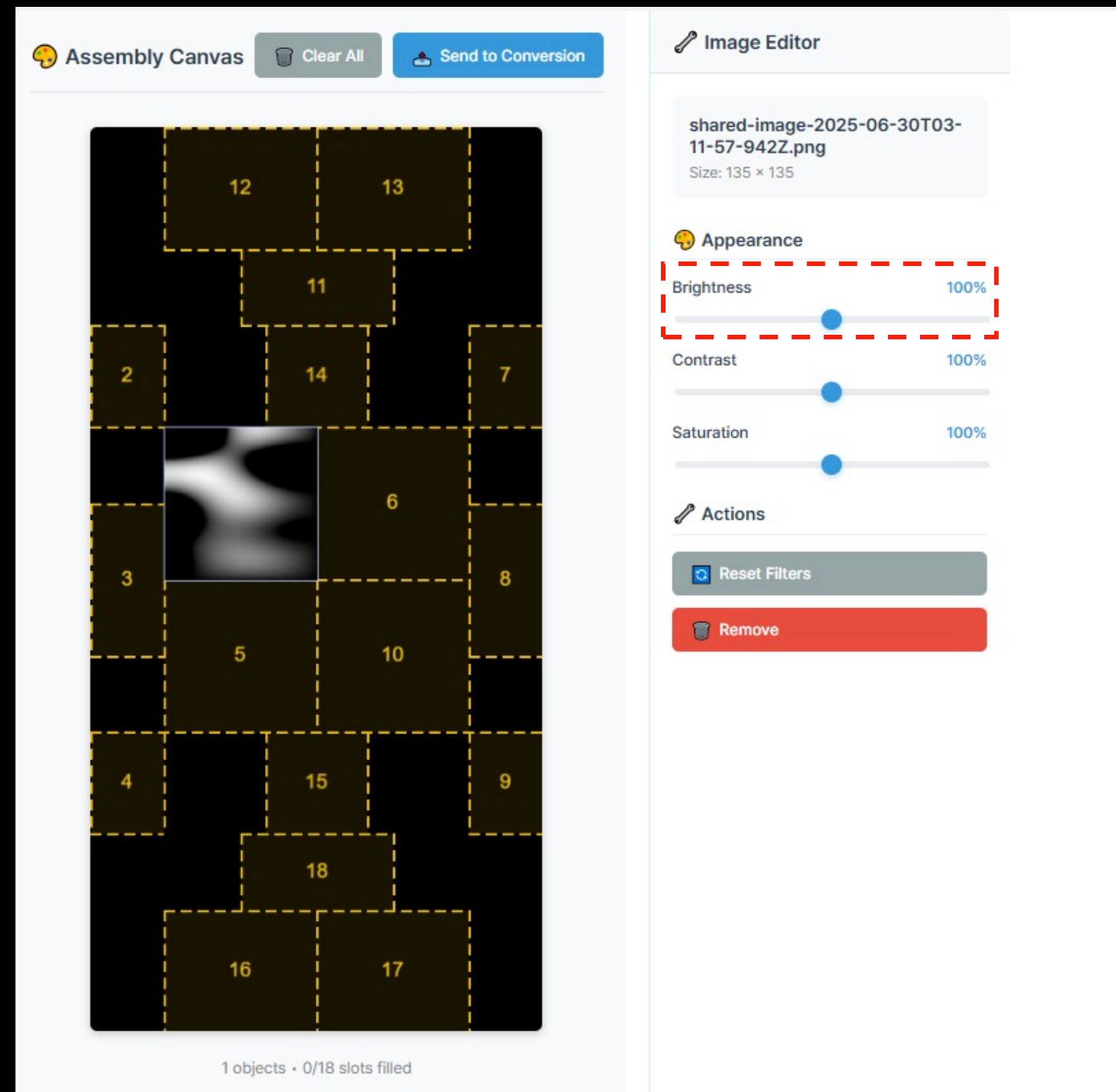
β-phase

Problem Solving

γ-phase : Answer Submit (~11:10)

δ-phase : Selecting Best Answer (~11:50)

Photo Uploading



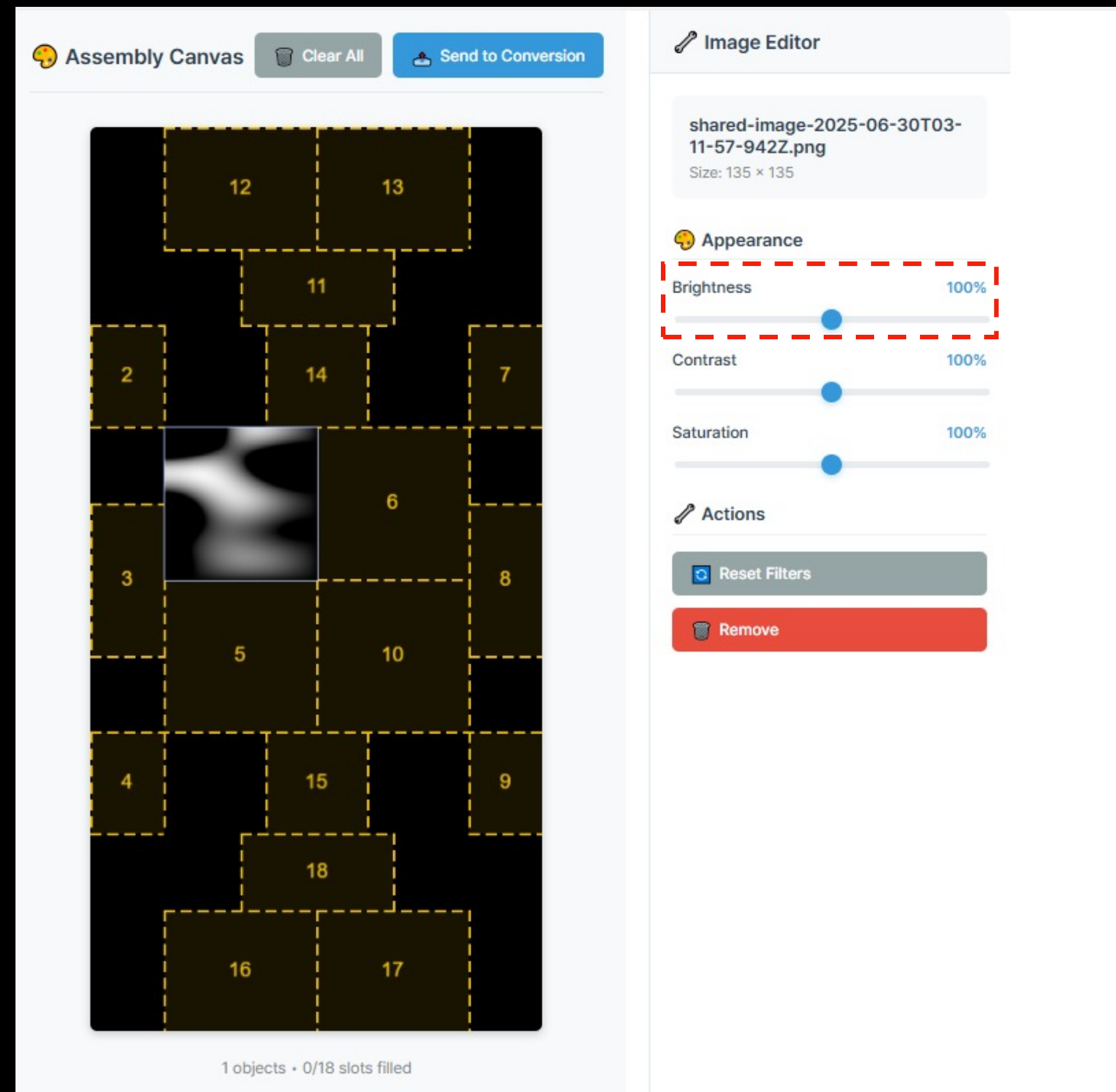
β-phase

Problem Solving

γ-phase : Answer Submit (~11:10)

δ-phase : Selecting Best Answer (~11:50)

Photo Uploading



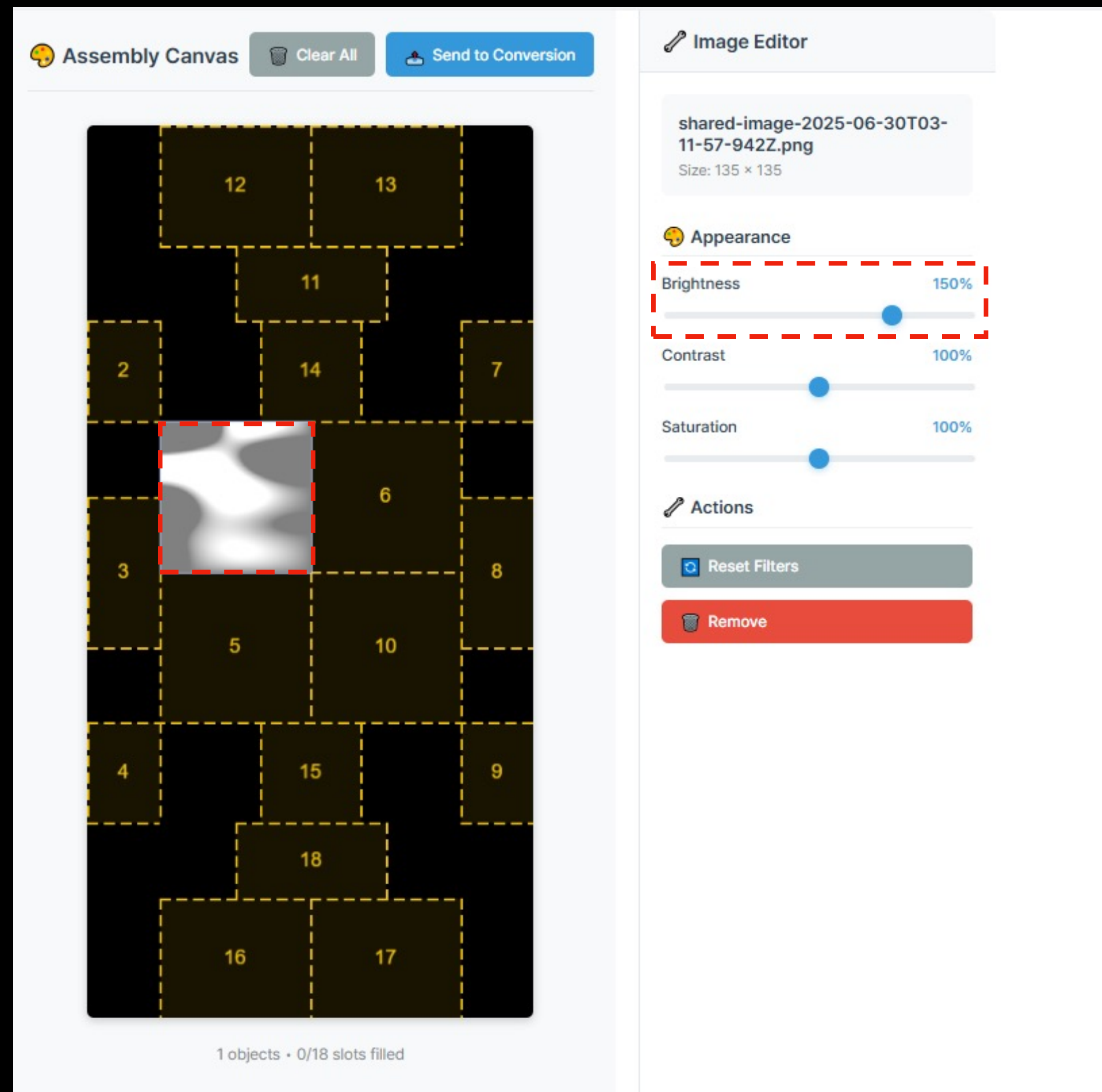
β -phase

Problem Solving

γ -phase : Answer Submit (~11:10)

δ -phase : Selecting Best Answer (~11:50)

Photo Uploading



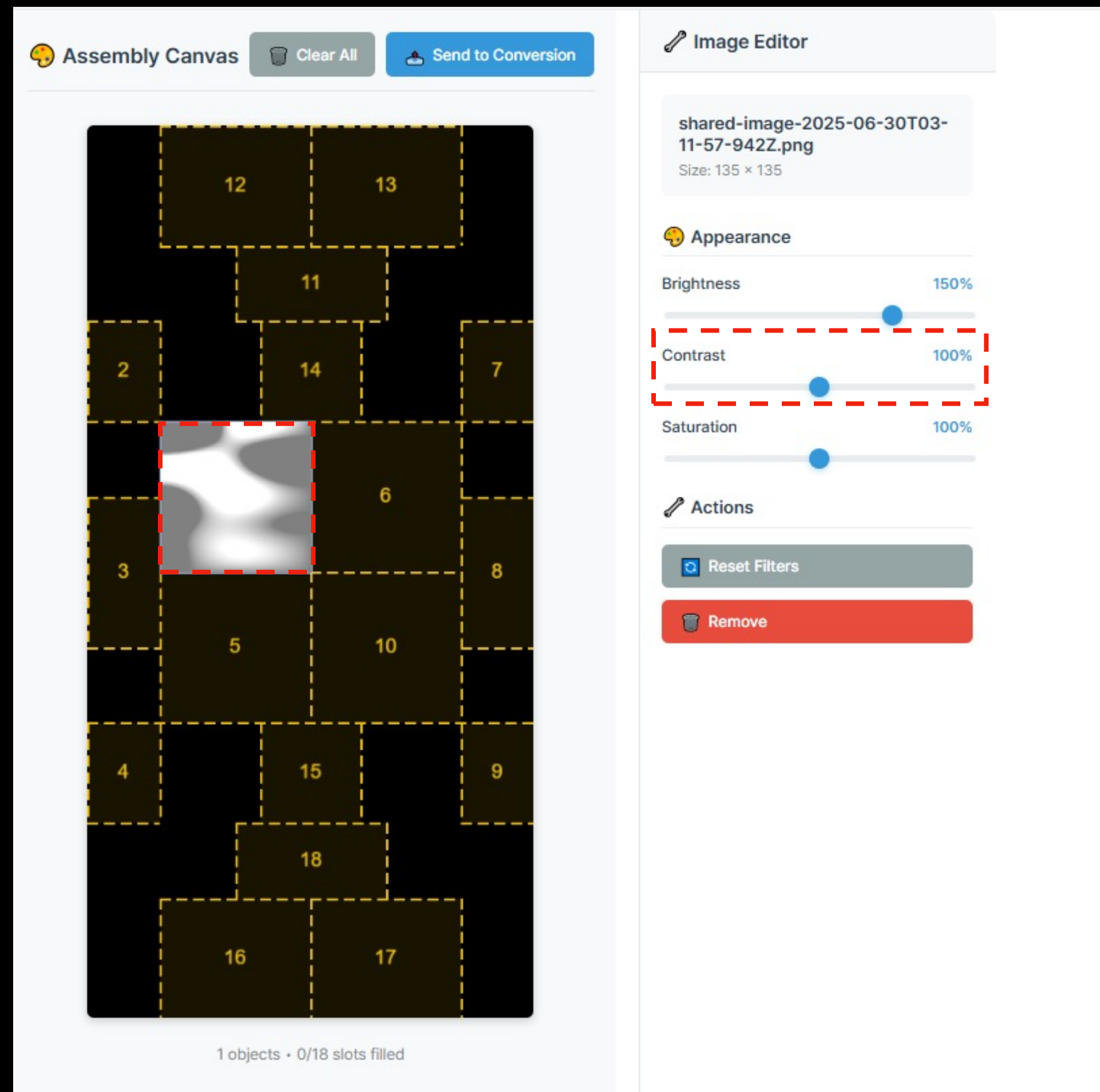
β-phase

Problem Solving

γ-phase : Answer Submit (~11:10)

δ-phase : Selecting Best Answer (~11:50)

Photo Uploading



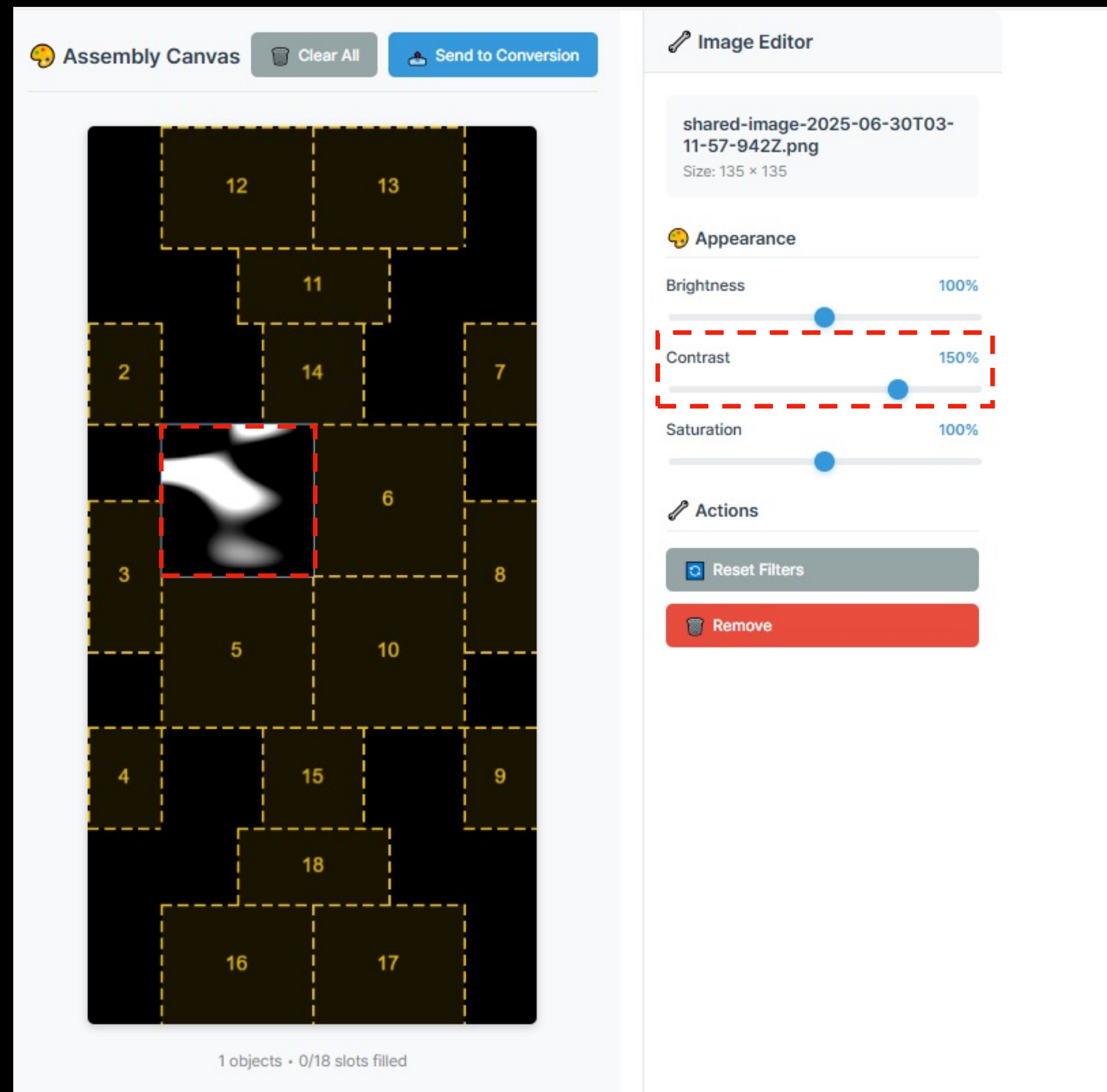
β-phase

Problem Solving

γ-phase : Answer Submit (~11:10)

δ-phase : Selecting Best Answer (~11:50)

Photo Uploading



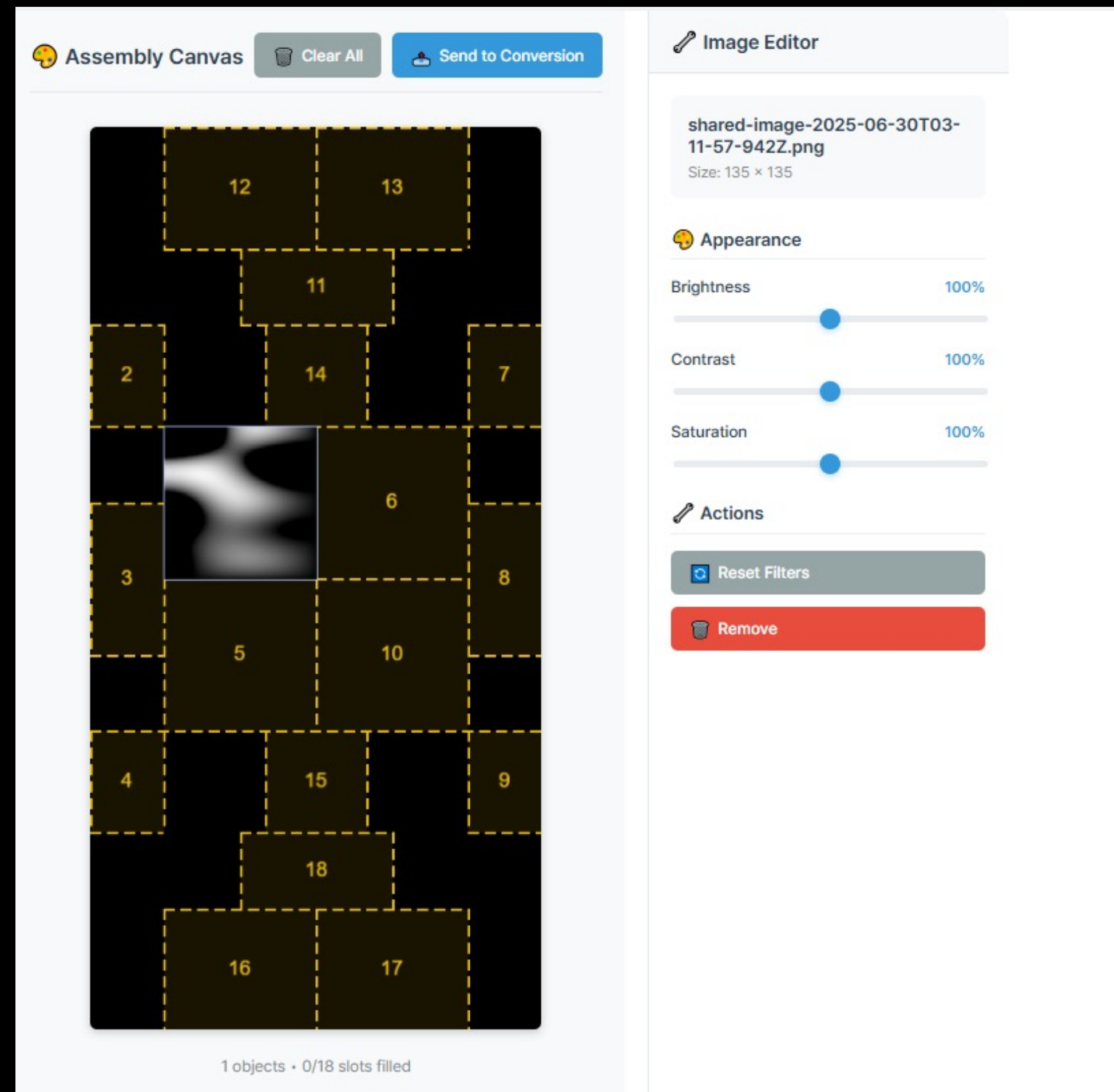
β-phase

Problem Solving

γ-phase : Answer Submit (~11:10)

δ-phase : Selecting Best Answer (~11:50)

Photo Uploading



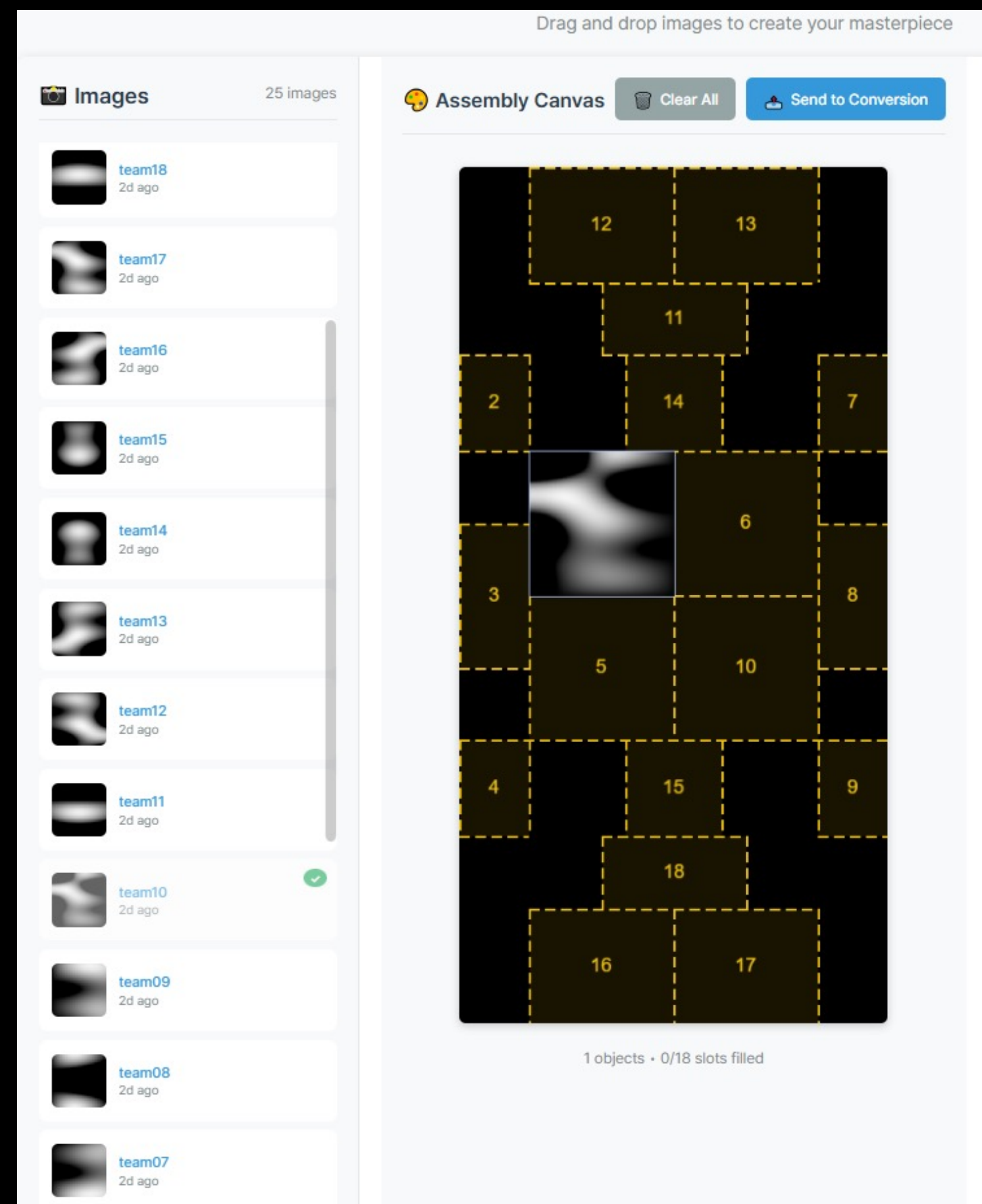
β -phase

Problem Solving

γ -phase : Answer Submit (~11:10)

δ -phase : Selecting Best Answer (~11:50)

Photo Assembling



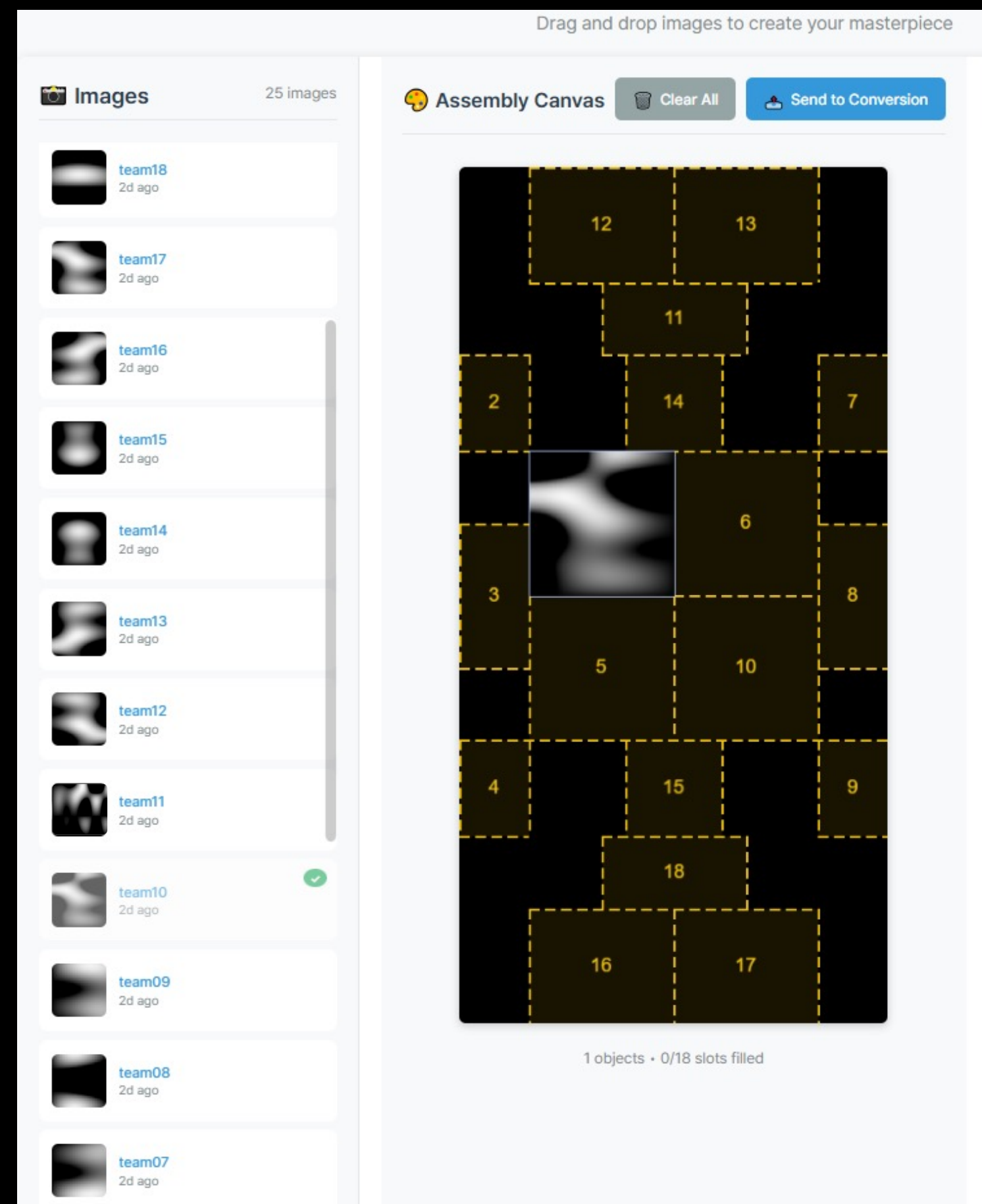
β -phase

Problem Solving

γ -phase : Answer Submit (~11:10)

δ -phase : Selecting Best Answer (~11:50)

Photo Assembling



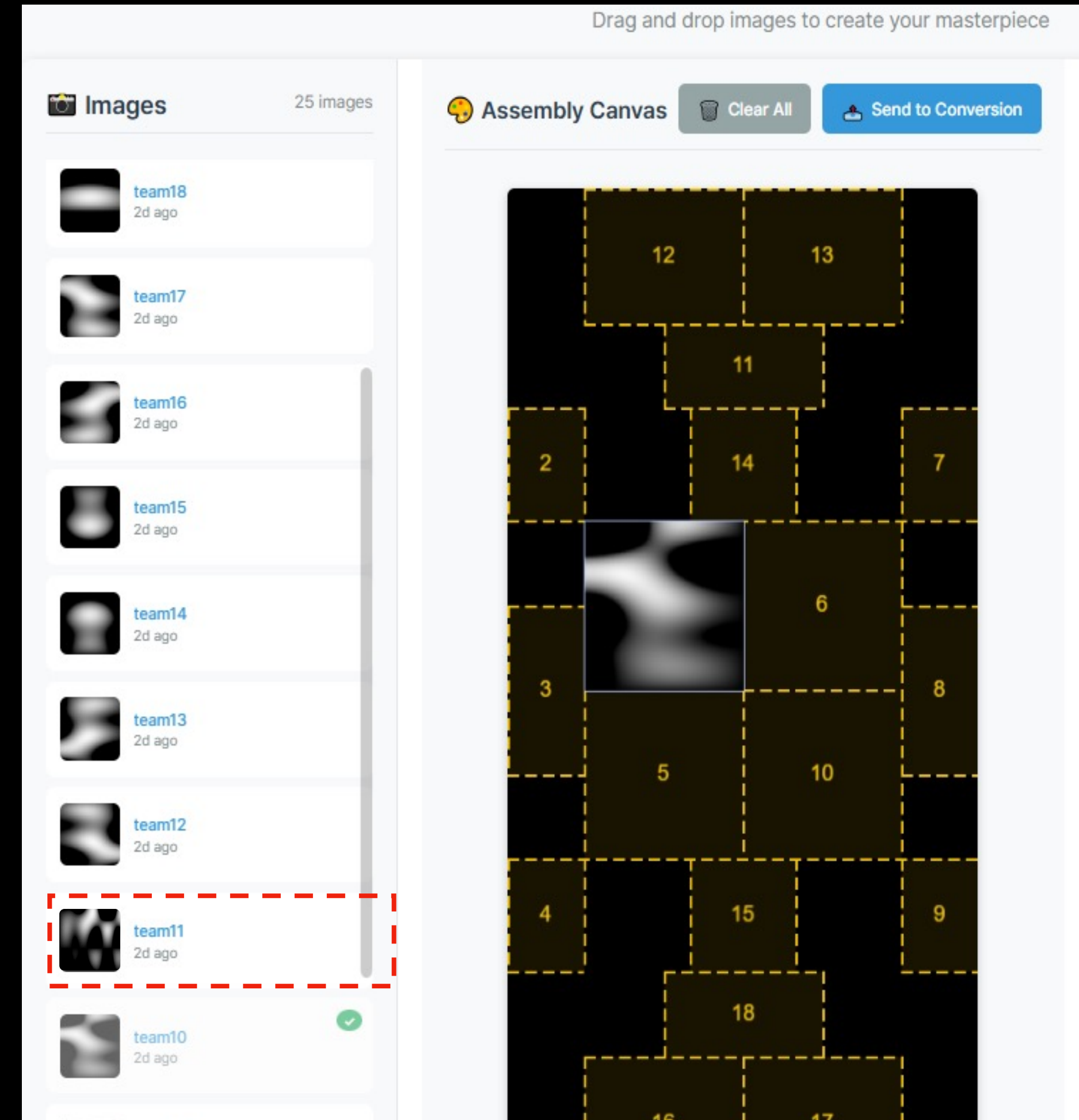
β -phase

Problem Solving

γ -phase : Answer Submit (~11:10)

δ -phase : Selecting Best Answer (~11:50)

Photo Assembling

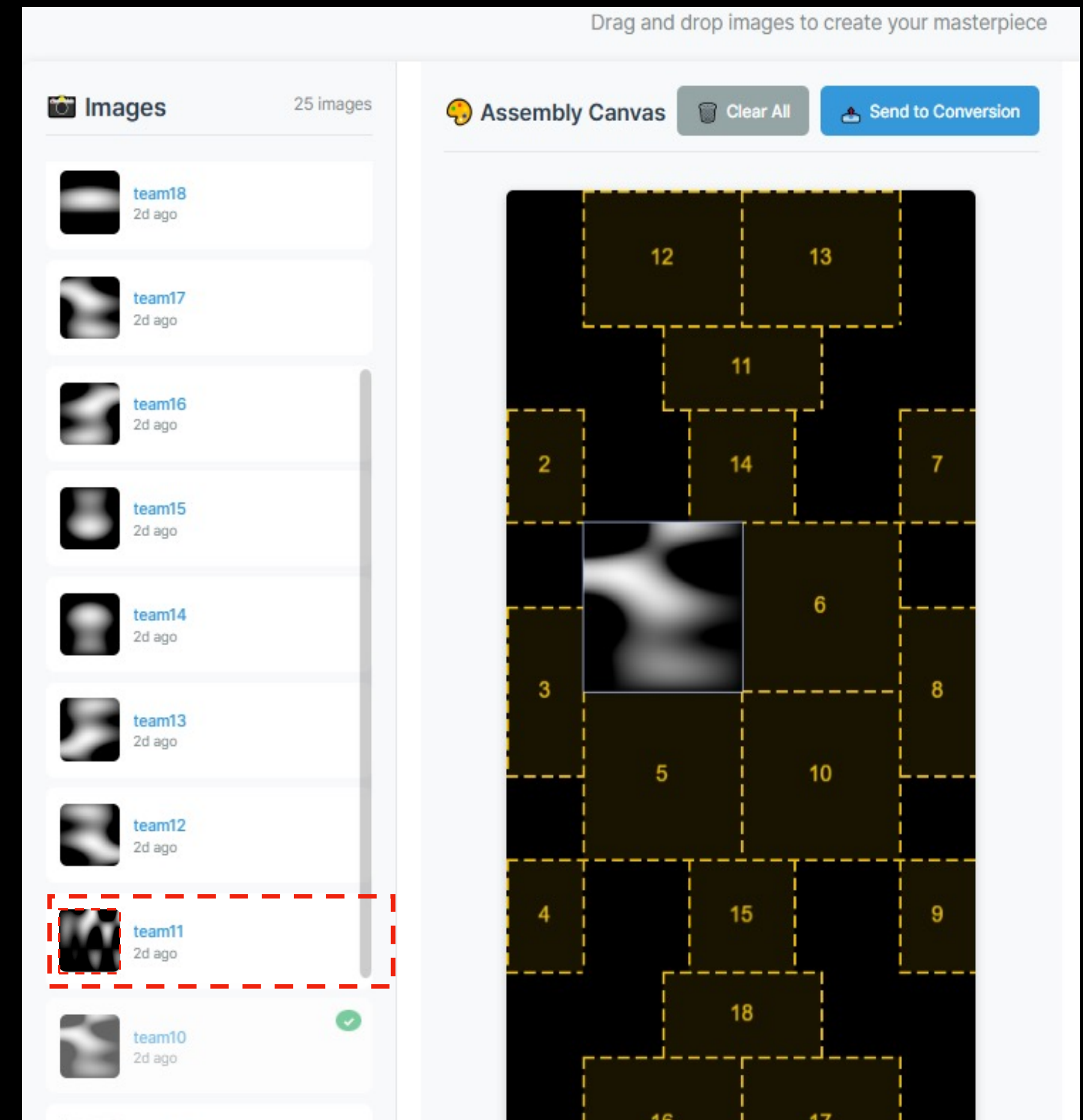


β -phase

Problem Solving

γ -phase : Answer Submit (~11:10)

δ -phase : Selecting Best Answer (~11:50)

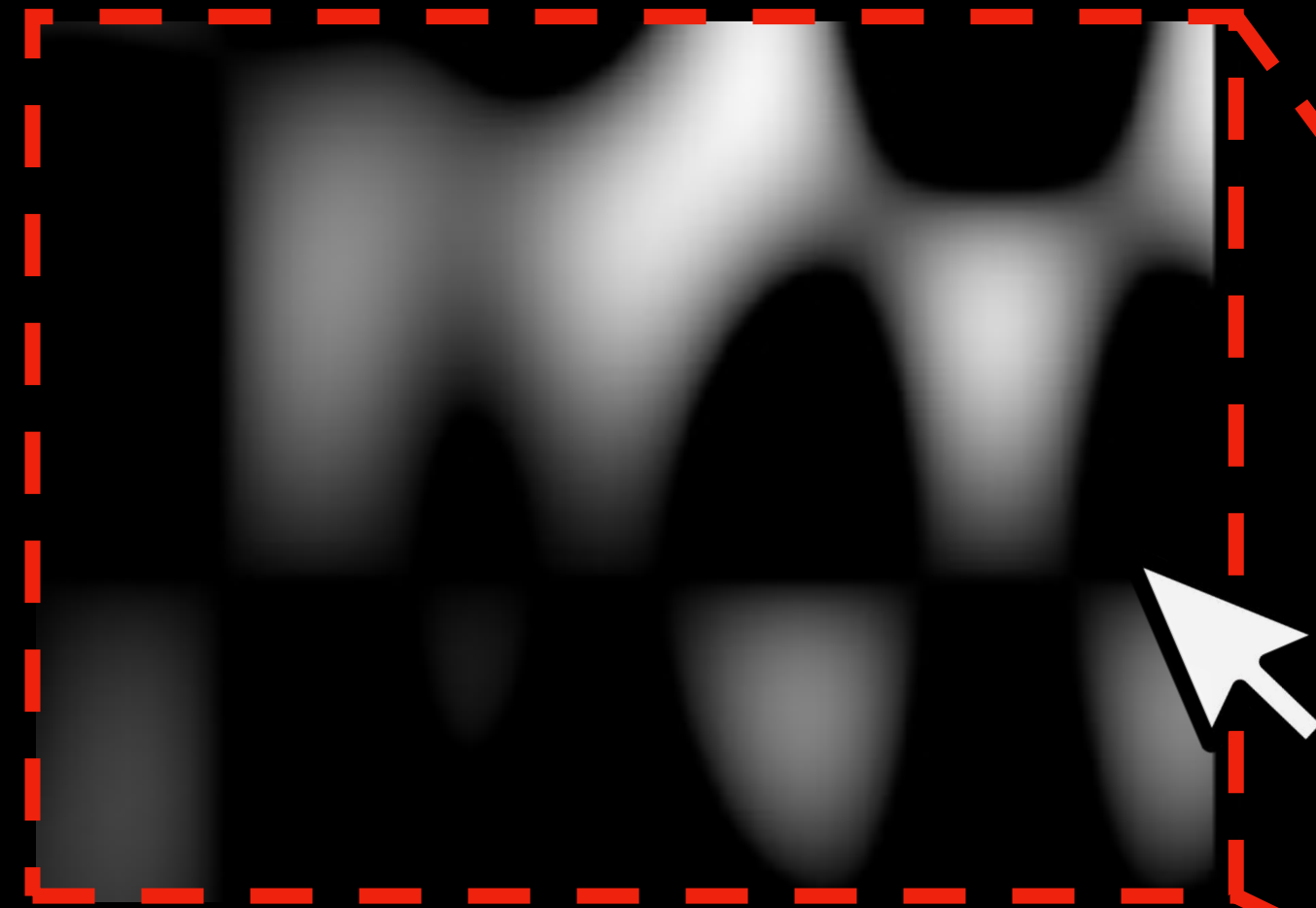


β -phase

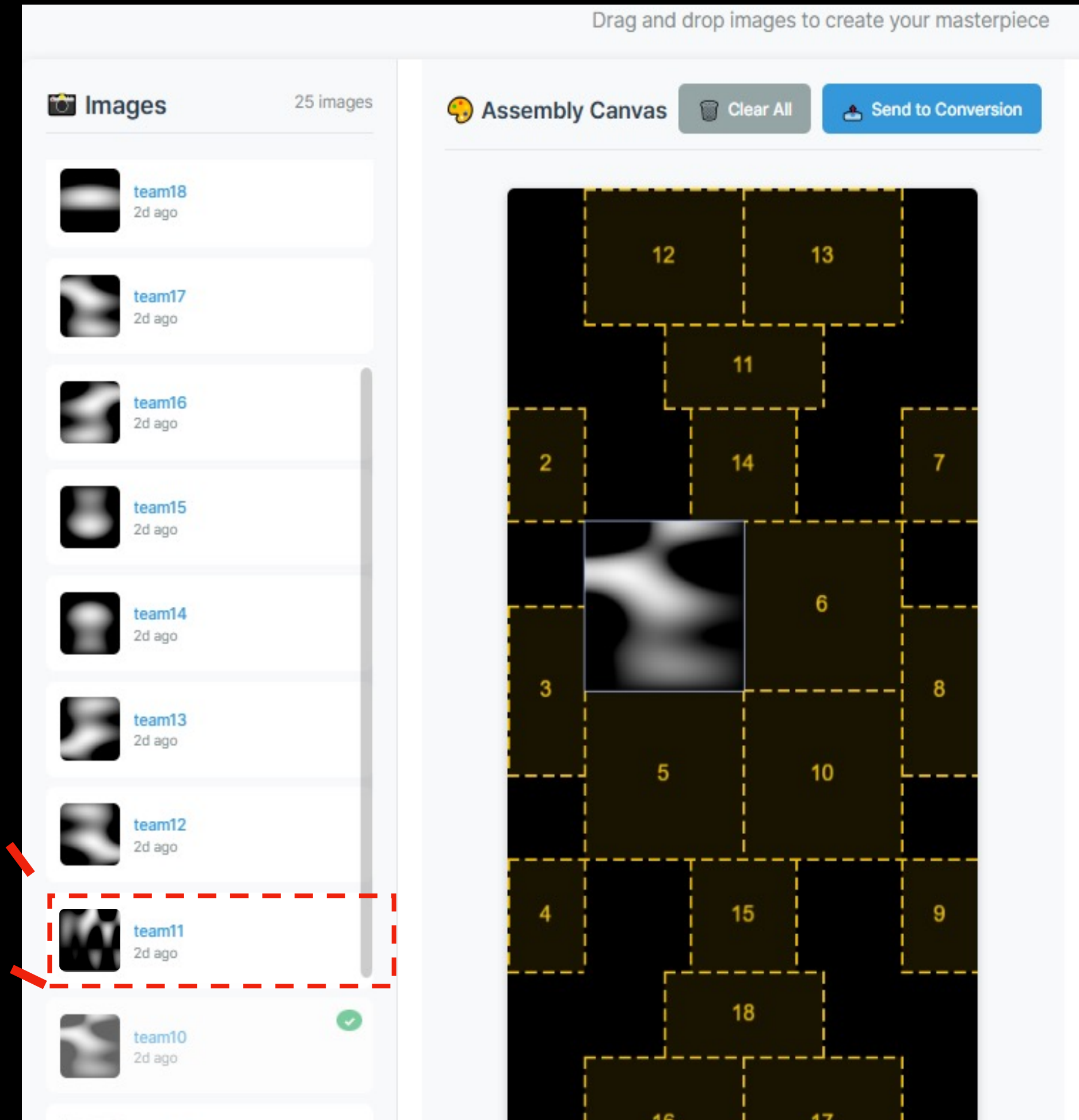
Problem Solving

γ -phase : Answer Submit (~11:10)

δ -phase : Selecting Best Answer (~11:50)



Select the
uploaded photo

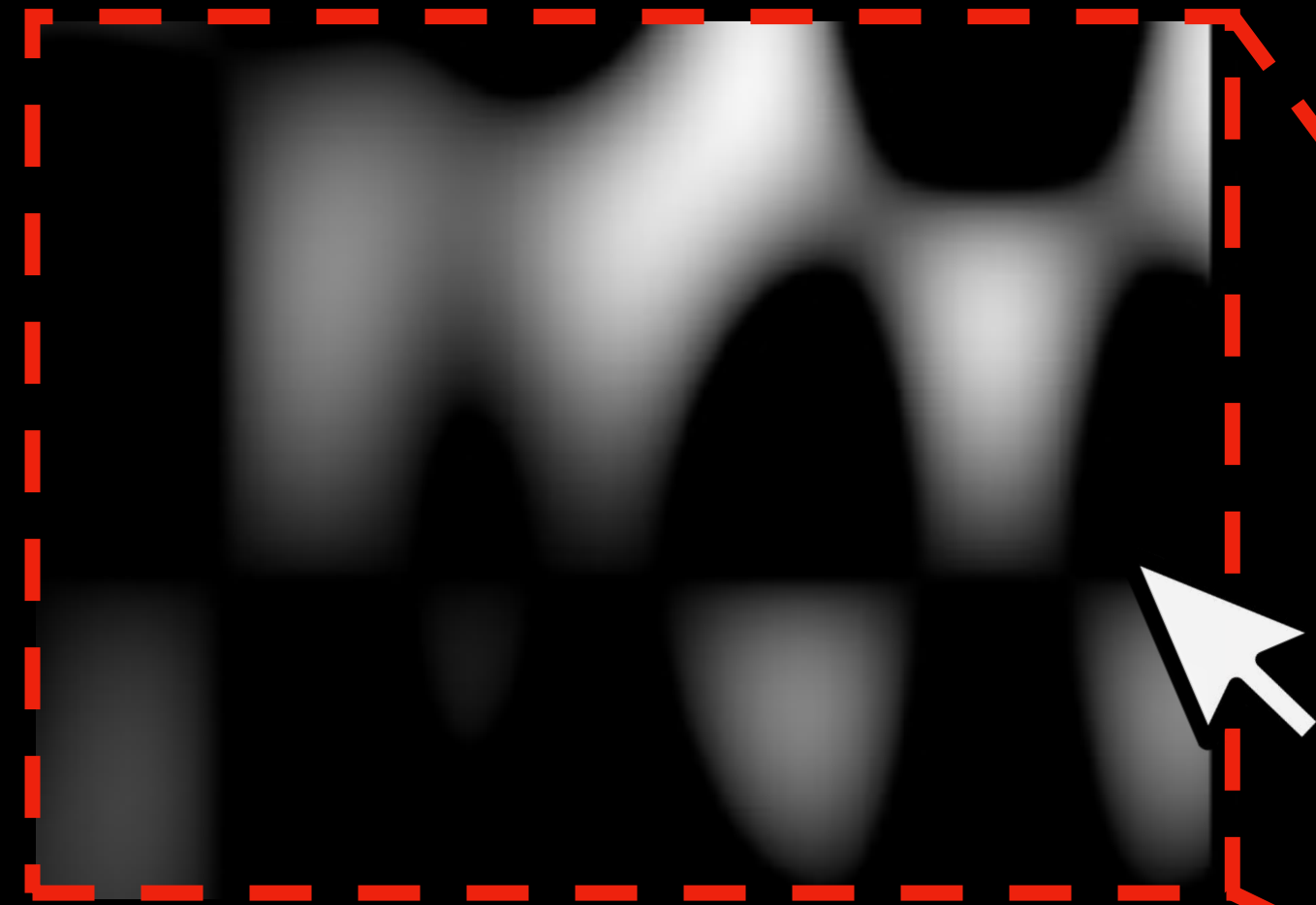


β -phase

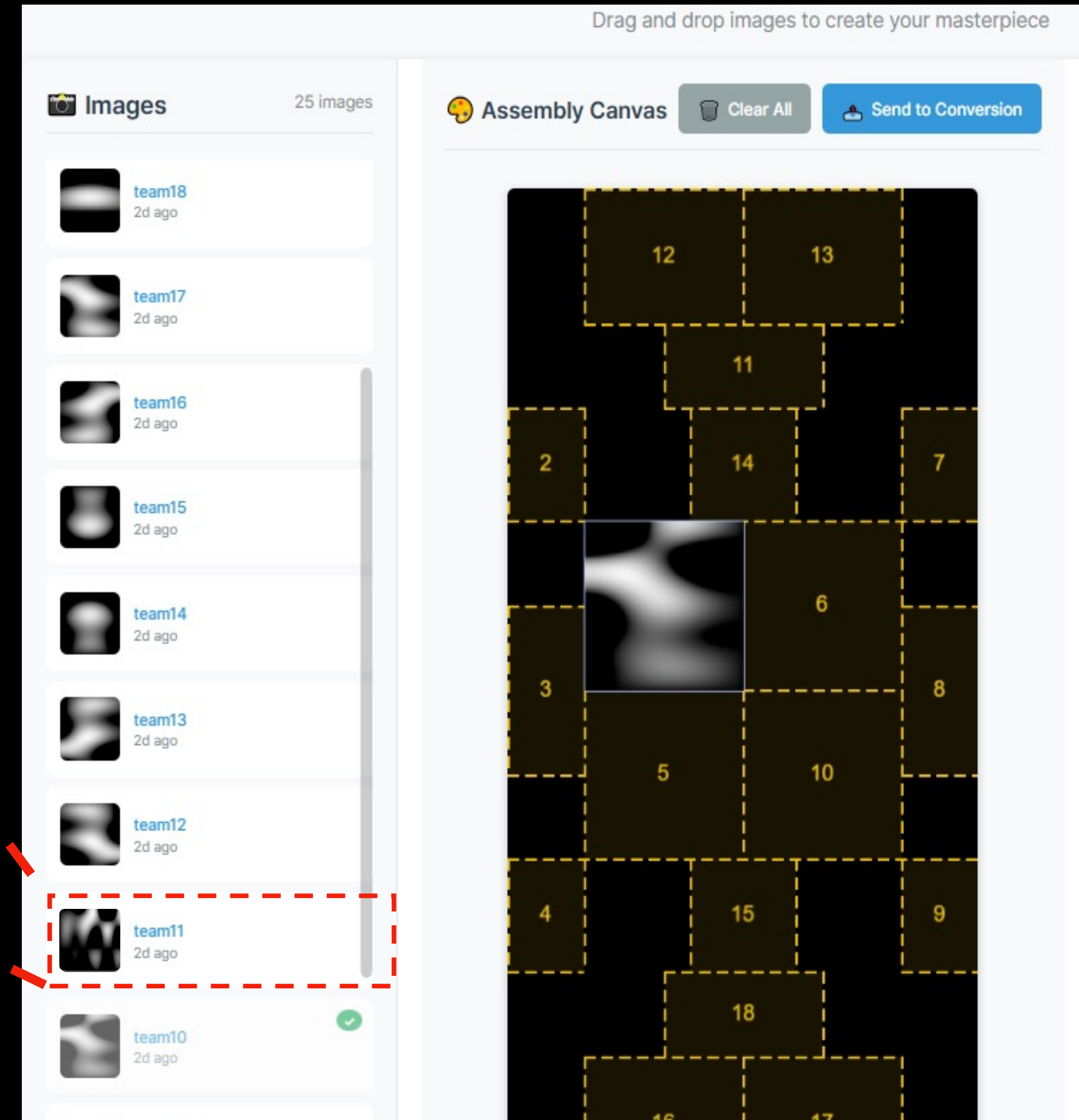
Problem Solving

γ -phase : Answer Submit (~11:10)

δ -phase : Selecting Best Answer (~11:50)



Select the
uploaded photo



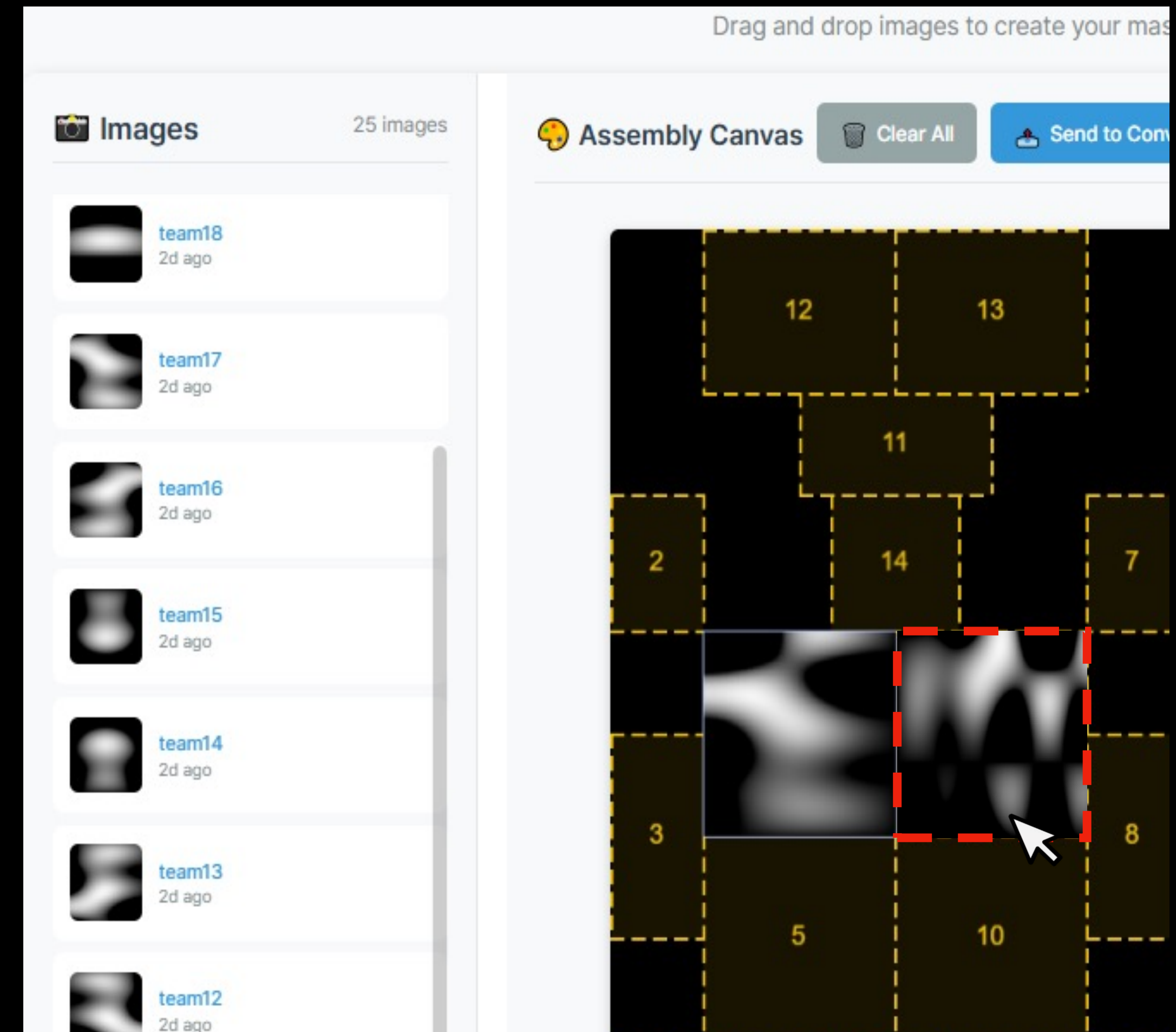
β -phase

Problem Solving

γ -phase : Answer Submit (~11:10)

δ -phase : Selecting Best Answer (~11:50)

Drag
&
Drop

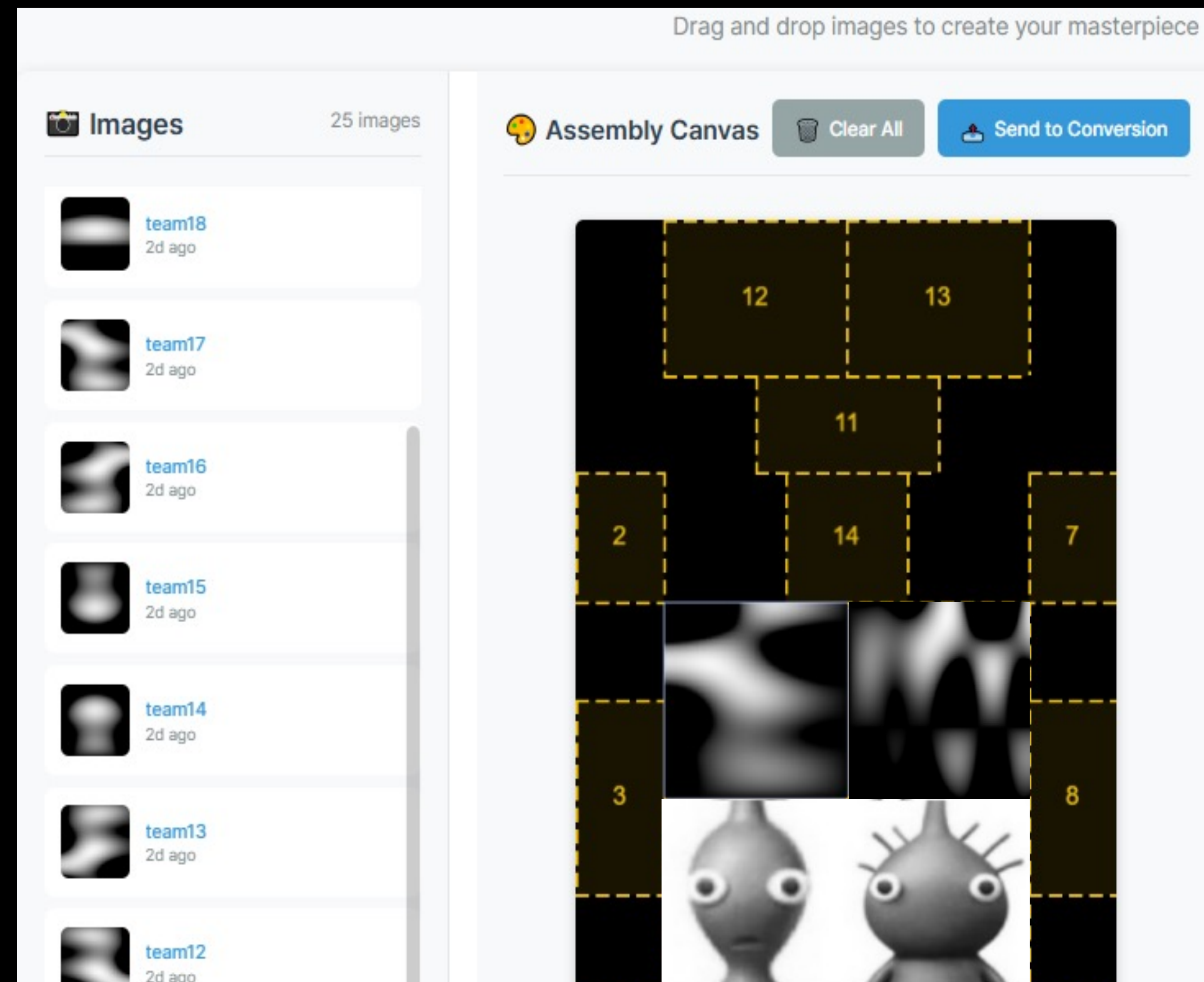


β -phase

Problem Solving

γ -phase : Answer Submit (~11:10)

δ -phase : Selecting Best Answer (~11:50)

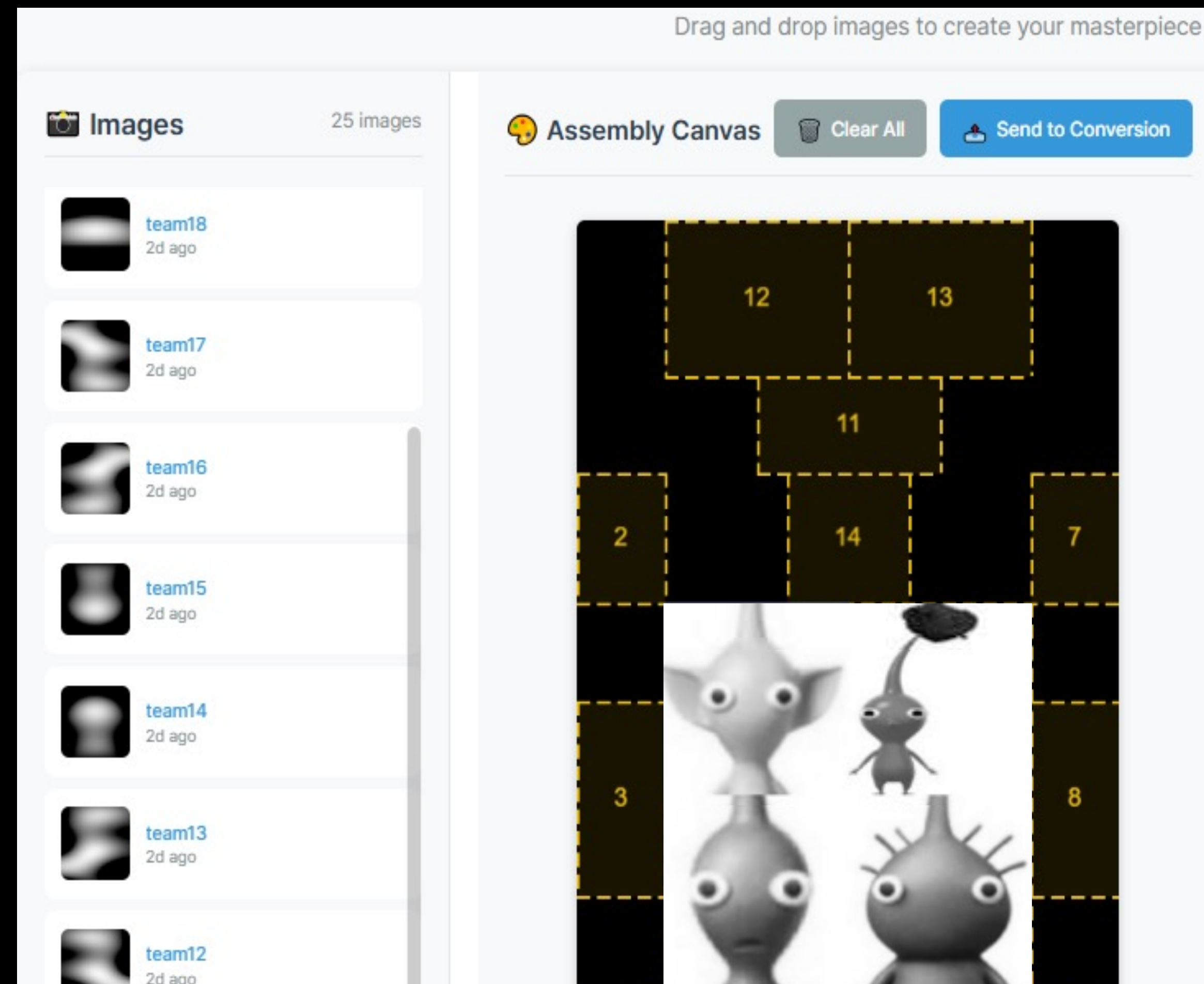


β -phase

Problem Solving

γ -phase : Answer Submit (~11:10)

δ -phase : Selecting Best Answer (~11:50)

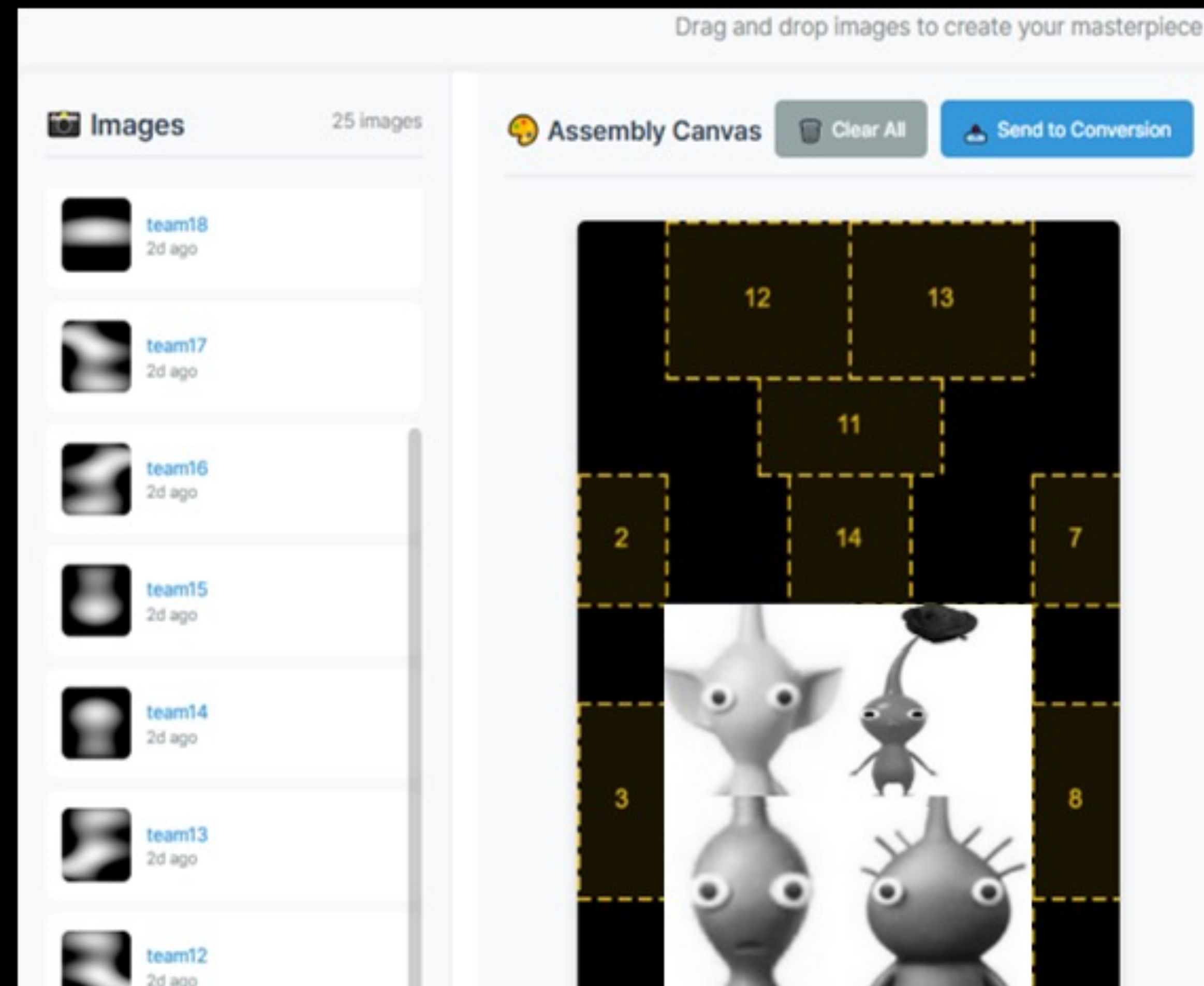


β -phase

Problem Solving

γ -phase : Answer Submit (~11:10)

δ -phase : Selecting Best Answer (~11:50)



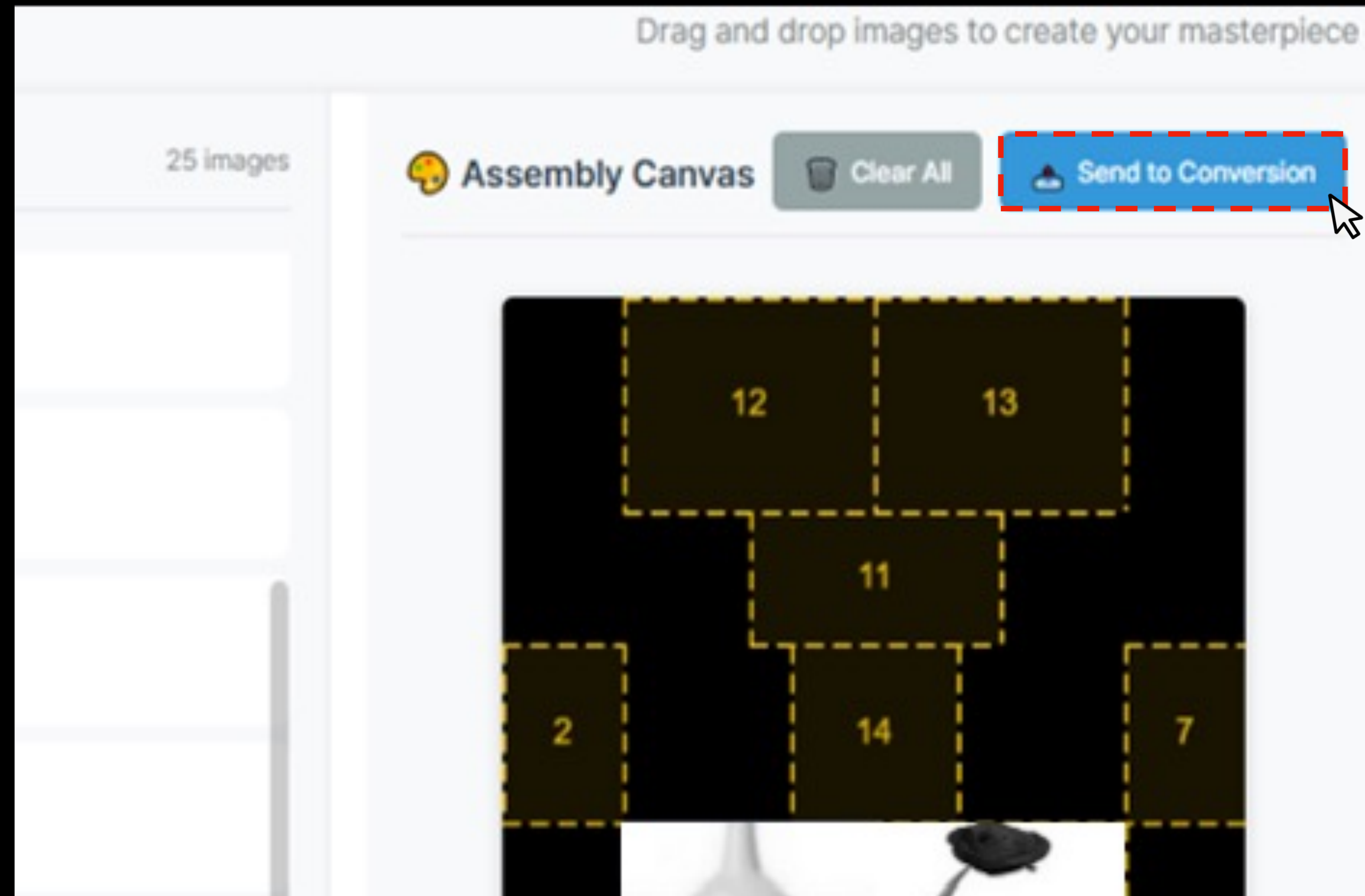
β -phase

Problem Solving

γ -phase : Answer Submit (~11:10)

δ -phase : Selecting Best Answer (~11:50)

Send to
conversion



β -phase

Problem Solving

γ -phase : Answer Submit (~11:10)

δ -phase : Selecting Best Answer (~11:50)

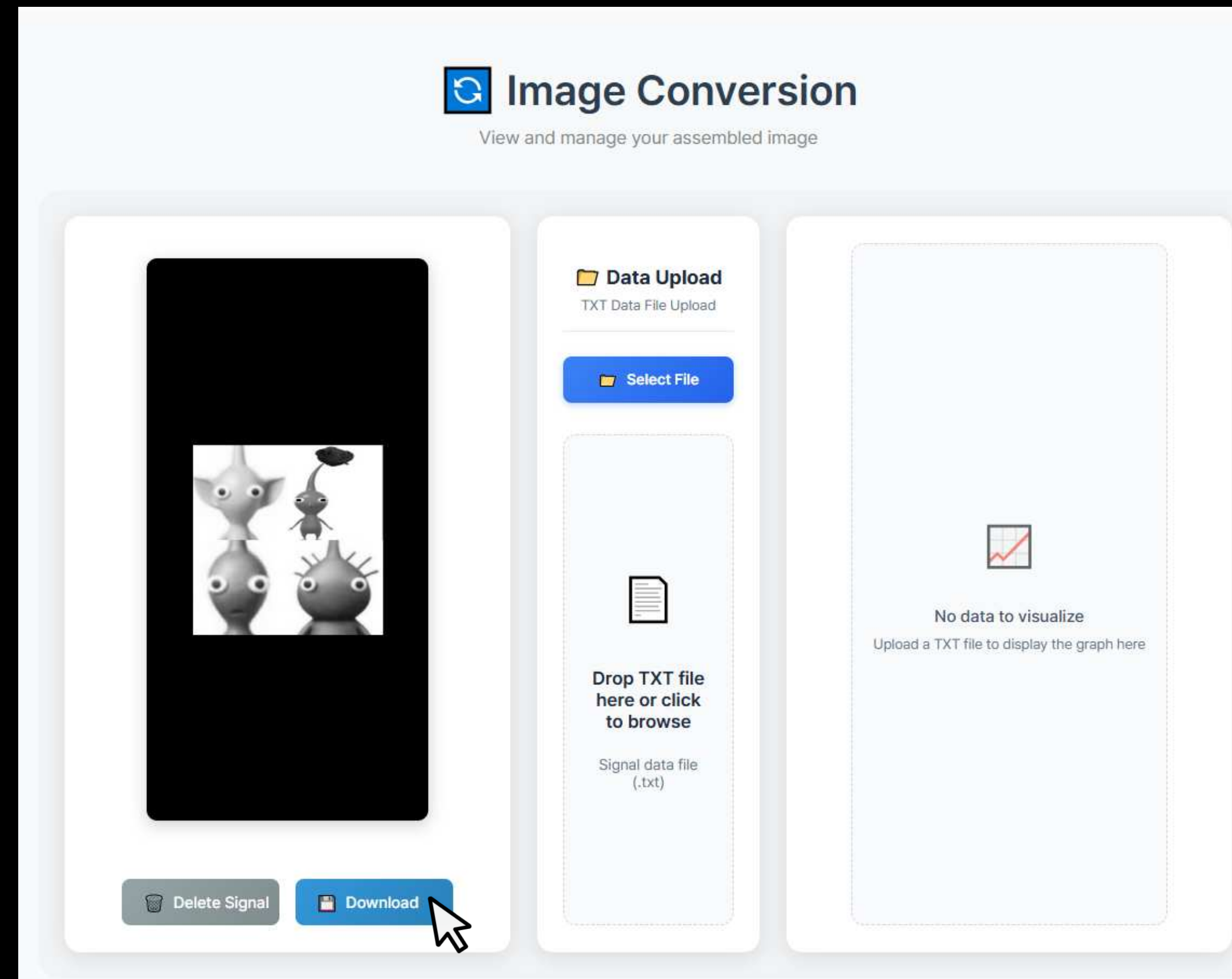


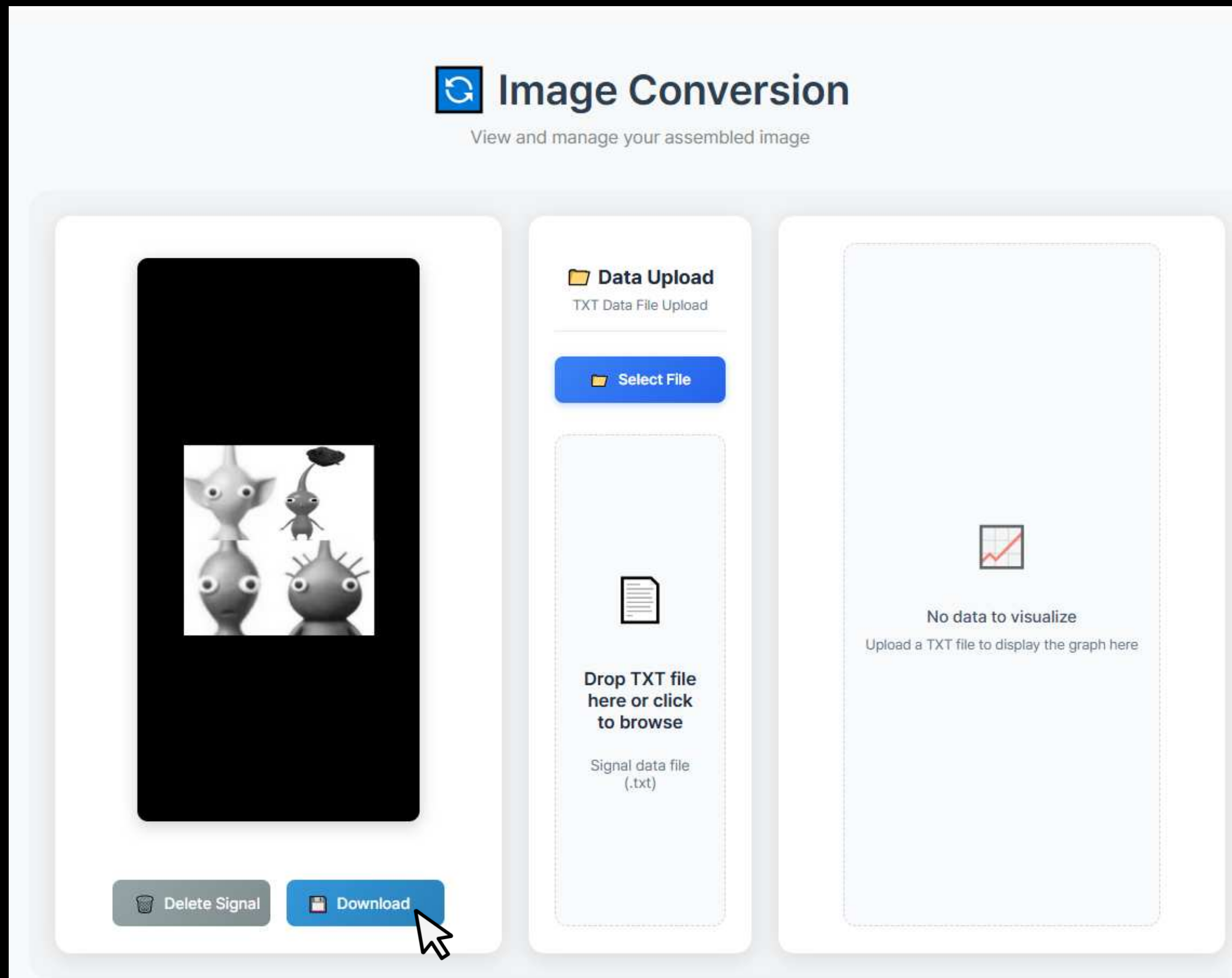
Image Reconstruction

β -phase

Problem Solving

γ -phase : Answer Submit (~11:10)

δ -phase : Selecting Best Answer (~11:50)



β -phase

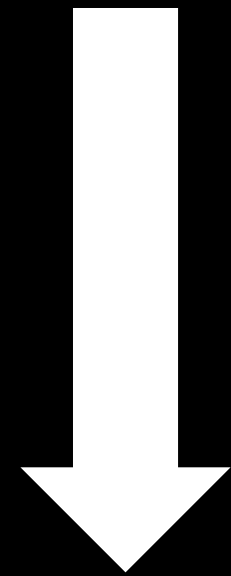
Problem Solving

γ -phase : Answer Submit (~11:10)

δ -phase : Selecting Best Answer (~11:50)



diffraction.txt



Use
Reconstruction
program



reconstruction.txt



answer.txt



answer_to_newpattern.exe



diffraction.txt



diffraction_to_reconstruction.exe



newpattern.txt



reconstruction.txt

β -phase

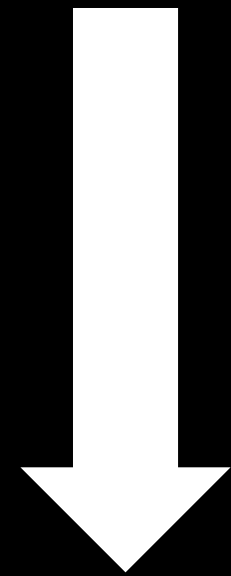
Problem Solving

γ -phase : Answer Submit (~11:10)

δ -phase : Selecting Best Answer (~11:50)



diffraction.txt



Use
Reconstruction
program



reconstruction.txt



answer.txt



answer_to_newpattern.exe



diffraction.txt



diffraction_to_reconstruction.exe



newpattern.txt



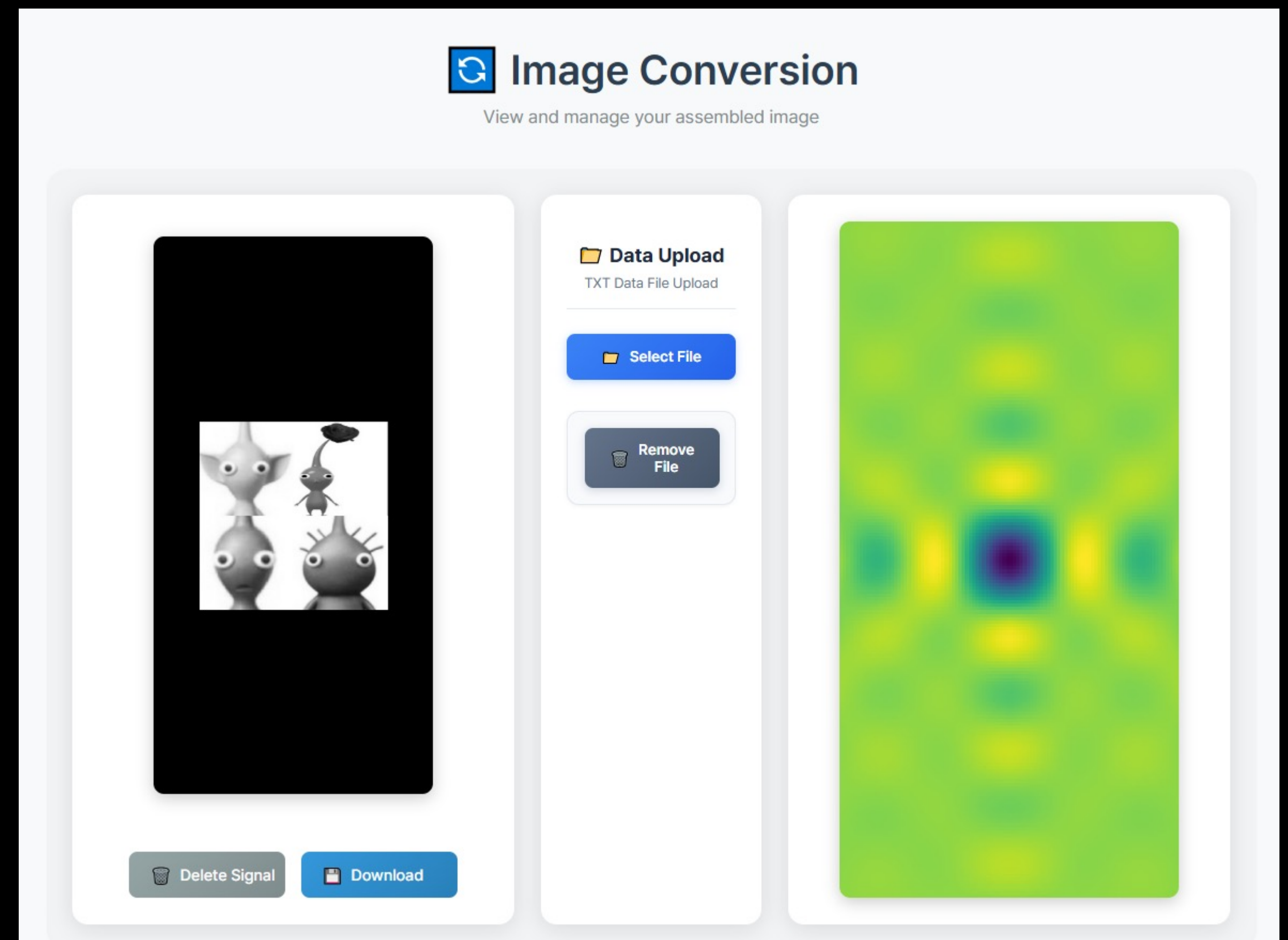
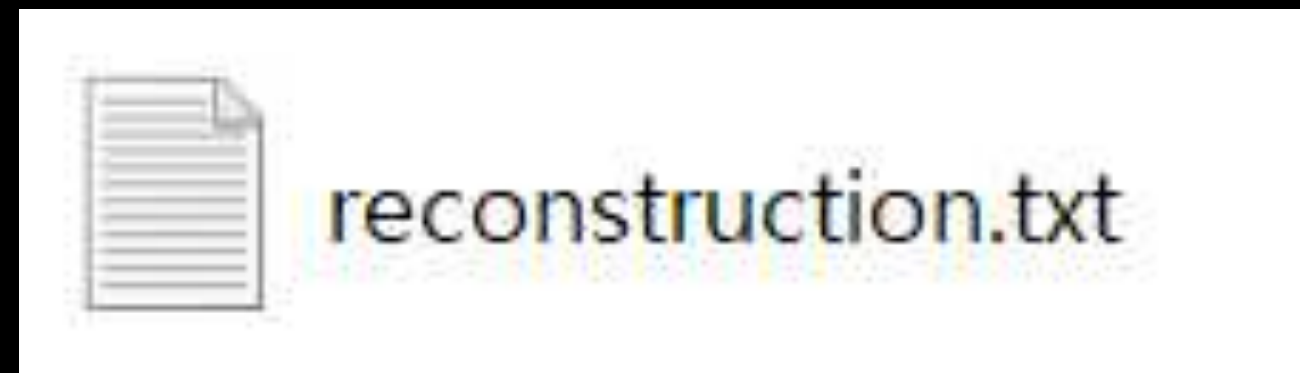
reconstruction.txt

β -phase

Problem Solving

γ -phase : Answer Submit (~11:10)

δ -phase : Selecting Best Answer (~11:50)

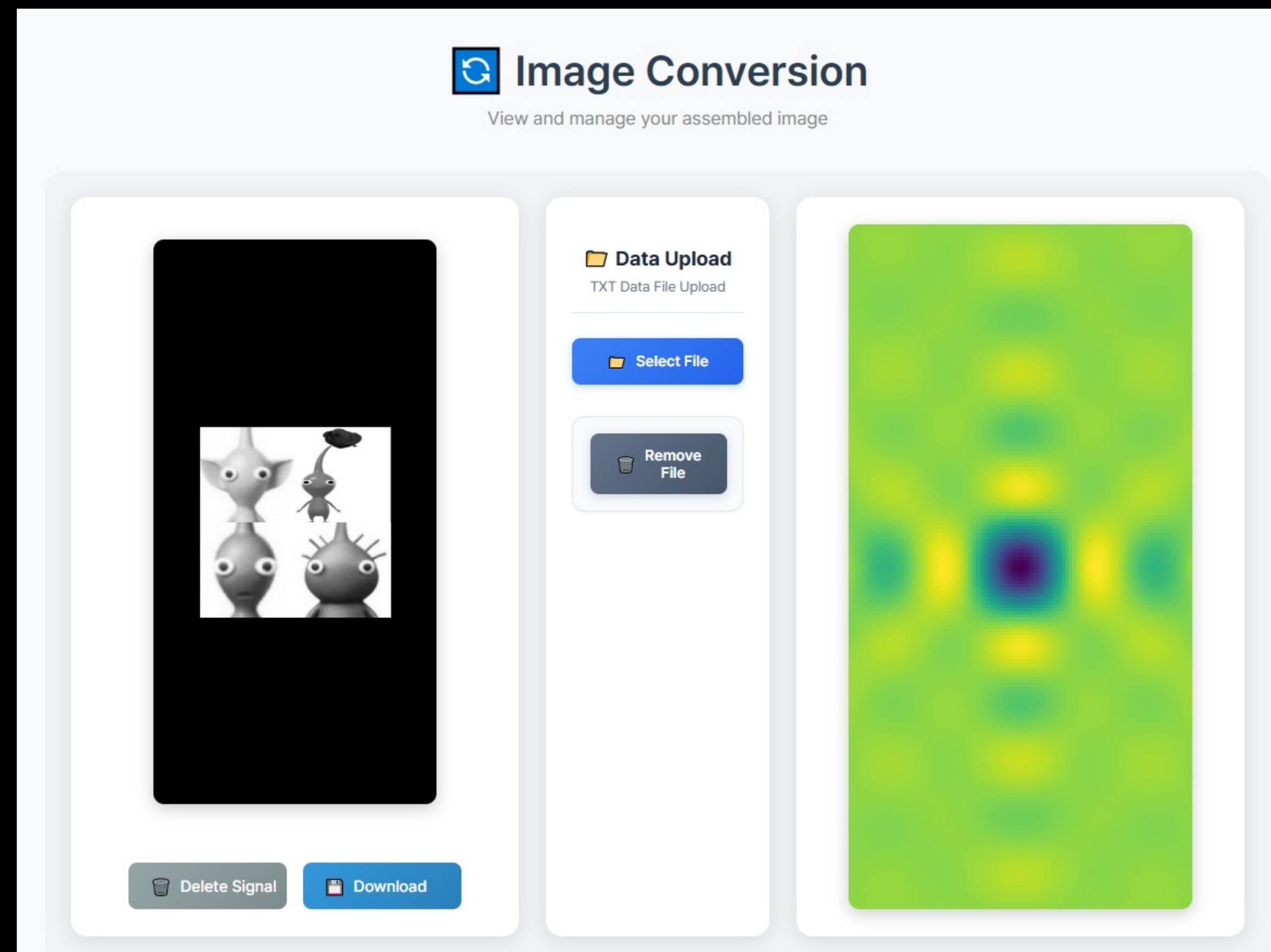


β -phase

Problem Solving

γ -phase : Answer Submit (~11:10)

δ -phase : Selecting Best Answer (~11:50)



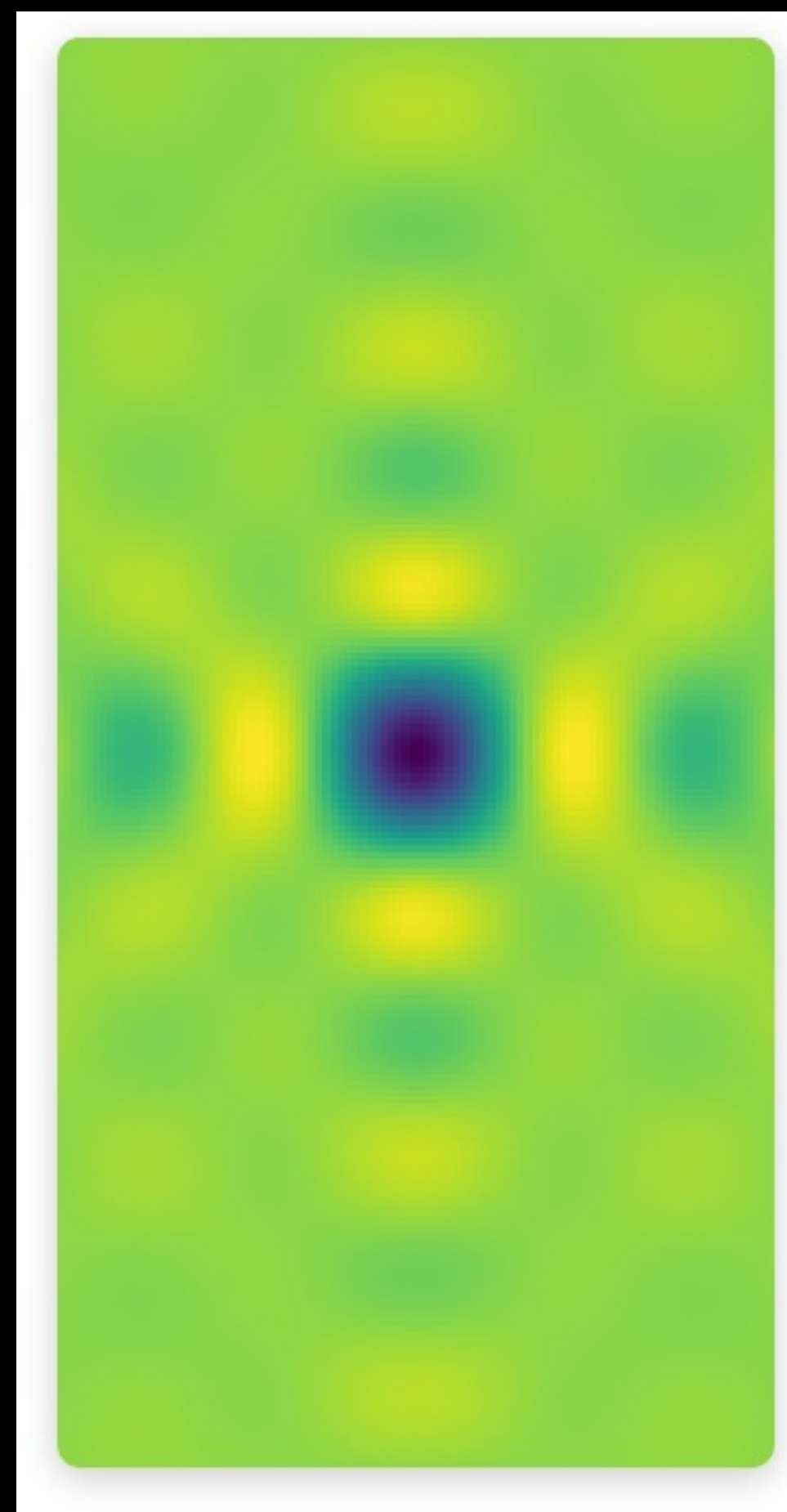
β -phase

Problem Solving

γ -phase : Answer Submit (~11:10)

δ -phase : Selecting Best Answer (~11:50)

Reconstructed
Slit Shape



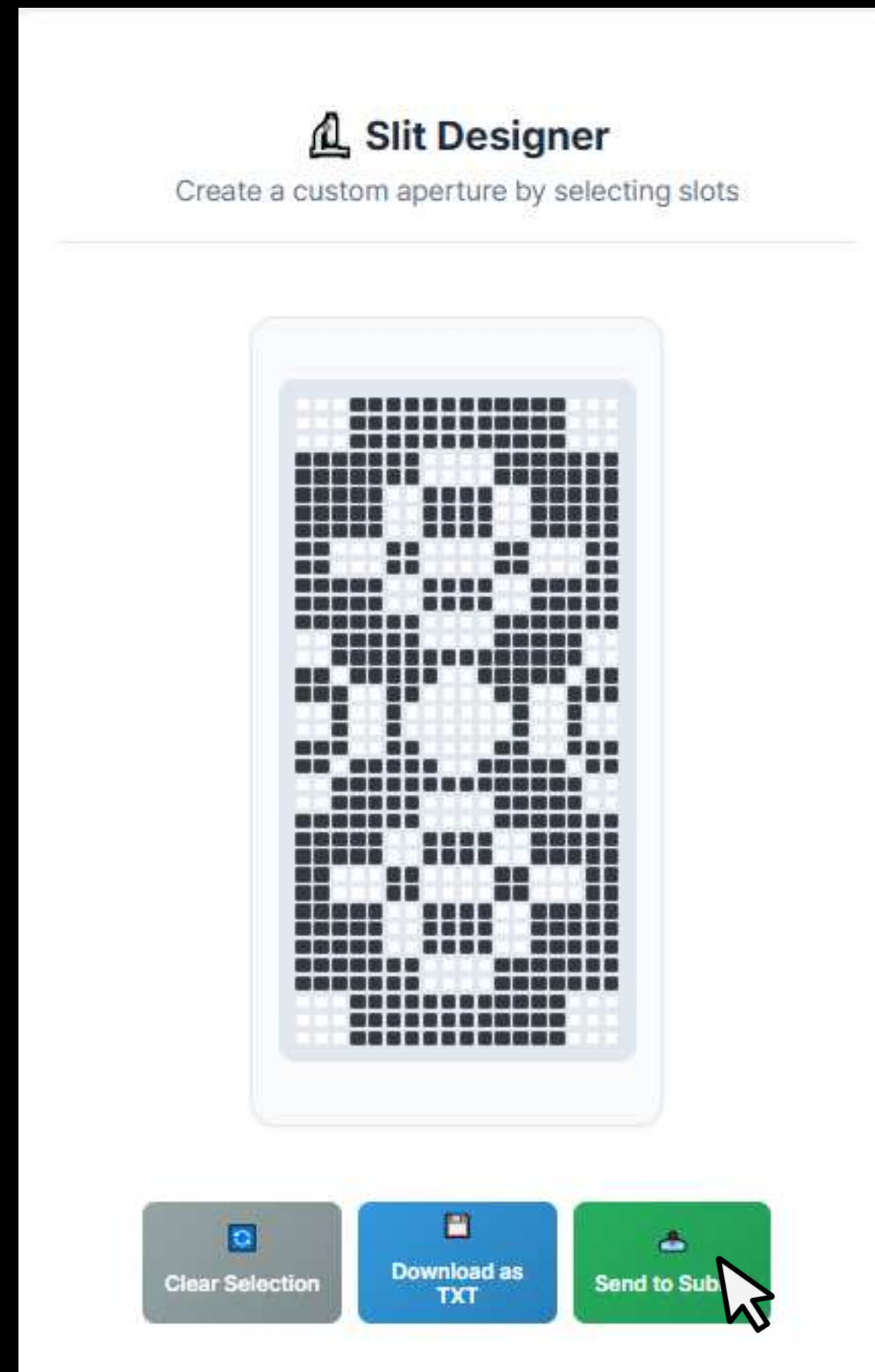
β -phase

Problem Solving

γ -phase : Answer Submit (~11:10)

δ -phase : Selecting Best Answer (~11:50)

Forward
conversion



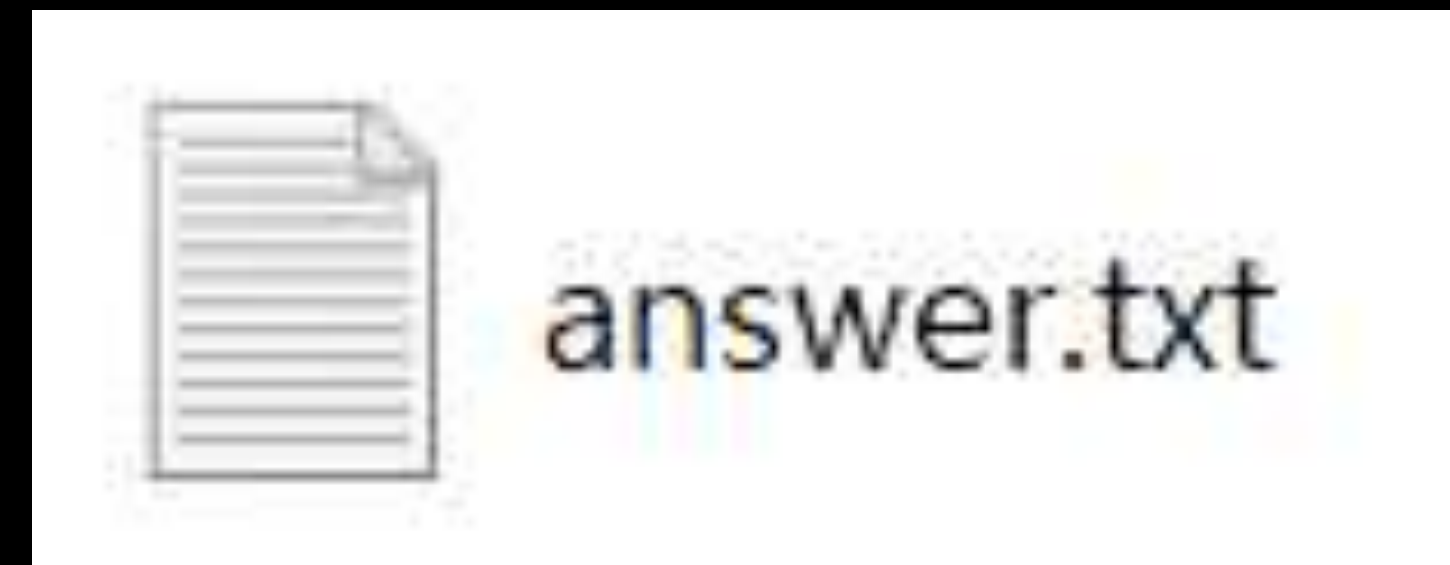
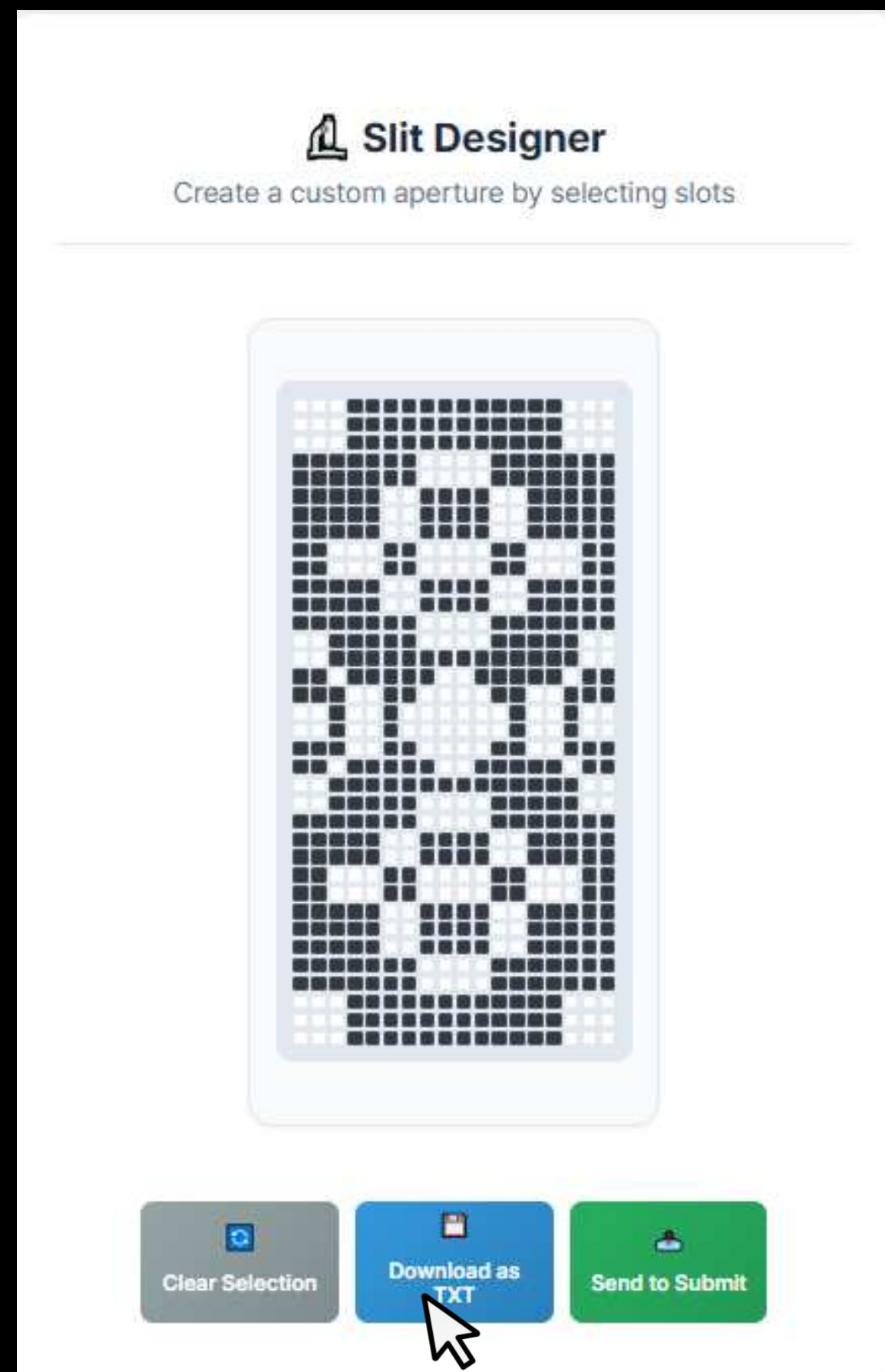
Predicted
Slit Shape

β -phase

Problem Solving

γ -phase : Answer Submit (~11:10)

δ -phase : Selecting Best Answer (~11:50)

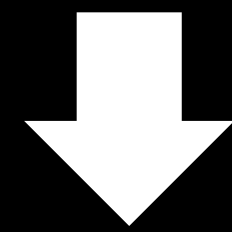
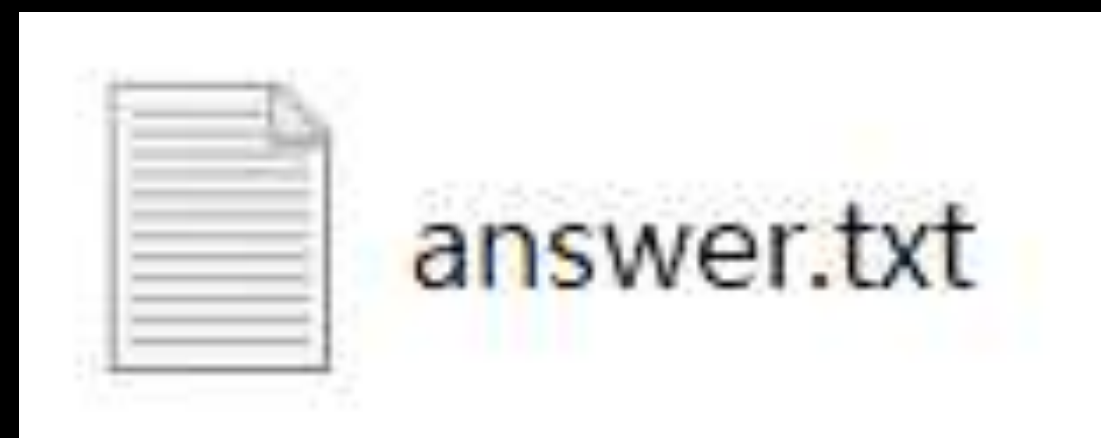


β -phase

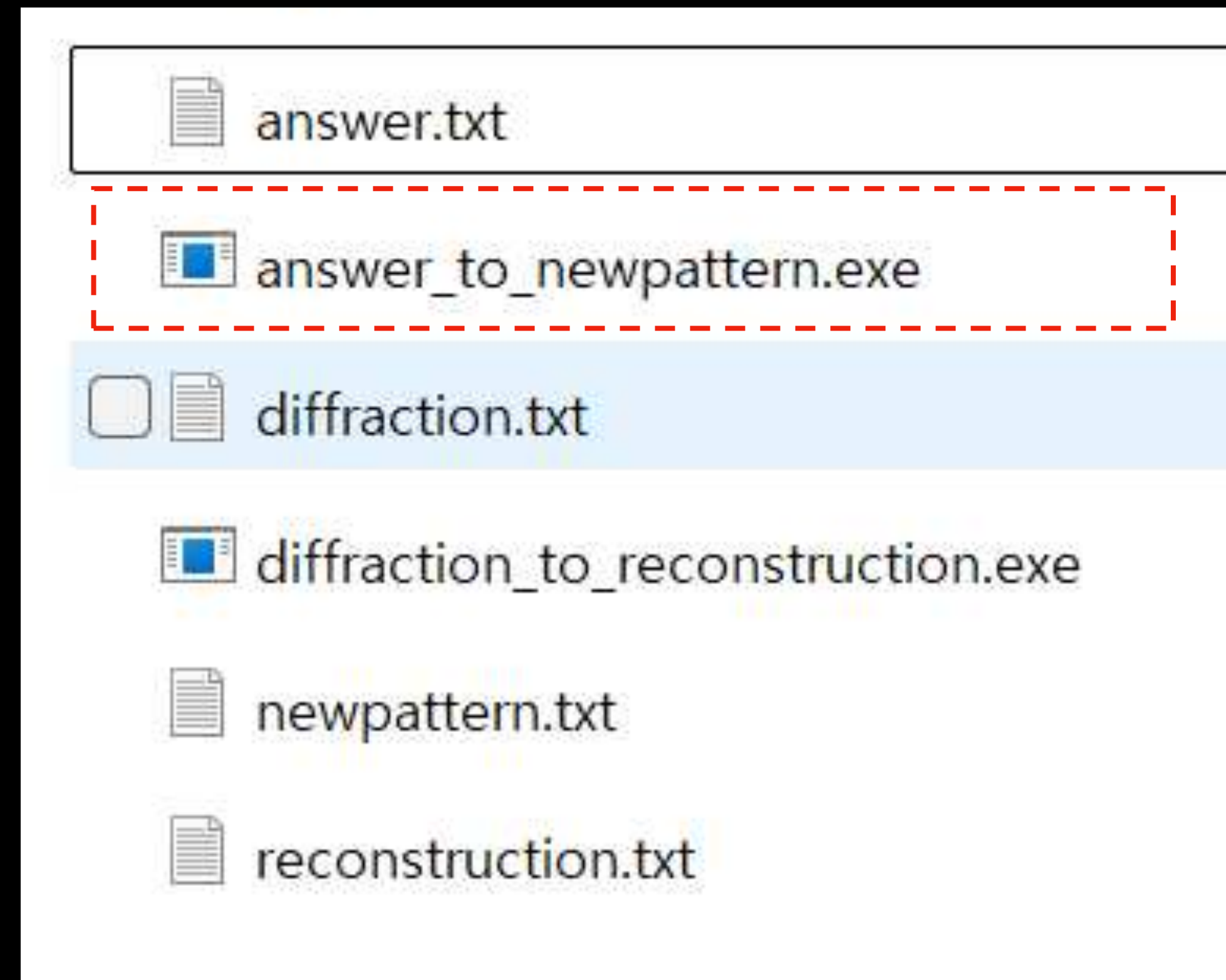
Problem Solving

γ -phase : Answer Submit (~11:10)

δ -phase : Selecting Best Answer (~11:50)



Use forward
conversion tool

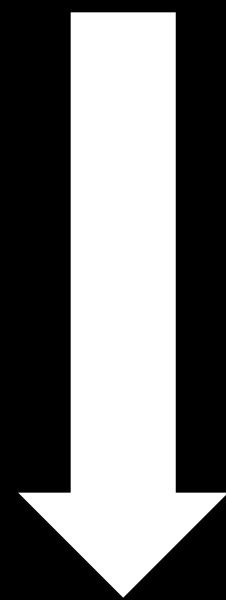
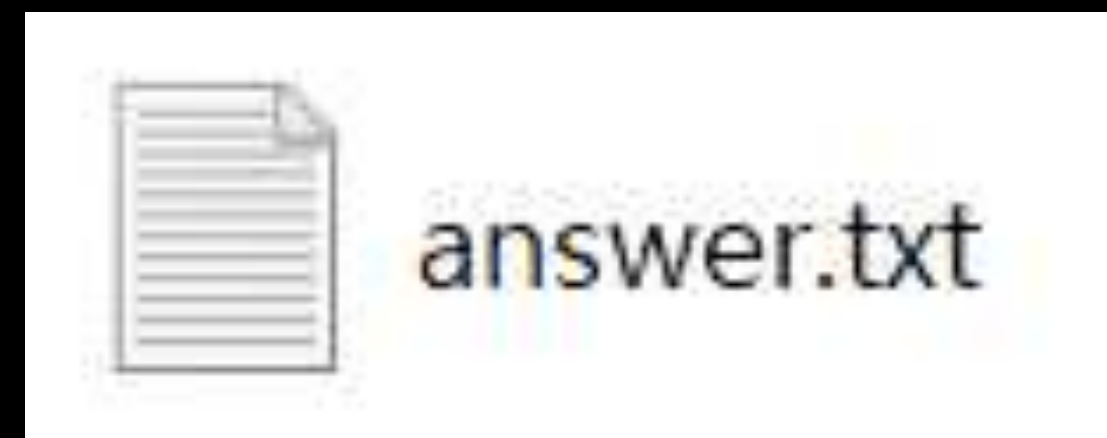


β -phase

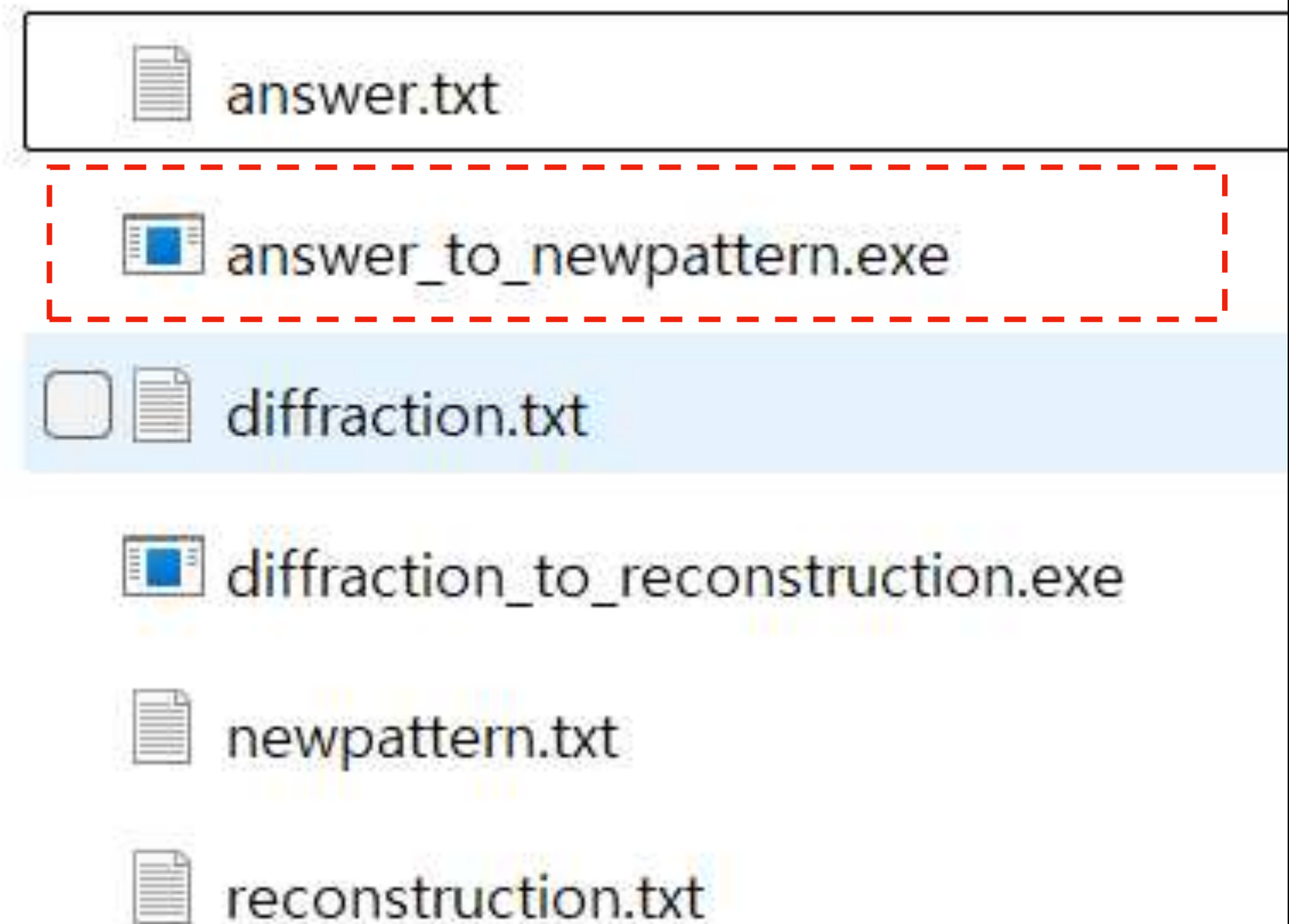
Problem Solving

γ -phase : Answer Submit (~11:10)

δ -phase : Selecting Best Answer (~11:50)



Use forward
conversion tool



β -phase

Problem Solving

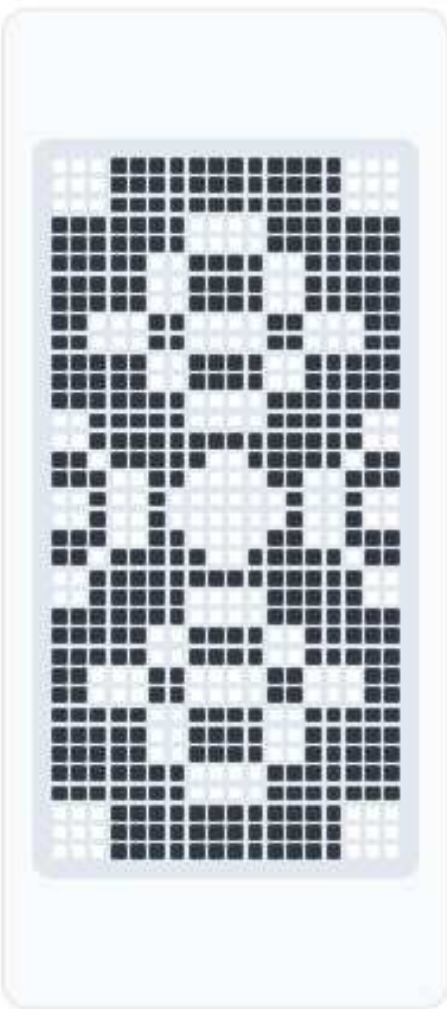
γ -phase : Answer Submit (~11:10)

δ -phase : Selecting Best Answer (~11:50)



Slit Designer

Create a custom aperture by selecting slots



A grid of 100x100 slots with a pattern of black and white squares.

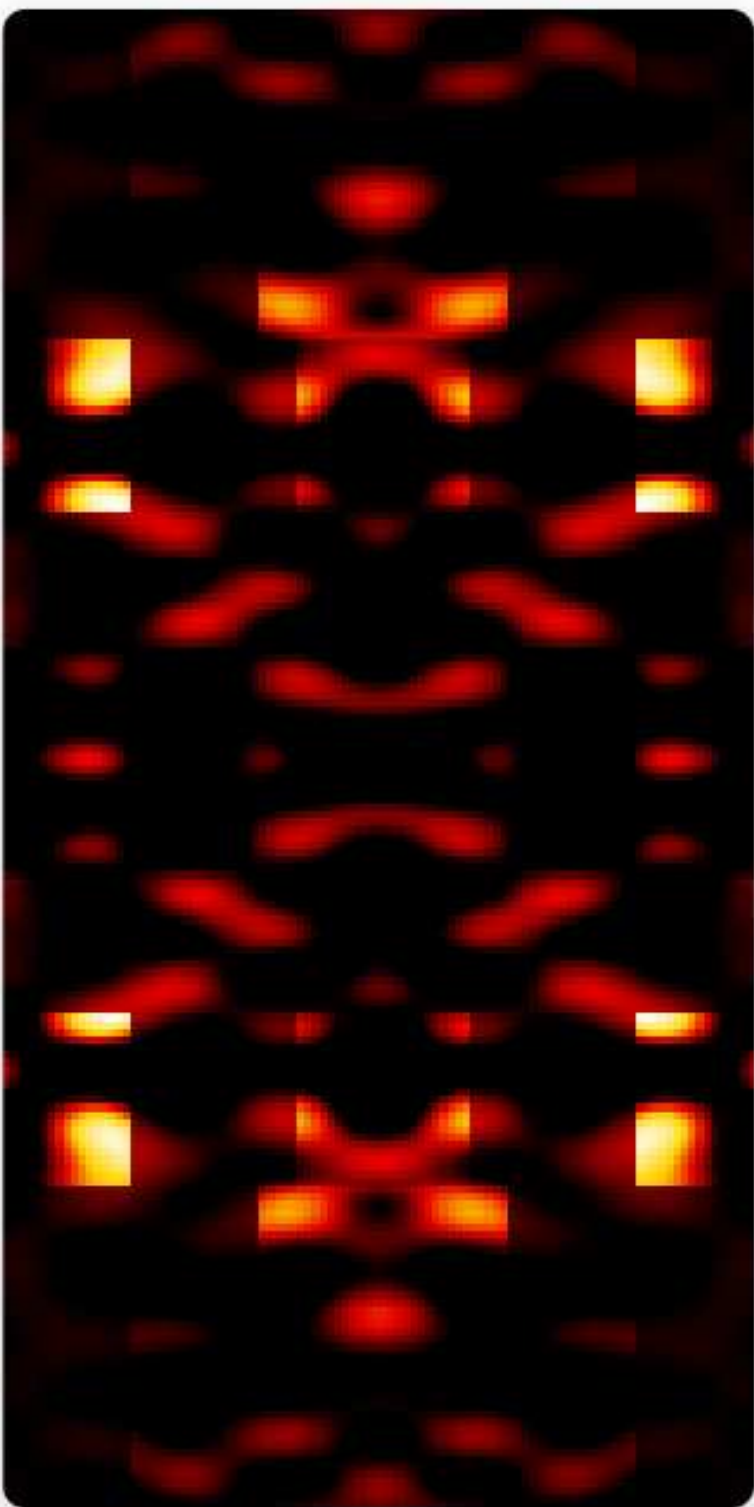
Clear SelectionDownload as TXTSend to Submit

Data Upload

TXT Data File Upload

Select File

Remove File



A vertical rectangular image showing a complex diffraction pattern with red and yellow spots on a black background.

β -phase

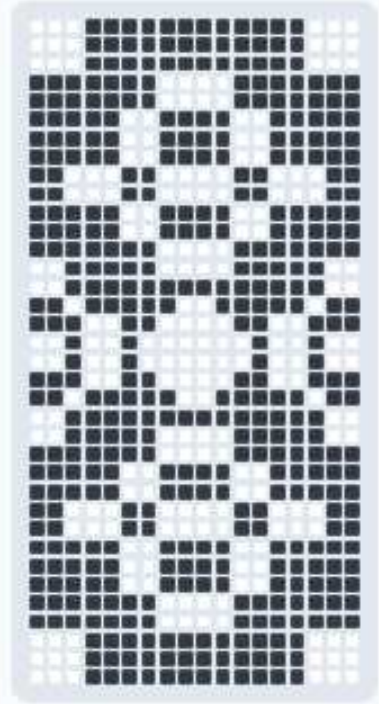
Problem Solving

γ -phase : Answer Submit (~11:10)

δ -phase : Selecting Best Answer (~11:50)

Slit Designer

Create a custom aperture by selecting slots



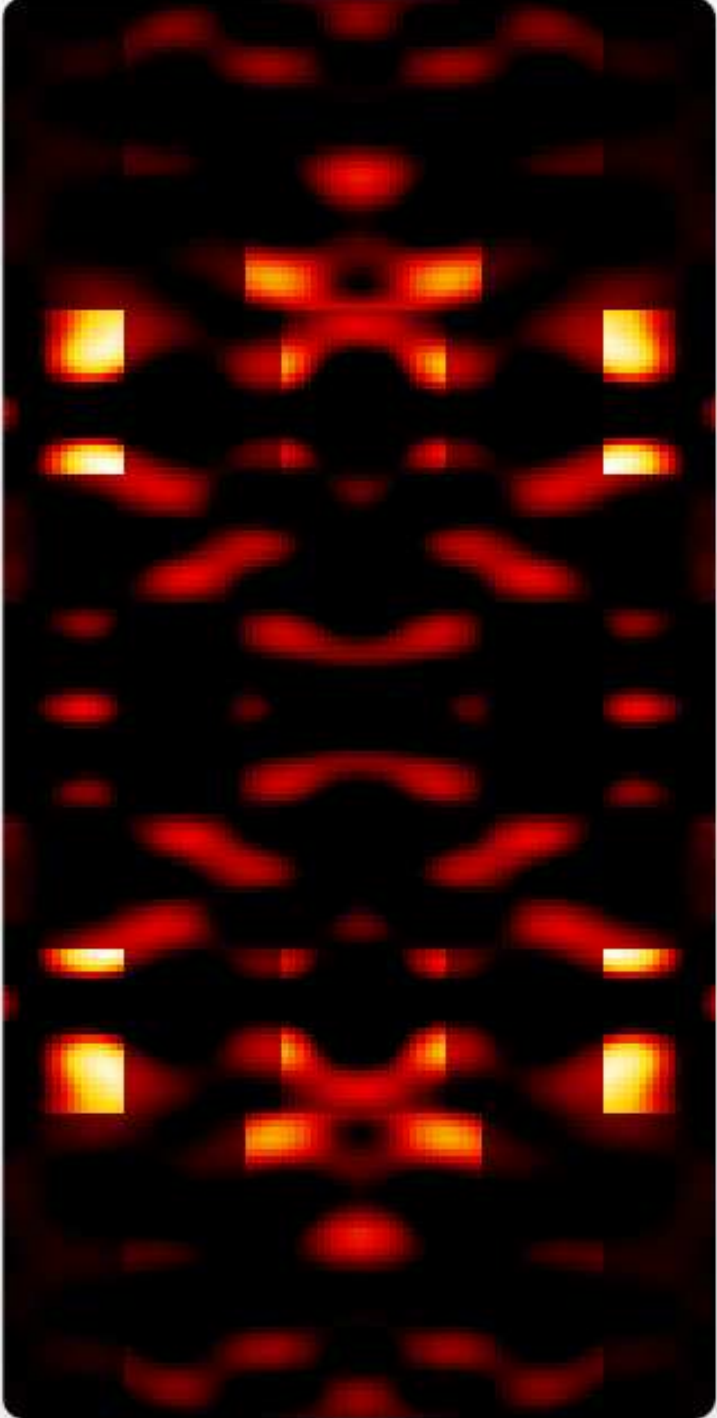
Clear SelectionDownload as TXTSend to Submit

Data Upload

TXT Data File Upload

Select File

Remove File

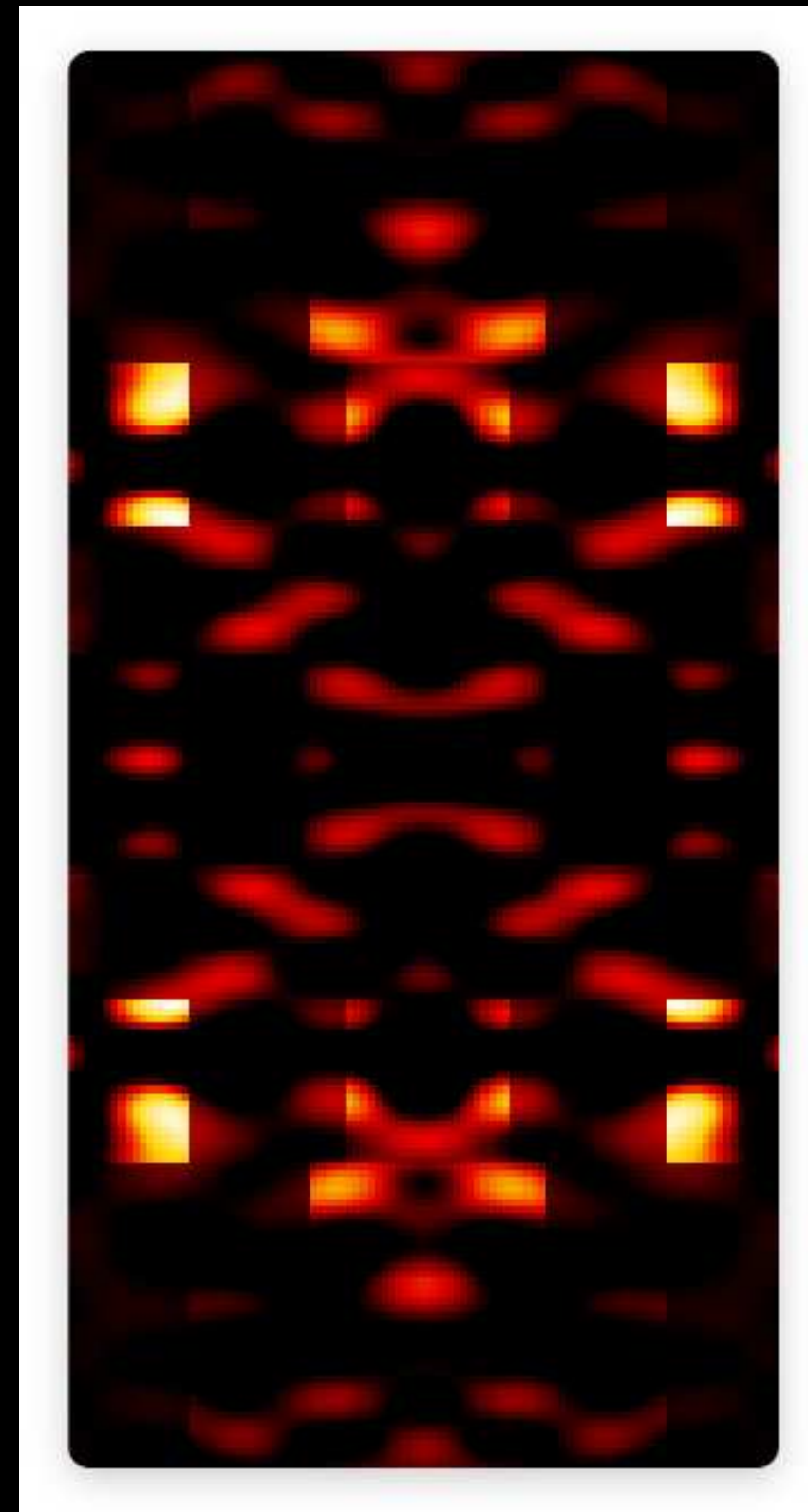


β -phase

Problem Solving

γ -phase : Answer Submit (~11:10)

δ -phase : Selecting Best Answer (~11:50)



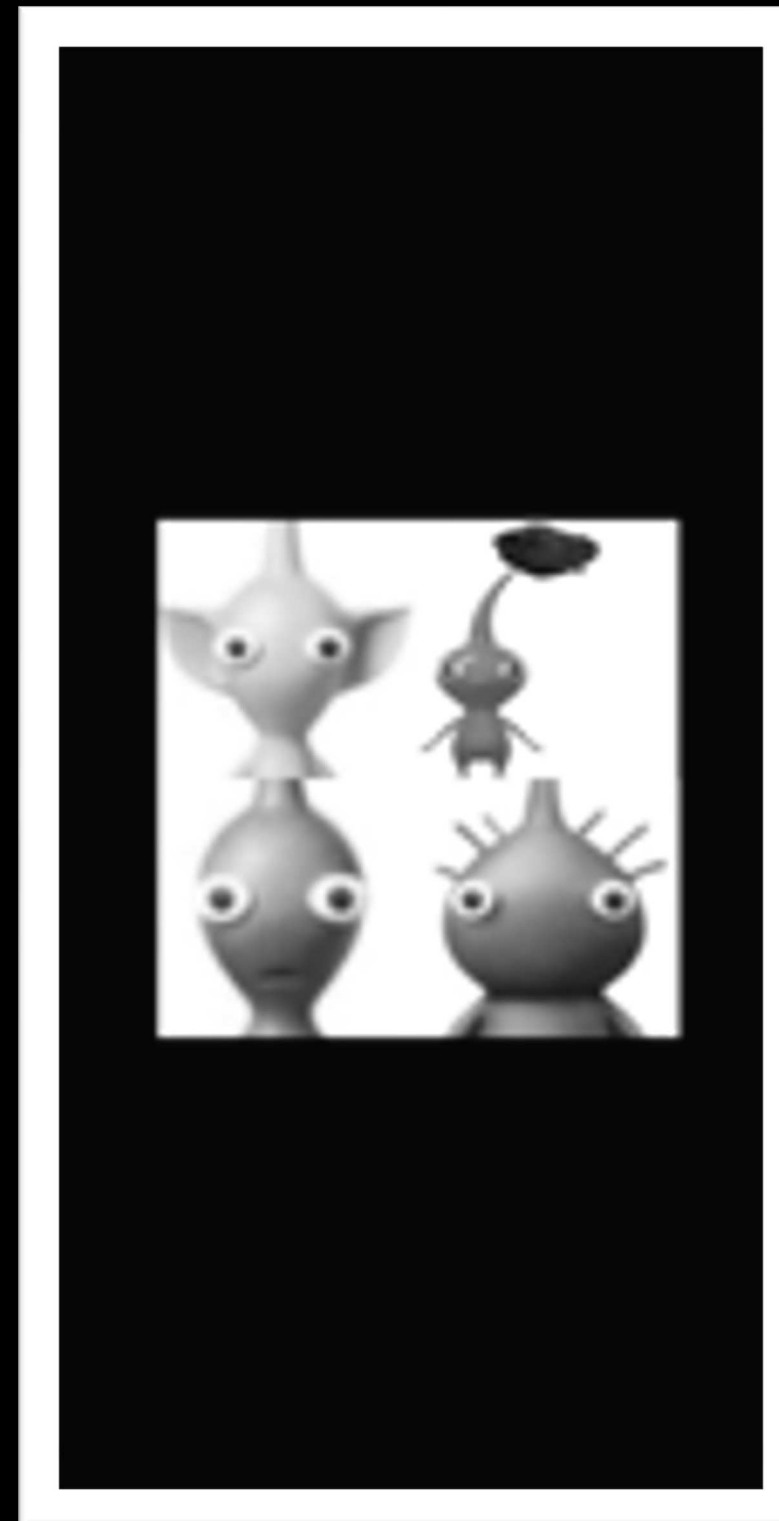
examine the result and
re-upload to refine the slit shape

β -phase

Problem Solving

γ -phase : Answer Submit (~11:10)

δ -phase : Selecting Best Answer (~11:50)



Through this sequence of forward and reverse conversions, participants determine the image arrangement to be submitted.

β-phase

Problem Solving

γ-phase : Answer Submit (~11:10)

δ-phase : Selecting Best Answer (~11:50)

Permission	Item	Photo Uploading	Reverse/Forward Conversion
	Check	O	O

γ -phase

Answer Submit

δ -phase : Selecting Best Answer (~11:50)

Final answer	Reasonable explanation

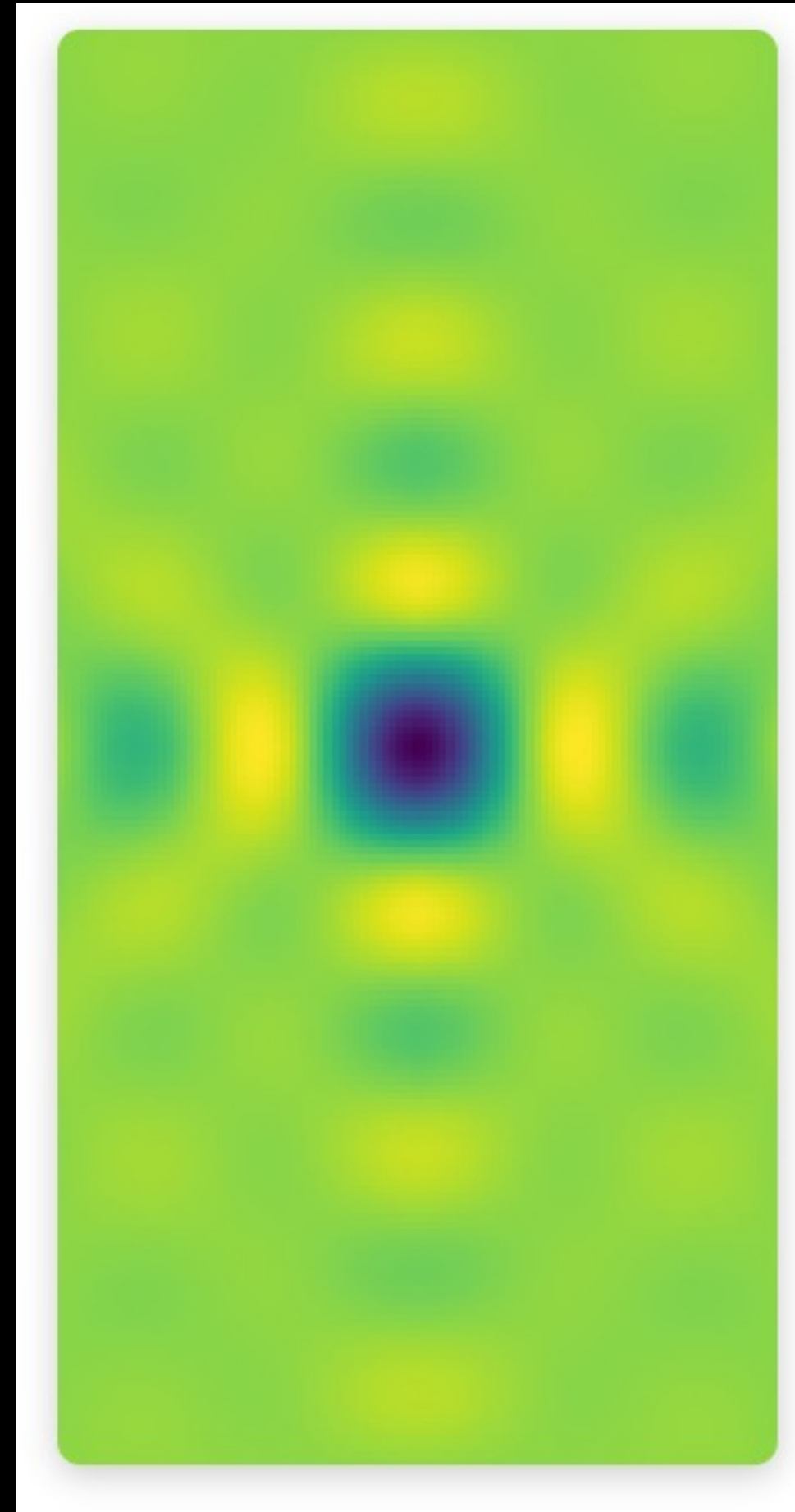
During the γ -phase, participants must submit the two items listed in the table.

γ -phase

Answer Submit

δ -phase : Selecting Best Answer (~11:50)

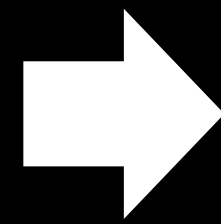
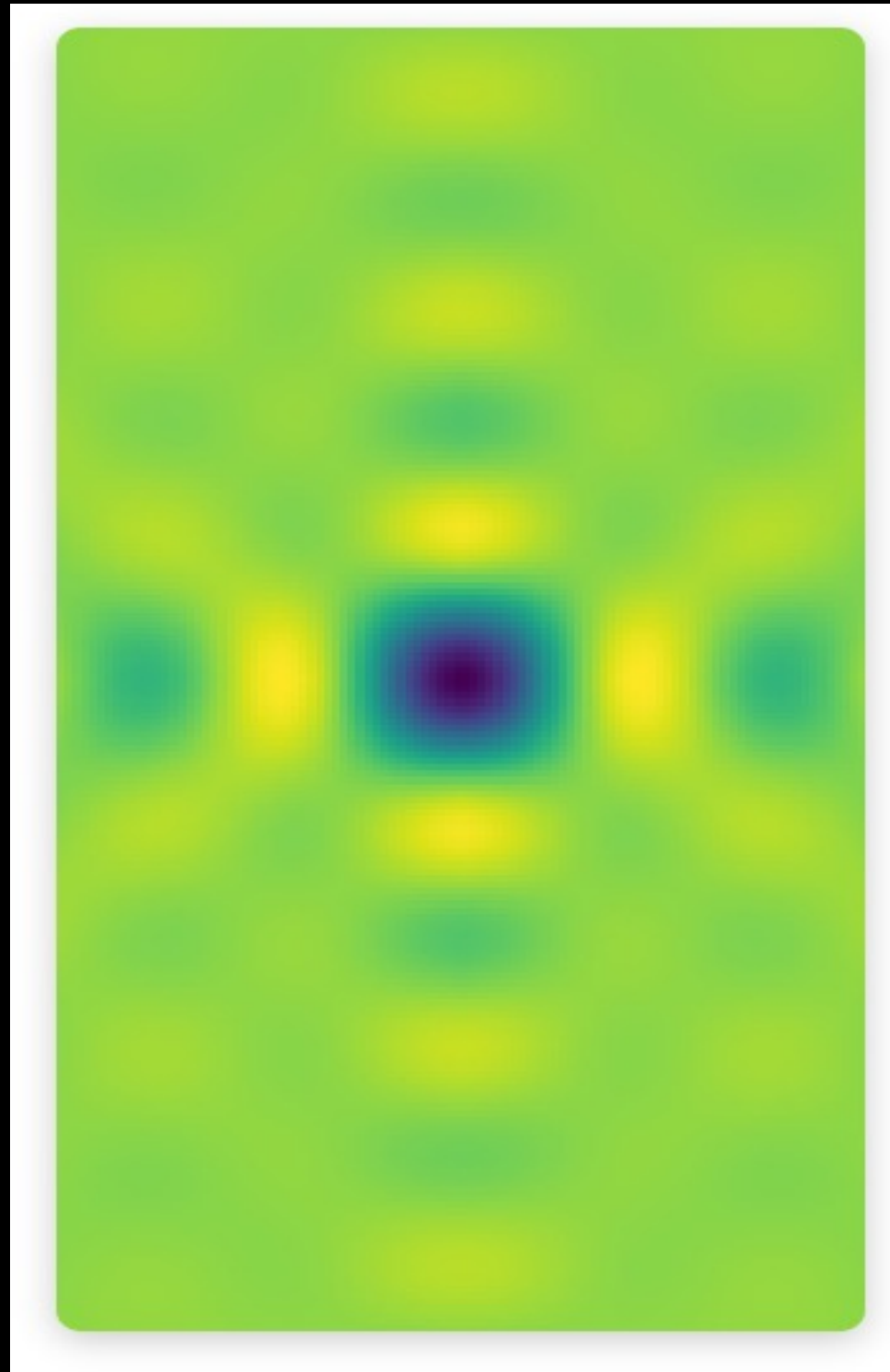
Reconstructed
Slit Shape



γ -phase

Answer Submit

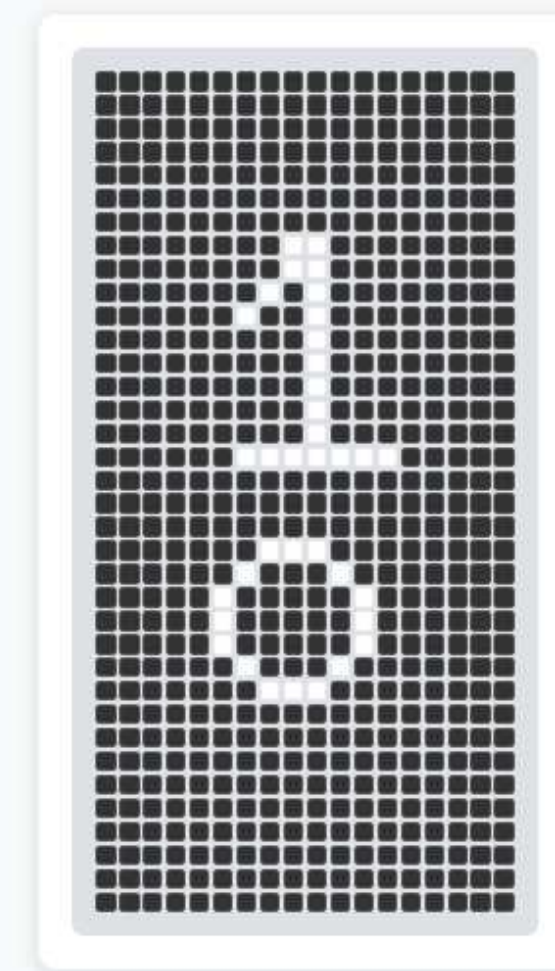
δ -phase : Selecting Best Answer (~11:50)



Answer Submission

Click on the grid squares to select your answer. You can click and drag to select multiple squares at once. You can submit multiple times to update your answer, and the latest submission will be saved.

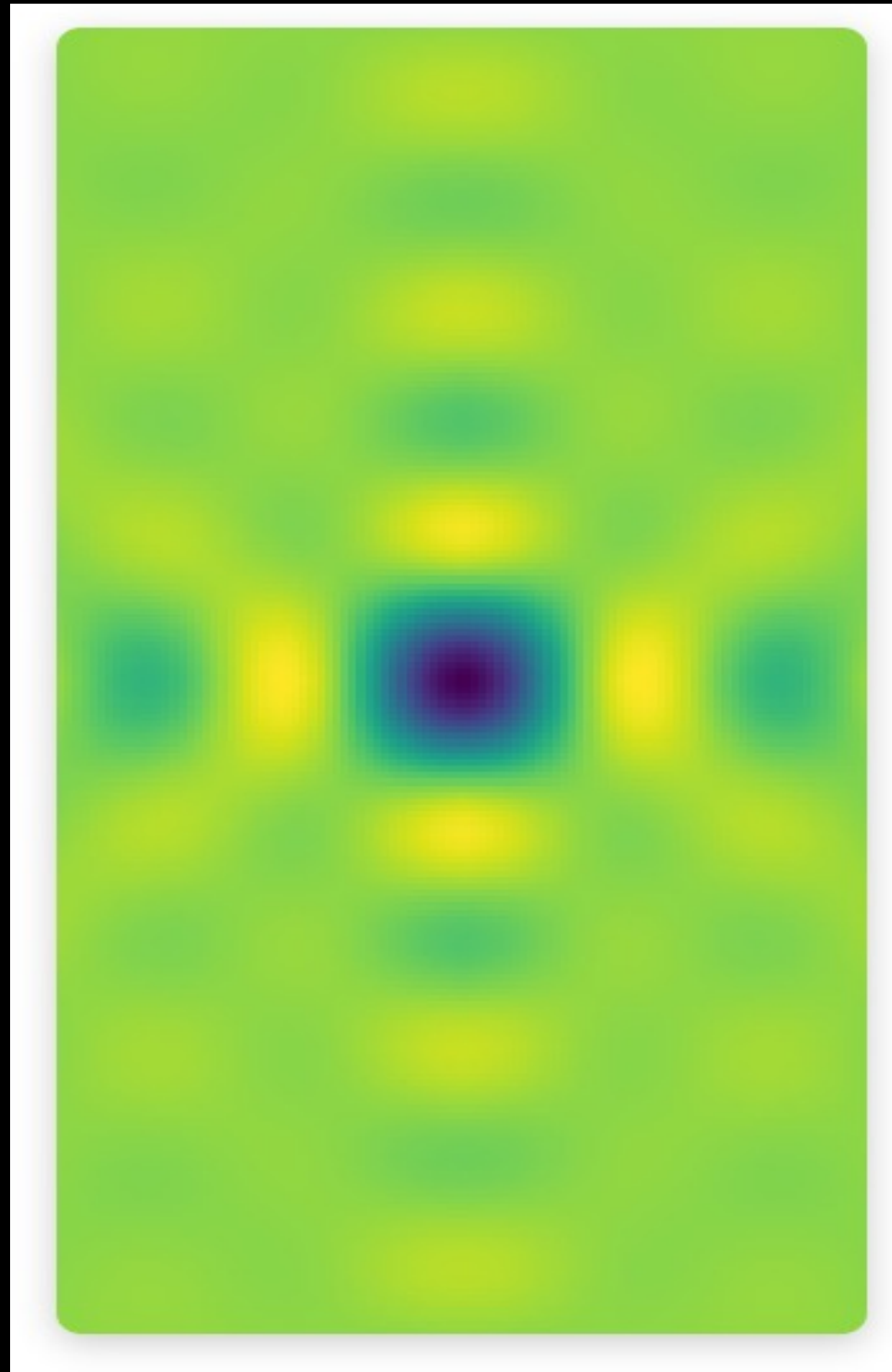
☐ Light Passes Through ☒ Light Blocked



γ -phase

Answer Submit

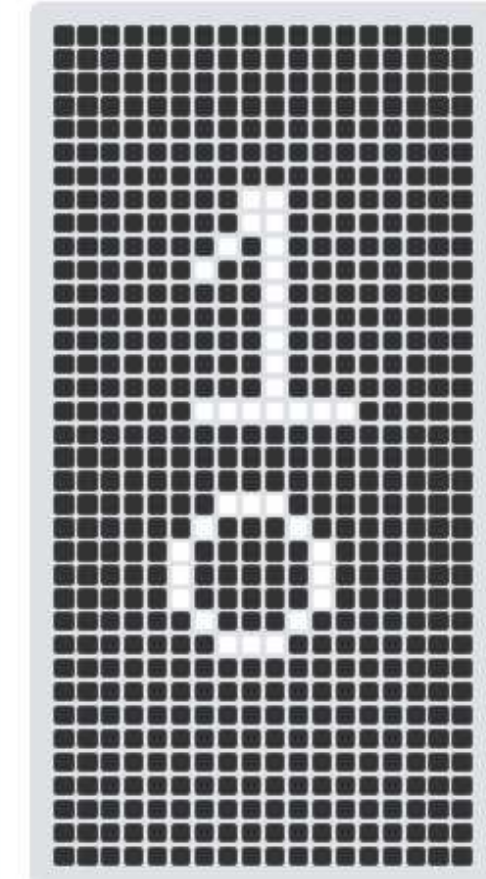
δ -phase : Selecting Best Answer (~11:50)



Answer Submission

Click on the grid squares to select your answer. You can click and drag to select multiple squares at once. You can submit multiple times to update your answer, and the latest submission will be saved.

☐ Light Passes Through ☒ Light Blocked

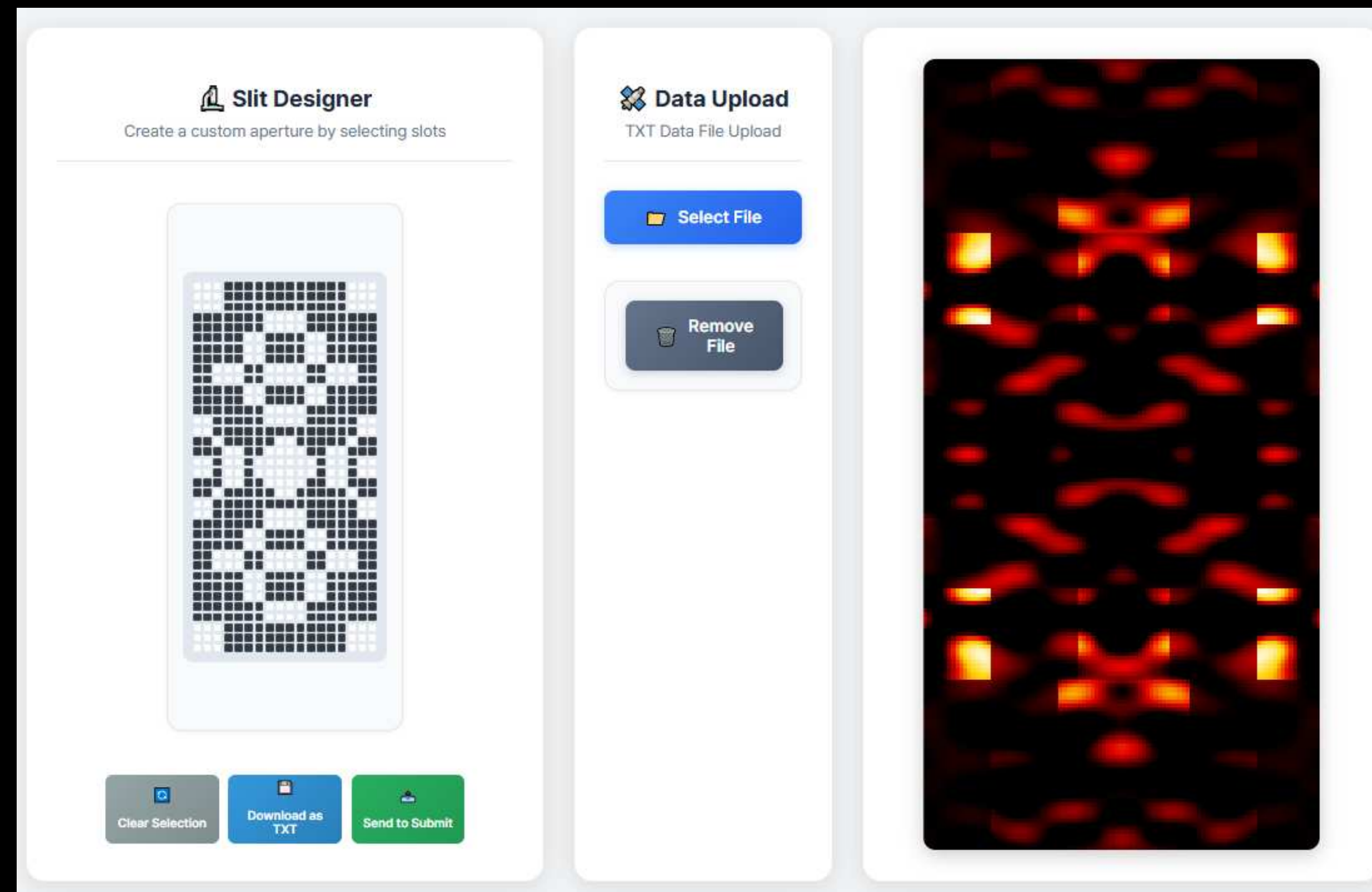
A 20x20 grid of squares where the central region is white (Light Passes Through) and the surrounding region is black (Light Blocked), forming a cross-like shape.

Participants analyze the reconstructed slit shape
to deduce the correct solution.

γ -phase

Answer Submit

δ -phase : Selecting Best Answer (~11:50)



Participants can also use the forward conversion
to verify their predicted answers.

γ -phase

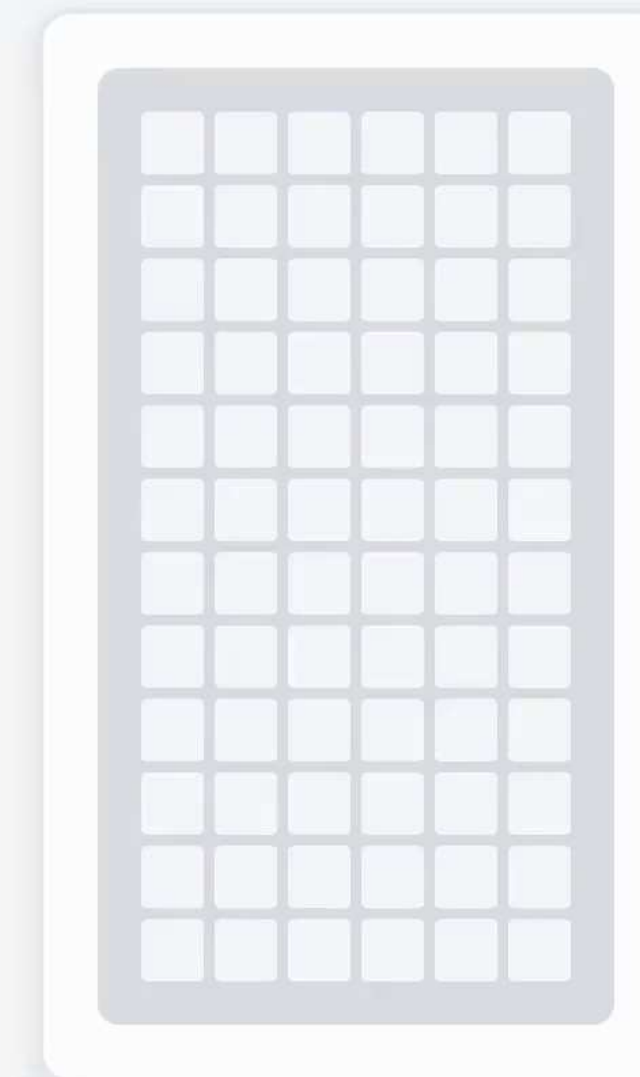
Answer Submit

δ -phase : Selecting Best Answer (~11:50)

Click
&
Drag

Answer Submission

Click on the grid squares to select your answer. You can click and drag to select multiple squares at once. You can submit multiple times to update your answer, and the latest submission will be saved.



Clear All

Save Draft

Submit Answer

γ -phase

Answer Submit

δ -phase : Selecting Best Answer (~11:50)

Final answer	Reasonable explanation
	

γ -phase

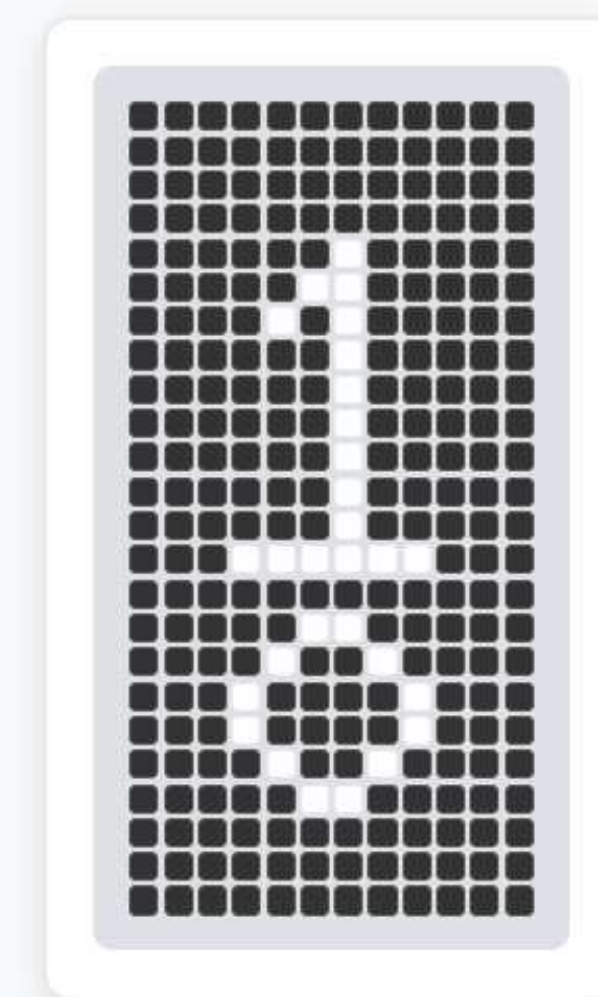
Answer Submit

δ -phase : Selecting Best Answer (~11:50)

**Write a reasonable explanation
in the comment section**

Answer Submission

Click on the grid squares to select your answer. You can click and drag to select multiple squares at once. You can submit multiple times to update your answer, and the latest submission will be saved.



Comment (Optional)

"1" the circle
because.....

28/500 characters

γ -phase

Answer Submit

δ -phase : Selecting Best Answer (~11:50)

Write a reasonable explanation
in the comment section

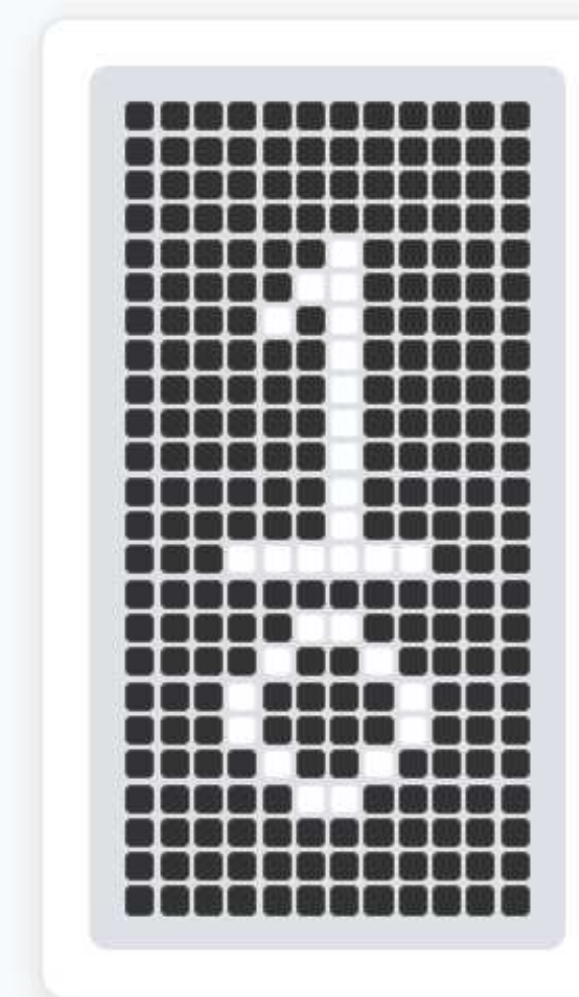
Comment (Optional)

"1" the circle
because.....

28/500 characters

Answer Submission

Click on the grid squares to select your answer. You can click and drag to select multiple squares at once. You can submit multiple times to update your answer, and the latest submission will be saved.



Comment (Optional)

"1" the circle
because.....

28/500 characters

γ -phase

Answer Submit

δ -phase : Selecting Best Answer (~11:50)

Write a reasonable explanation
in the comment section

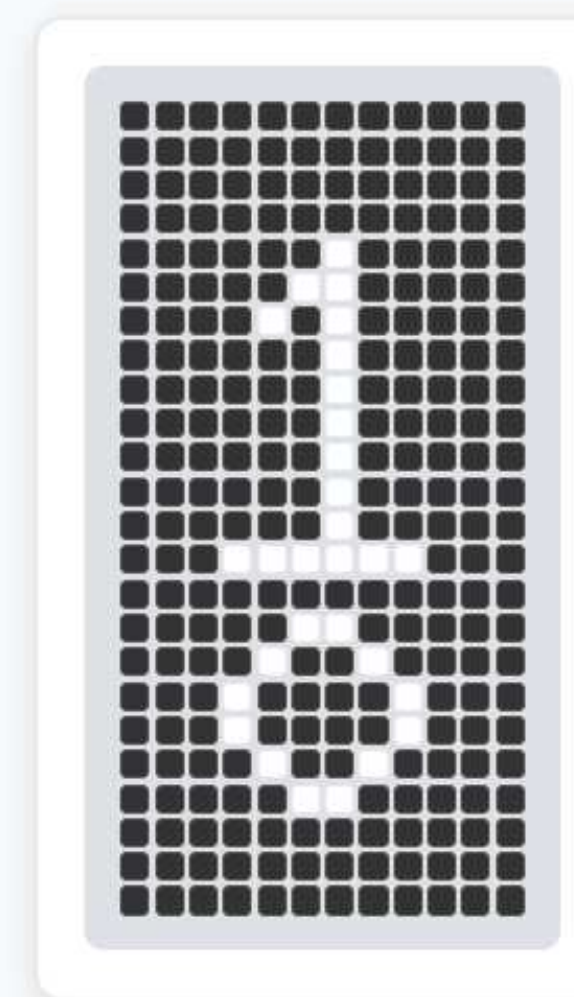
Comment (Optional)

"1" the circle
because.....

28/500 characters

Answer Submission

Click on the grid squares to select your answer. You can click and drag to select multiple squares at once. You can submit multiple times to update your answer, and the latest submission will be saved.



Comment (Optional)

"1" the circle
because.....

28/500 characters

γ -phase

Answer Submit

δ -phase : Selecting Best Answer (~11:50)

Final answer	Reasonable explanation
✓	✓

γ -phase

Answer Submit

δ -phase : Selecting Best Answer (~11:50)

Item Permission	Photo Uploading	Reverse/Forward Conversion
Check	X	O

δ -phase

Selecting Best Answer

First vote

Vote Participation

Test vote

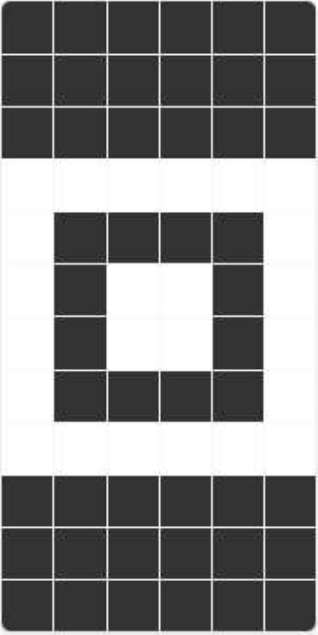
First vote

Max 5 votes

No duplicate selection, Anonymous voting

Option 1

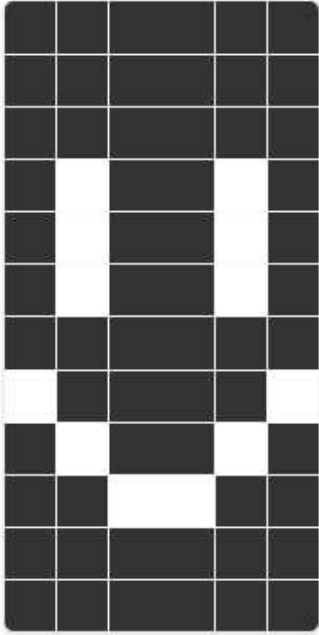
☐



Circle is circle.

Option 2

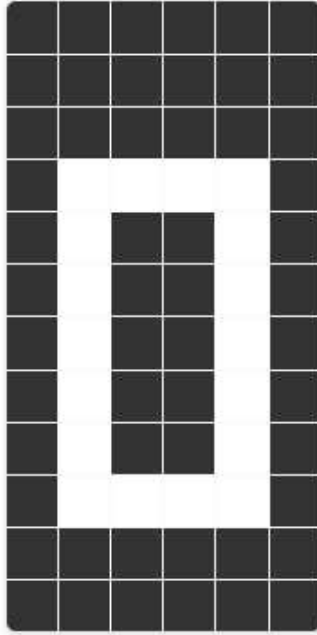
☐



smile 😊

Option 3

☐



Babo

Submit Vote

Please select an option.

δ -phase

Selecting Best Answer

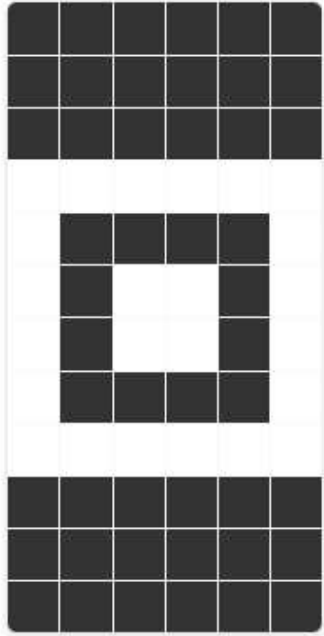
Vote Participation

Test vote

First vote

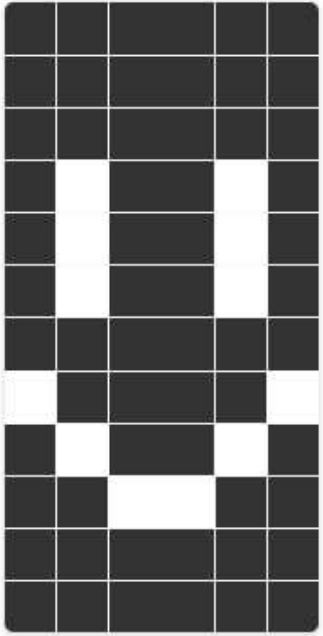
Max 5 votes No duplicate selection, Anonymous voting

Option 1



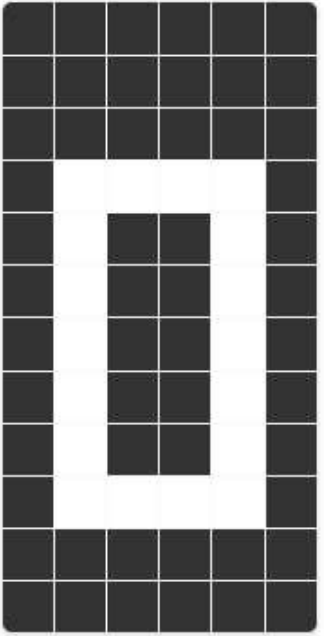
Circle is circle.

Option 2



smile 😊

Option 3



Babo

Submit Vote

Please select an option.

First vote



Each team has five votes

δ -phase

Selecting Best Answer

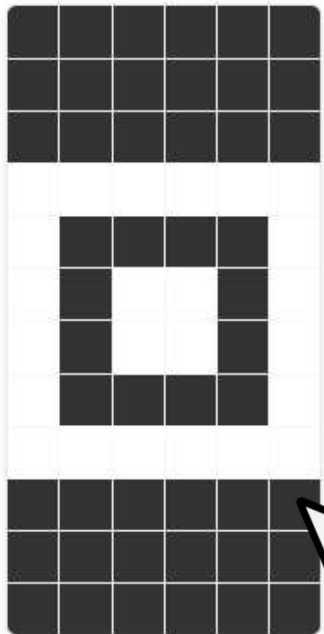
Vote Participation

Test vote

First vote

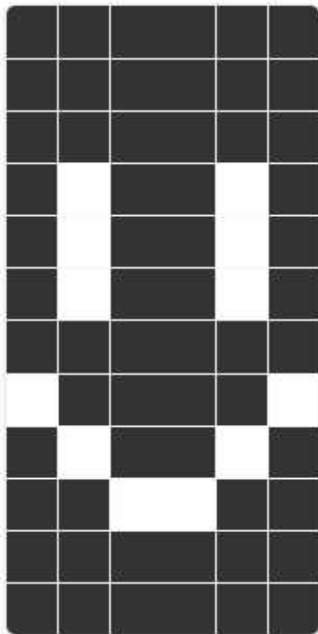
Max 5 votes No duplicate selection, Anonymous voting

Option 1 ☒



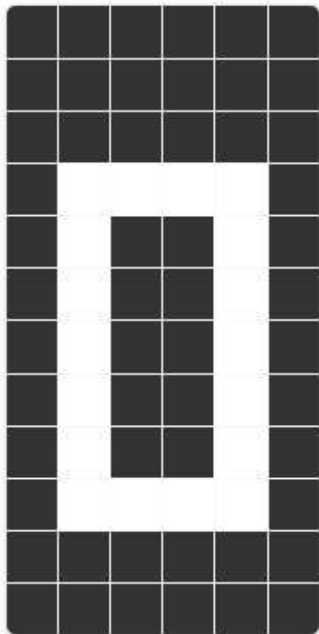
Circle is circle.

Option 2 ☐



smile 😊

Option 3 ☐



Babo

Submit Vote

1/5 vote used

First vote



Each team has five votes



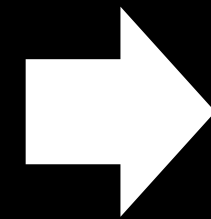
Duplicate voting is not allowed

δ -phase

Selecting Best Answer



18 teams



Representative Team



Around
~5 teams

The leaders of the top teams (around 5) in the voting results will come forward and give a 2-minute explanation based on their submitted reasoning.

δ -phase

Selecting Best Answer



18 teams



Representative Team



Around
~5 teams

The leaders of the top teams (around 5) in the voting results will come forward and give a 2-minute explanation based on their submitted reasoning.

δ -phase

Selecting Best Answer



18 teams

Vote



Representative Team



Around
~5 teams

The leaders of the top teams (around 5) in the voting results will come forward and give a 2-minute explanation based on their submitted reasoning.

δ -phase

Selecting Best Answer

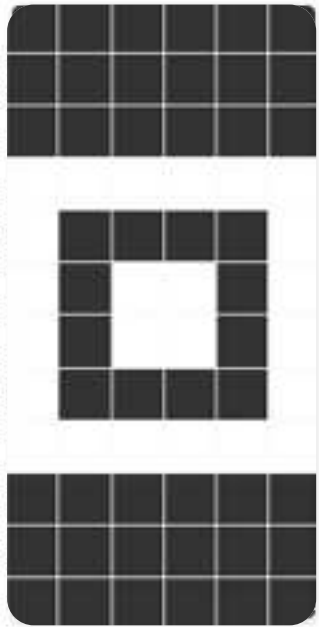
Vote Participation

Test Vote

Second Vote

Max 5 votes Duplicate selection allowed, Anonymous voting

Option 1 - 3 +



Circle is circle.

Submit Vote

3/5 votes used

Second vote



Each team has five votes;
This corresponds to one vote per person

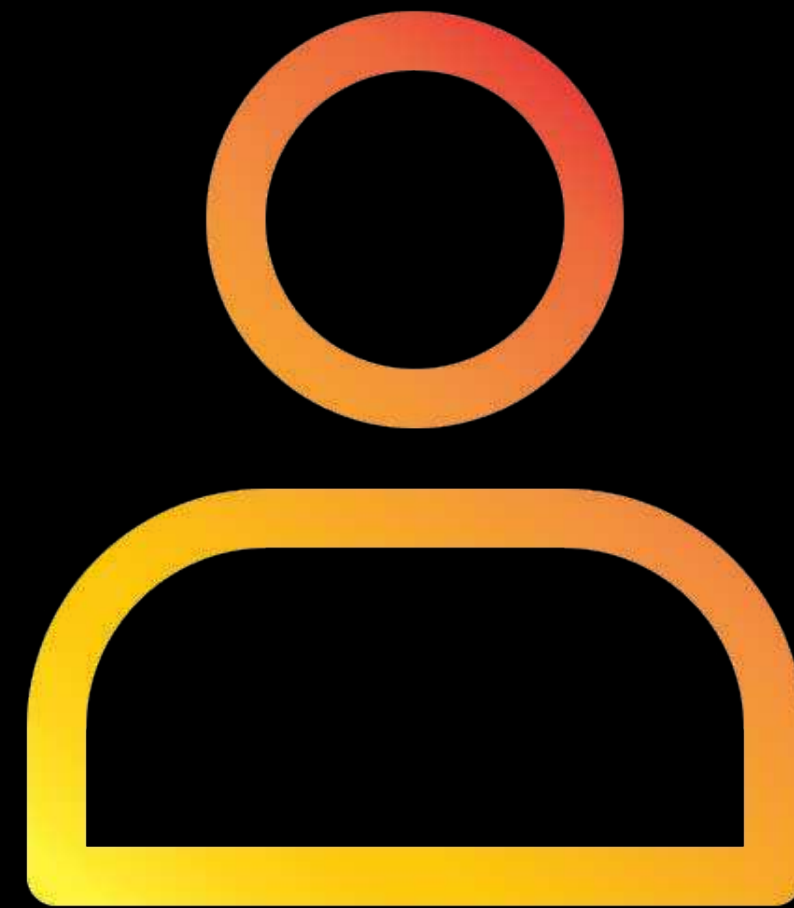


Duplicate voting is allowed

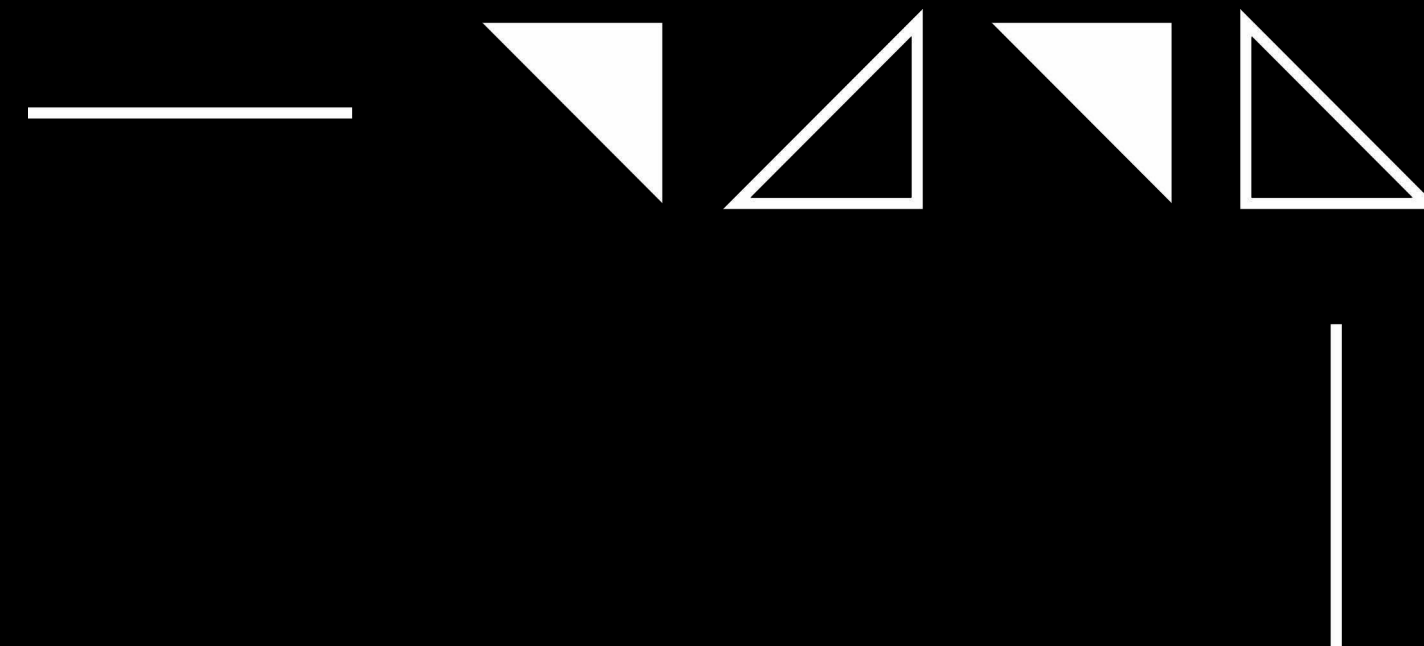
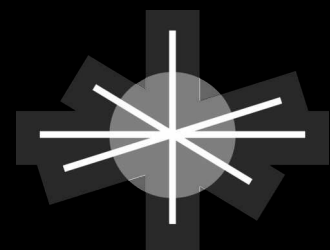
δ -phase

Selecting Best Answer

Reference Team

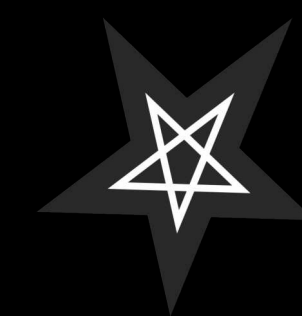


The team that receives the most votes in the second vote
will be selected as the Reference Team.



科学部

2025



Science Competition

