| Topic	WRAPPING UP AR
Class Description	Students will revise the Augmented Reality (AR) concepts they have learned during the module.
Class	C187
Class time	45 mins
Goal	● Revise the augmented reality concepts.
Resources Required	● Teacher Resources: ○ Visual Studio Code Editor ○ laptop with internet connectivity ○ smartphone ○ earphones with mic ○ notebook and pen ● Student Resources: ○ Visual Studio Code Editor ○ laptop with internet connectivity ○ smartphone ○ earphones with mic ○ notebook and pen

Class structure		
	Warm-Up	5 mins
	Teacher-led Activity	15 mins
	Student-led Activity	20 mins
	Wrap-Up	5 mins

WARM-UP SESSION - 5 mins

CONTEXT
● **Revising AR Concepts.**

Teacher Starts Slideshow

Slide 1 to 3 Refer to speaker notes and follow the instructions on each slide.	
Hey <student's name>. How are you? It's great to see you! Are you excited to learn something new today? **Following are the WARM-UP session deliverables:** ● Greet the student. ● Revision of previous class activities.	**ESR**: Hi, thanks! Yes I am excited about it! Click on the slide show tab and present the slides

WARM-UP QUIZ Click on In-Class Quiz

Continue WARM-UP Session **Slide 4 to 23**

Following are the session deliverables:
- Appreciate the student.
- Narrate the story by using hand gestures and voice modulation methods to bring in more interest in students.

Class Steps	Teacher Action	Student Action
Step 1: **Warm-Up** **(5 mins)**	Hi, how are you? Great!	**ESR:** I am good!
	Can you tell me what we have learned in the previous class?	**ESR:** ● We revised all the virtual reality concepts. ● We also learned about the particle system in VR. ● We made the fireworks using the **spe-particles** component.

	Great! In today's class we will walk through the augmented reality concepts that we have covered in this module. Are you excited? Let's get started then.	**ESR**: Yes.

Teacher Ends Slideshow

TEACHER-LED ACTIVITY - 15 mins

Teacher Initiates Screen Share

CHALLENGE
- **Revising AR Concepts.**

Step 2: Teacher-led Activity (15 mins)	*<The teacher downloads the presentation file from Teacher Activity 1.>* **[Teacher Activity 1]** Before we can begin, can you tell me what we have done in augmented reality? ● *Open and start the presentation by clicking on the "**Slide Show**" button.*	**ESR**: Varied.

	• *Use left/right arrow keys to move to the next/previous slide.* • *Share your screen during the Slide show and discuss the concepts along with it. Help the students to recollect and help them answer on their own.*	
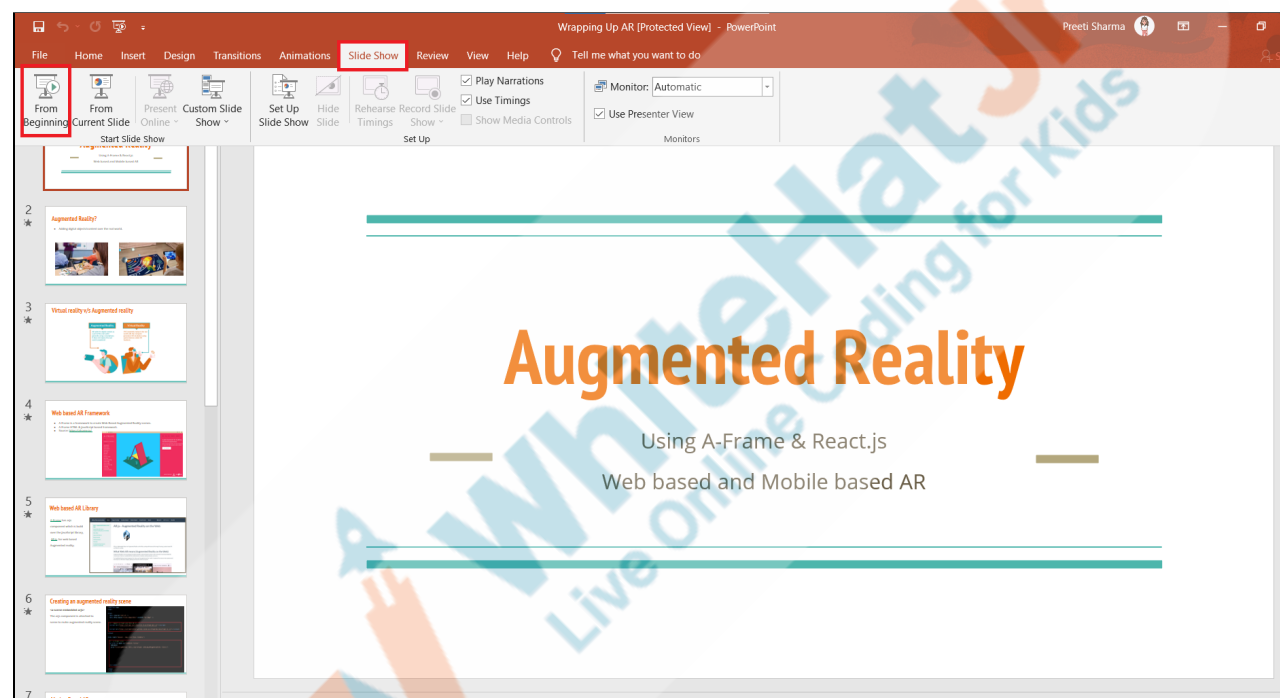
	Discuss each concept using the slides:
	
	• What is Augmented reality?
	• What is A-Frame?
	• How scenes are created?
	• A-Frame Camera.
	• A-Frame **arjs** component.
	• Marker based AR:
	    ○ Hiro & Kanji Marker
	    ○ Pattern Marker
	    ○ Barcode marker	

	● Markerless AR:
	  ○ Location based
	  ○ Face Recognition
	● Image tracking based AR.
	
	Note: Ask Questions & Encourage student to give answers on their own
	
	Help them recollect where they have used these concepts in the module.
	
	Now that we have revised the concepts let's quickly AR portfolio where you can show all your projects descriptions in AR.
	
	You will create pattern markers for each project and design a portfolio page.
	
	The portfolio page will have all the project pattern markers which can be scanned through the app.
	
	The app will be launched only after scanning the QR code on your portfolio.
	
	Are you excited?
		ESR: Yes!

Teacher Stops Screen Share		
	Now it's your turn. Please share your screen with me.	
Teacher Starts Slideshow 🖼️		

We have one more class challenge for you. Can you solve it? Let's try. I will guide you through it.	

Teacher Ends Slideshow

STUDENT-LED ACTIVITY - 20 mins

- **Ask the student to press the ESC key to come back to the panel.**
- **Guide the student to start screen share.**
- **Teacher gets into fullscreen.**

ACTIVITY

- **Creating an Augmented reality portfolio with a list of the projects they created in this module.**

Step 3: Student-led Activity (20 mins)	*Guide the student to download the boilerplate code from Student Activity 1.*	
	Guide the student to set the basic A-Frame scene.	

```html
<!DOCTYPE html>
<html>

<head>
  <meta charset="utf-8" />
  <meta http-equiv="X-UA-Compatible" content="IE=edge" />
  <title>Marker based AR Portfolio</title>

  <!-- Import A-Frame and then AR.js -->
  <script src="https://aframe.io/releases/1.0.4/aframe.min.js"></script>

  <script src="https://jeromeetienne.github.io/AR.js/aframe/build/aframe-ar.js"></script>

</head>

<body style="margin : 0px; overflow: hidden;">

  <!-- A-frame scene -->
  <a-scene vr-mode-ui="enabled: false;" embedded
    arjs="trackingMethod: best; sourceType: webcam;debugUIEnabled: false;">



  </a-scene>
</body>

</html>
```

	Guide the student to create pattern markers of the 6 images given in the assets folder:	
	 • *Open the link to create a pattern marker: AR.js Marker Training.* • *Upload the first icon image.* • *Download the pattern marker and pattern image.* • *Repeat the activity for all other 5 icon images.*	

Open *AR.js Marker Training*

Upload the image to generate pattern marker (.patt file) and pattern image (.png file)

Download to generate pattern marker(.patt file) and pattern image(.png file)

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	*Guide the student to add the pattern marker to the scene for **each** project using <a-marker> or <a-marker-camera> tag.*	

```
<!-- Project Virtual Flight -->
<a-marker-camera type="pattern" url="./pattern-marker/virtual-flight/pattern-icon-01.patt">

</a-marker-camera>
```

```
<!-- Project Virtual Tour -->
<a-marker-camera type="pattern" url="./pattern-marker/virtual-tour/pattern-icon-04.patt">

</a-marker-camera>
```

```
<!-- Project Virtual Shooting Game -->
<a-marker-camera type="pattern" url="./pattern-marker/shooting-game/pattern-icon-03.patt">

</a-marker-camera>
```

```
<!-- Project AR Menu Card -->
<a-marker-camera type="pattern" url="./pattern-marker/ar-menu-card/pattern-icon-02.patt">

</a-marker-camera>
```

```
<!-- Project AR Navigation-->
<a-marker-camera type="pattern" url="./pattern-marker/ar-navigation/pattern-icon-03.patt">

</a-marker-camera>
```

```
<!-- Project AR Face Recognition-->
<a-marker-camera type="pattern" url="./pattern-marker/ar-face-recognition/pattern-icon-06.patt">

</a-marker-camera>
```

	Guide the student to add the video or image as a child of the <a-marker> whichever they like to show once the marker is scanned.	

	Guide the student to create the images/video for their projects by themselves.	

```html
<a-assets>

  <img id="card2" src="./VR-AR-ProjectCards/2.png">
  <img id="card3" src="./VR-AR-ProjectCards/3.png">
  <img id="card4" src="./VR-AR-ProjectCards/4.png">
  <img id="card5" src="./VR-AR-ProjectCards/5.png">
  <img id="card6" src="./VR-AR-ProjectCards/6.png">

</a-assets>


<!-- Project Virtual Flight -->
<a-marker type="pattern" url="pattern-marker/virtual-flight/pattern-icon-01.patt">
  <a-plane src="#card2" position="0 0 -1" width="2" height="1.5" rotation="-90 0 0"></a-plane>
</a-marker>

<!-- Project Virtual Tour -->
<a-marker type="pattern" url="pattern-marker/virtual-tour/pattern-icon-04.patt">
  <a-plane src="#card3" position="0 0 -1" width="2" height="1.5" rotation="-90 0 0"></a-plane>
</a-marker>
```

	Guide the student to host the project by creating a new repo and get the hosted link.	

Create a new repository

A repository contains all project files, including the revision history. Already have a project repository elsewhere?
Import a repository.

Owner *   Repository name *

👤 PreetiSharma15 ▾ / AR Portfolio   ✓

Great repository names are shor Your new repository will be created as AR-Portfolio. t turbo-octo-fortnight?

Description (optional)

[   ]

⦿ 📓 **Public**
        Anyone on the internet can see this repository. You choose who can commit.

○   🔒 **Private**
        You choose who can see and commit to this repository.

Initialize this repository with:
Skip this step if you're importing an existing repository.

☑ **Add a README file**
    This is where you can write a long description for your project. Learn more.

☐ **Add .gitignore**
    Choose which files not to track from a list of templates. Learn more.

☐ **Choose a license**
    A license tells others what they can and can't do with your code. Learn more.

| Options	
Manage access	**GitHub Pages**
Security & analysis	GitHub Pages is designed to host your personal, organization, or project pages from a GitHub repository.
Branches	✓ Your site is published at https://preetisharma15.github.io/AR-Portfolio/
Webhooks	
Notifications	**Source**
	Your GitHub Pages site is currently being built from the main branch. Learn more.
Integrations	� Branch: main ▾ 📁 / (root) ▾ Save
Deploy keys	**Theme Chooser**
	Select a theme to publish your site with a Jekyll theme. Learn more.
Actions	Choose a theme
Environments	**Custom domain**
	Custom domains allow you to serve your site from a domain other than preetisharma15.github.io. Learn more.

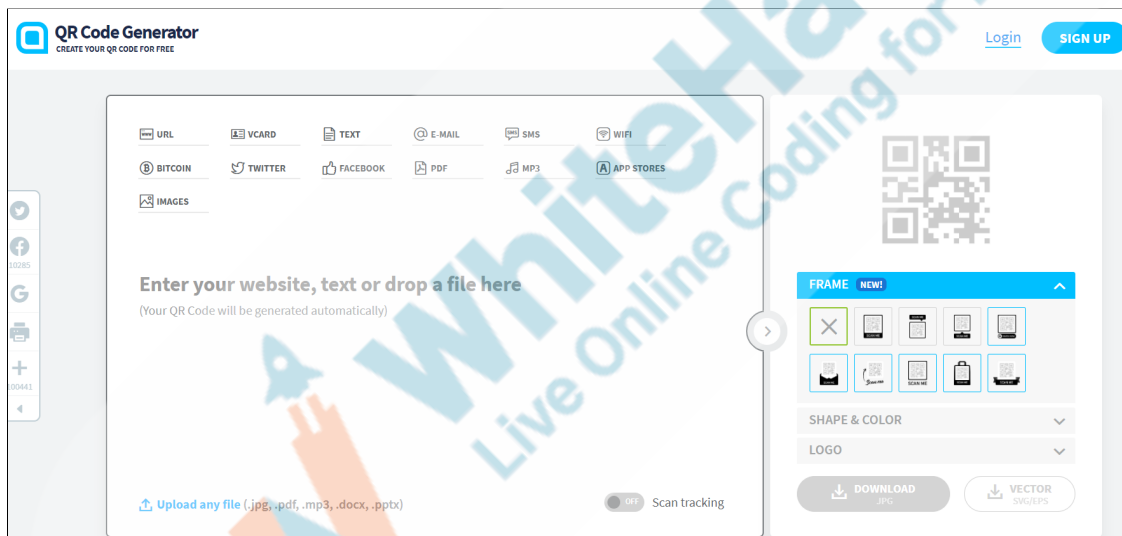|	*Guide the student to get the QR Code for the hosted link of this project:* • *Open QR Generator link*	

	● *Paste the GitHub hosted link(**Note**: You can include index.html at the end of the hosted link if the direct link does not give the output.)* ● *Click download.* ***Note***: *Do not go back or refresh the page while QR Code is being generated.*	

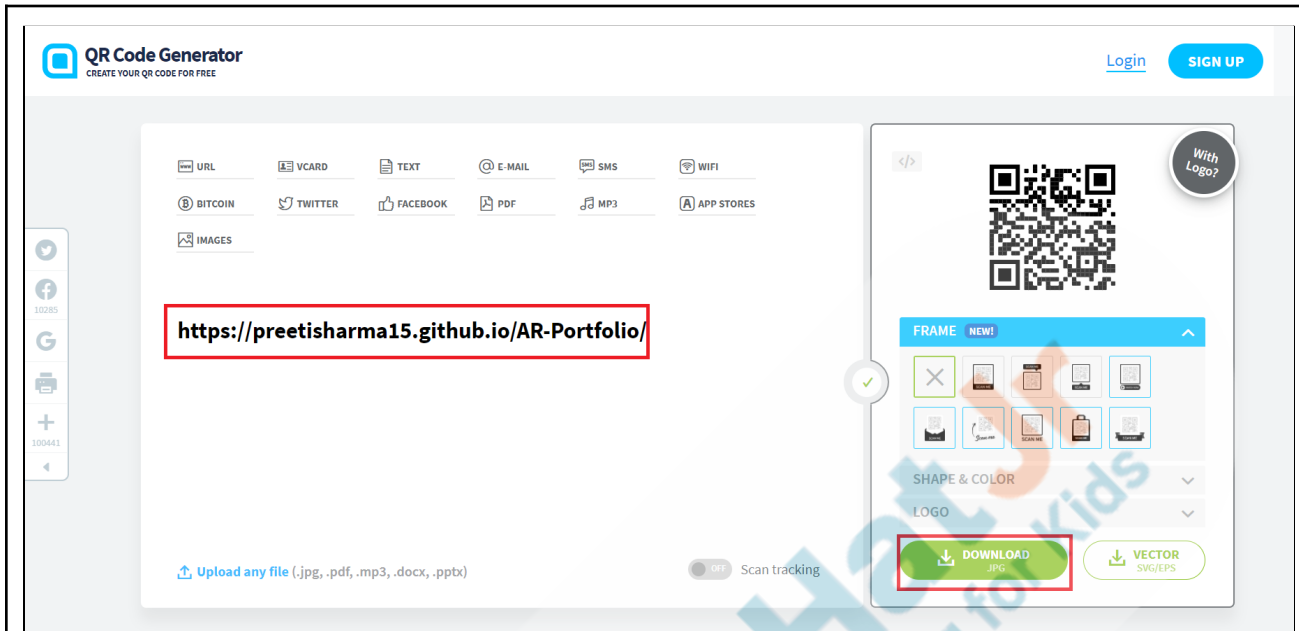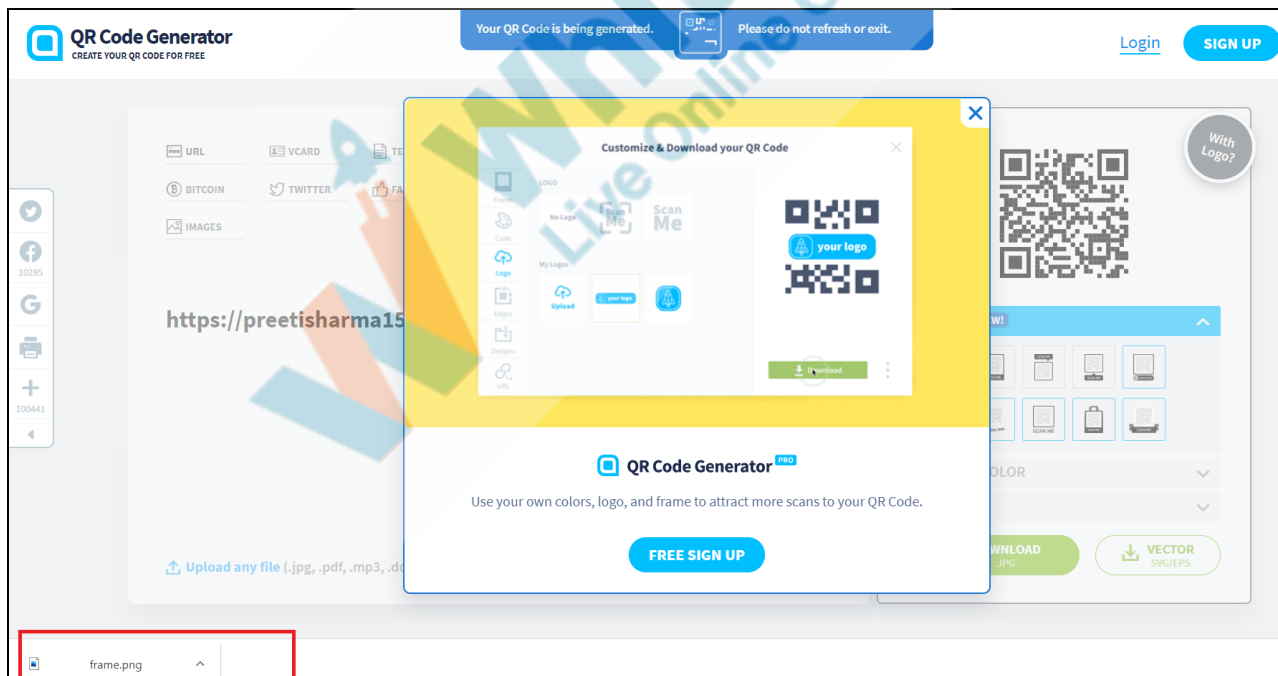● *Open* *[QR Generator link](#)*

● *Paste the GitHub hosted link. (**Note**: You can include index.html at the end of the hosted link if the direct link does not give the output.)*

- *Click download*

Once the QR image(.png file) is downloaded, you can add it to the document.

	Guide the student to design the ***portfolio page in the Google docs/Microsoft Docs*** *or any other online design editor:*
	
	   ● *Add your skills and hobbies or anything that you would want in your portfolio.*
	
	   ● *Do add the* ***pattern marker icons*** *and* ***QR code*** *in the portfolio document page.*	

Preeti Sharma
WhiteHatJr Student

Scan Me

ABOUT ME

Hi, I am Preeti and I love coding.

SKILLS

★ JavaScript
★ HTML
★ CSS
★ Python
★ Machine Learning
★ Virtual Reality
★ Augmented Reality

HOBBIES
Cycling, Reading books

PROJECTS
Launch the app using the QR code above & scan the icons below to know more about my AR-VR projects.

BADGES EARNED

Note: Place the pattern marker far away from each other in the portfolio doc to avoid overlapping of the image/video assigned to each marker.

	Guide the student to test the output: • *Scan the QR marker at top with the QR **Scanner app** (download the app if it is not available on your phone).* *Also if your smartphone has an advanced camera that can scan QR, you can also scan with that too.* • *Click on Go to the website. (Instruction might vary based on the scanning app.)* • *Scan the markers in the portfolio to see the image/video content over the respective pattern markers.*	
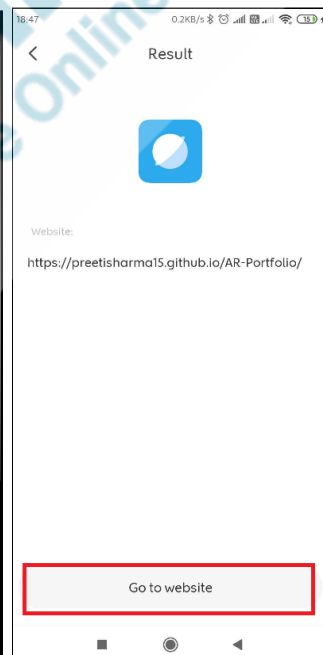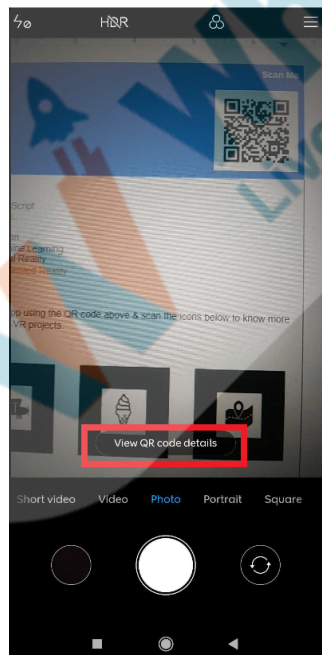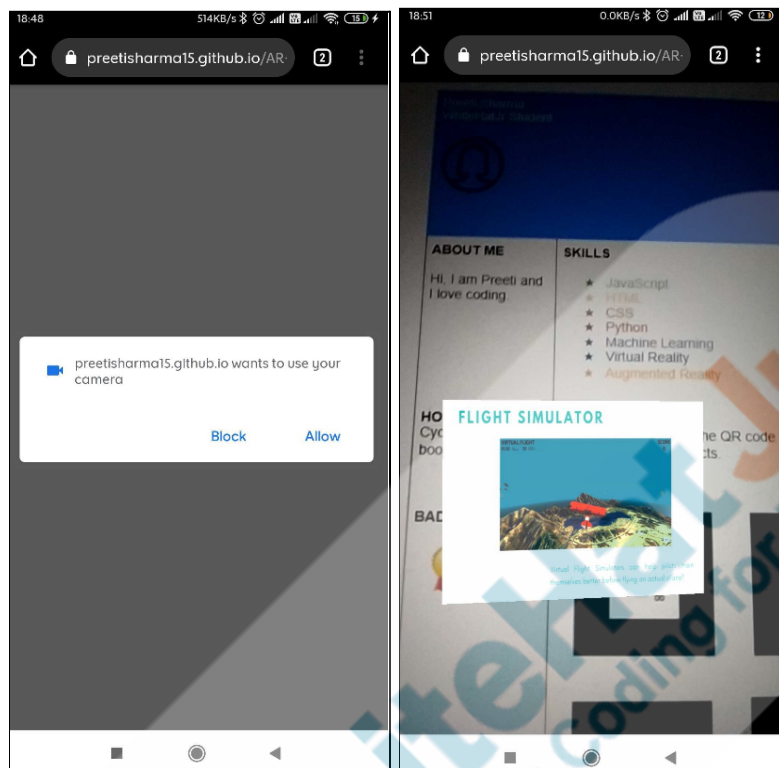
WRAP UP SESSION - 5 mins

Teacher Starts Slideshow
Slide 29 to 33

Activity details

Following are the WRAP-UP session deliverables:
- Appreciate the student.
- Revise the current class activities.
- Discuss the quizzes.

WRAP-UP QUIZ
Click on In-Class Quiz

Continue WRAP-UP Session
Slide 34 to 39

Activity Details

Following are the session deliverables:
- Explain the facts and trivia
- Next class challenge
- Project for the day
- Additional Activity (Optional)

FEEDBACK
- **Appreciate and compliment the student for trying to learn a difficult concept.**
- **Get to know how they are feeling after the session.**
- **Review and check their understanding.**

Teacher Action	Student Action
You get Hats off for your excellent work!	*Make sure you have given at least 2 Hats Off during the class for:* Creatively Solved Activities +10 Great Question +10 Strong Concentration +10

PROJECT OVERVIEW DISCUSSION
Refer the document below in Activity Links Sections

Teacher Clicks ✖ End Class

Additional Activities	*Encourage the student to write reflection notes in their reflection journal using markdown.*
	
	Use these as guiding questions:
	● What happened today?
	  ○ Describe what happened.
	  ○ The code I wrote.
	● How did I feel after the class?
	● What have I learned about programming and developing games?
	● What aspects of the class helped me? What did I find difficult?
		The student uses the markdown editor to write their reflections in a reflection journal.

Activity	Activity Name	Links
Teacher Activity 1	Slide Show PPT File	https://s3-whjr-curriculum-uploads.whjr.onlin e/80efcbce-a4bf-466c-be27-397188a73cf0.p ptx
Teacher Activity 2	Reference Code	https://github.com/whitehatjr/PRO-C187-Cod e-Ref
Teacher Activity 3	Sample Portfolio	https://s3-whjr-curriculum-uploads.whjr.onlin e/00863de7-0df7-4247-a48f-d7c1a1a431e2. png
Student Activity 1	Sample Portfolio	https://s3-whjr-curriculum-uploads.whjr.onlin e/00863de7-0df7-4247-a48f-d7c1a1a431e2. png
Student Activity 3	Boilerplate Code	https://github.com/whitehatjr/PRO-C187-Stu dent-Boilerplate
Teacher Reference 1	Project Document	https://s3-whjr-curriculum-uploads.whjr.onlin e/1a656c5b-13cb-4a4e-8031-760c30fa4ce0. pdf

Teacher Reference 2	Visual-Aid	https://s3-whjr-curriculum-uploads.whjr.online/99b06db8-ea01-4002-b670-09b45aa024f3.html
Teacher Reference 3	In-Class Quiz	https://s3-whjr-curriculum-uploads.whjr.online/8bd38e91-b2de-436a-9dc9-31cfddea145c.pdf