Topic	BINARY STRINGS PROGRAMING	
Class Description	**Applying procedural programming paradigm to convert high-level code language into machine-level binary. Kids' relationship with technology undergoes a paradigm shift as they program the machine to achieve their own objectives.**	
Class	**ADV-C3**	
Class time	**50 mins**	
Goal	• Write short computer programs in blockly language	

Resources Required	• Teacher Resources
	  ○ Use your Code.org login credentials
	  ○ Earphone with mic
	  ○ Notepad and Pen
	• Student Resources
	  ○ Use your Code.org login credentials
	  ○ Earphone with mic (optional)
	  ○ Notepad and Pen	

Class structure	**Warm Up** **Teacher-Led Activity** **Student-Led Activity** **Wrap Up** **Project Pointers and Cue**	**2 mins** **8 mins** **30 mins** **5 mins** **5 mins**
For working with the MIT App inventor, please refer to Teacher Reference Activity 3 before the class.		
WARM UP SESSION - 2 mins		
Teacher starts slideshow **from slides 1 to 16.** Refer to speaker notes and follow the instructions on each slide.		
TEACHER ACTIVITY **- 8 mins**		

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Teacher Initiates Screen Share	
Say	**Do**
I am going to write a few **PROGRAMS** using **BINARY** and then you will have to do the rest as we keep writing complex computer programs like software developers do.	Explain these steps to students while you do these activities Teacher Activity 1-BINARY ARTIST
Draw with Binary Binary is a way of representing information using only two options. In this case, off and on. Here, we're going to use the number 0 as code for "off" and the number 1 as code for "on". 0 1 In this stage, we've provided you with a grid of "pixels" that you can walk through and make designs by turning on certain squares!	
So, Binary means 0 and 1 wherein 0 is OFF and 1 is ON. **BINARY STRING** is a combination of zeroes and ones. You can remember it like this: **ONE** is the sign for light bulb **ON** **ZERO** is the sign for light bulb **OFF**	Solution 1 Explain what we mean by **Binary** from above Activity 1 link. Teacher Activity 2-BINARY ARTIST

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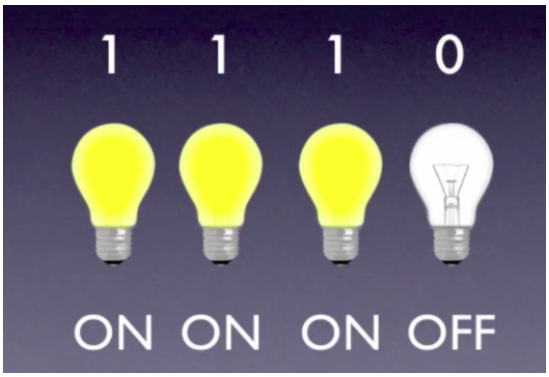
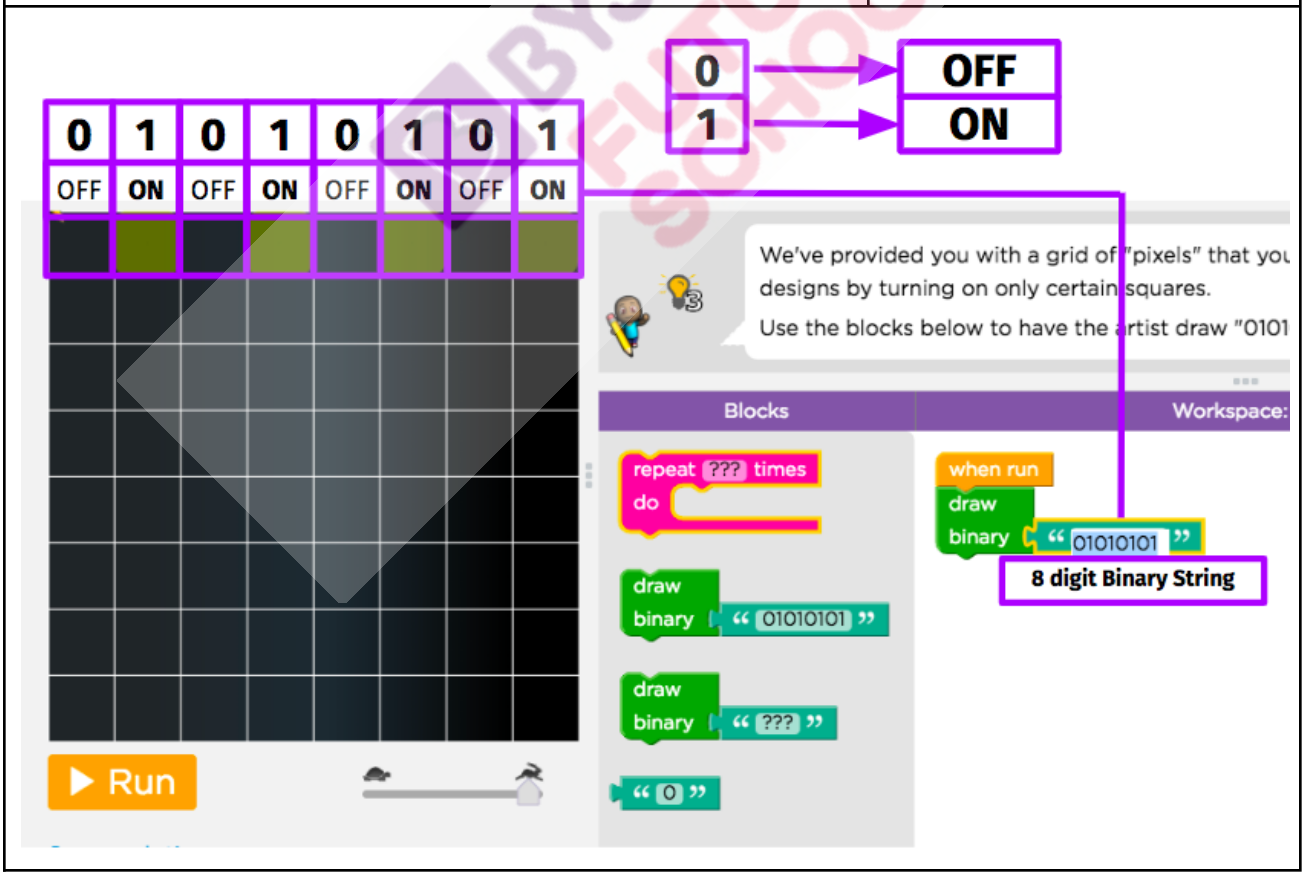


Remember we are writing computer **PROGRAMS** with binary digits.

Solution 2

Image given below is for the teacher's understanding.



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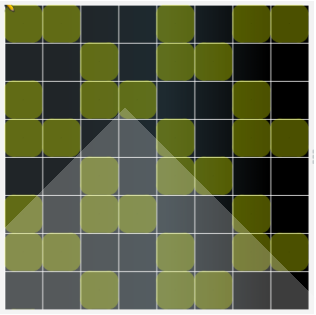
Now you see how we can write a **PROGRAM** to draw. Don't forget 0 is OFF and 1 is ON.

Let's solve this.

So you see there are different blocks which help us to write complex computer programs. As we go along we will learn more advanced blocks used in **PROGRAMMING.**

Teacher Activity 3-BINARY ARTIST



Solution 3

Teacher Activity 4-BINARY ARTIST

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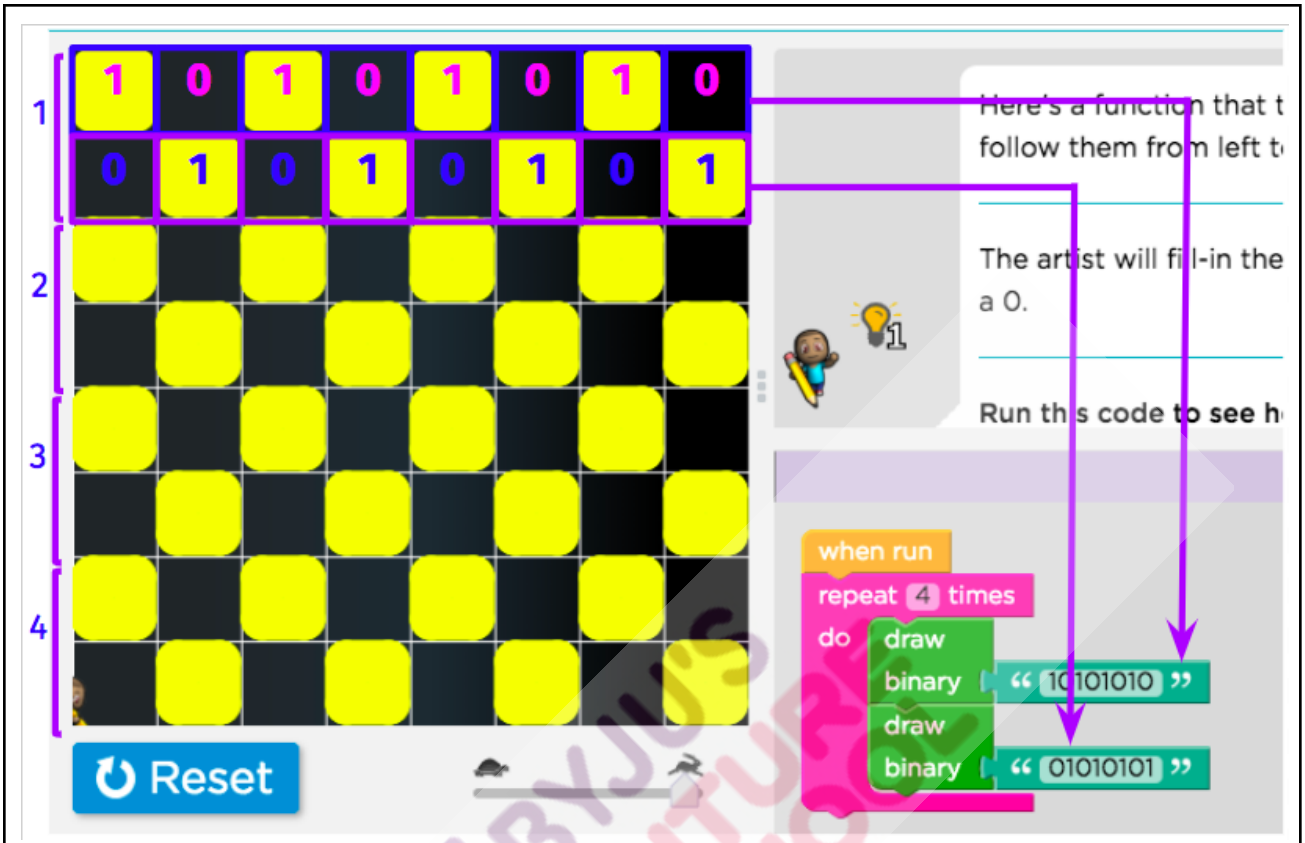
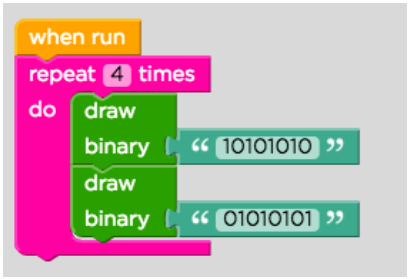


Solution 4



Teacher Stops Screen Share

Teacher starts slideshow from slides 17 to 20.
Refer to speaker notes and follow the instructions on each slide.

STUDENT ACTIVITY - 30 mins

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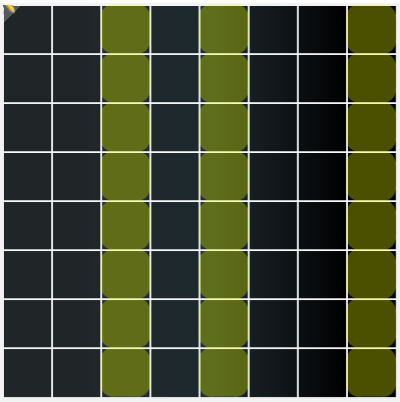
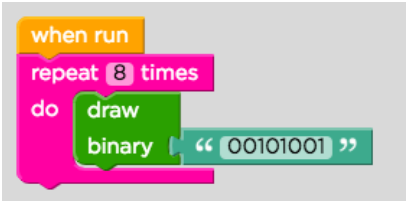
Now it's your turn. Please share your screen with me.	

- **Ask Student to press ESC key to come back to panel**
- **Guide Student to start Screen Share**
- **Teacher gets into Fullscreen**

Student Initiates Screen Share

Say	Do
Remember how binary works and now you have to complete these following coding activities. It will be great fun. Remember a **COMPUTER PROGRAM** is a set of instructions written using a computer language. Algorithms are not a program. Algorithm and program - both are sets of instructions, one is written in English to understand the logic and solve a problem. Now, this logic is written using some kind of computer language and is called a program. Here, you are using **BINARY** strings to write computer **PROGRAM.**	Student Activity 1-BINARY ARTIST  Solution 1 

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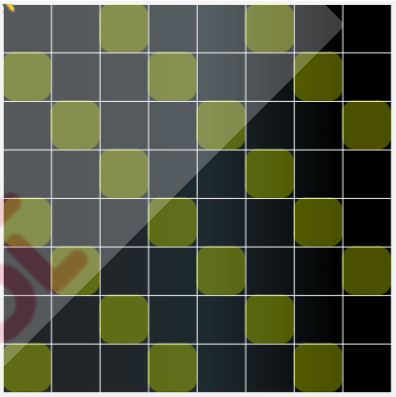
Well done.
Let's write more complex **COMPUTER PROGRAMS** using binary strings.

You are doing absolutely great.
Your computer programs are working well.

Can you draw a smiley with Binary Strings? Let's find out in the next activity.

Student Activity 2-BINARY ARTIST



Solution 2

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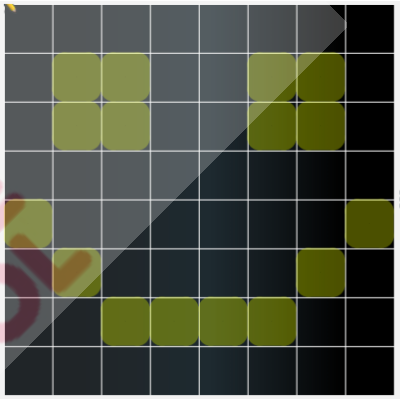
Great! You see how we can switch Pixels **ON** and **OFF** using zeros and ones. Let's continue.

Student Activity 3-BINARY ARTIST



Solution 3

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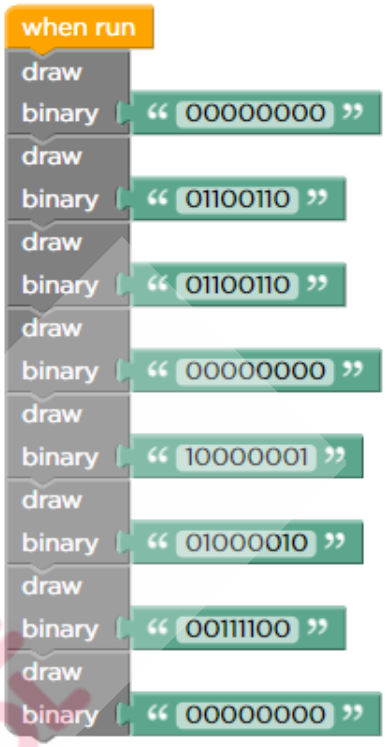
Here, can you identify a repeating pattern?



Student Activity 4-BINARY ARTIST

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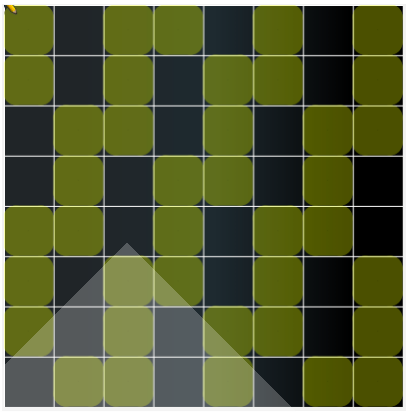
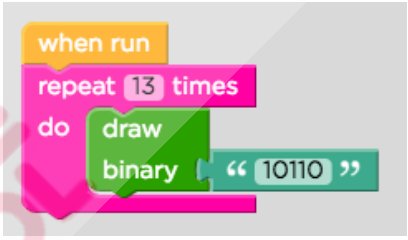
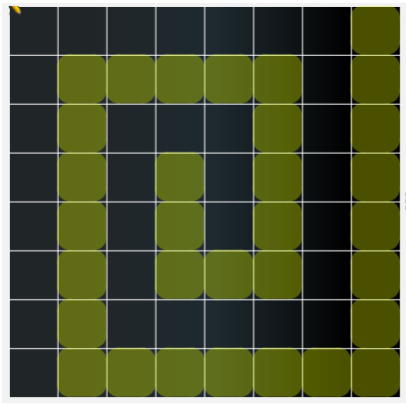


Solution 4



[Student Activity 5-BINARY ARTIST]



Solution 5

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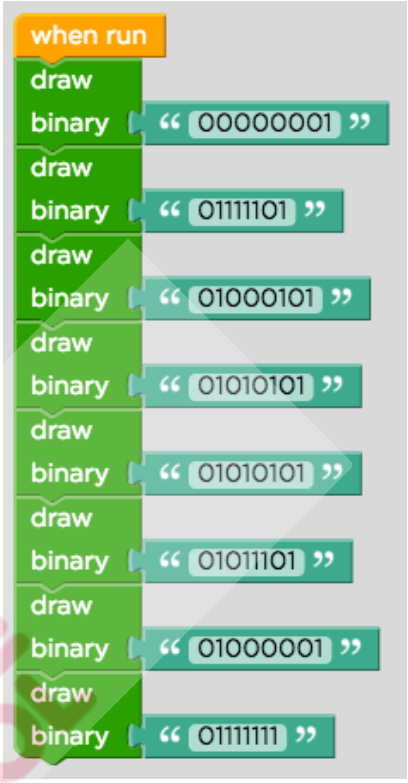
You did an amazing job! Excellent.	 Teacher asks the student to go back to the **Panel.**

NOTE: Do the below thing if the student doesn’t have a android phone OR NOX emulator installed in his/her system

Call the parent to inform them that from today we will start creating mobile applications. Script and context for the same is mentioned below:

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<Begin by greeting the parent> I have called you, to inform you that from next class onwards *<student name>* will start creating My Profile mobile applications using the MIT platform. MIT (Massachusetts Institute of Technology) platform is a visual programming environment originally provided by Google and now maintained by Massachusetts Institute of Technology. This platform allows users to build fully functional apps for smartphones and tablets. So for testing this application built on MIT *<student name>* will require an android phone. If possible **please arrange one for *<student name>*** so from today *<student name>* can start working on it. **NOTE: Guide the student to download MIT AI2 companion application(Link has been provided in Student-Modular-Activity-3.1)**. If not possible then I will help *<student name>* to install the NOX emulator which is a 3rd party emulator for testing MIT applications, **NOTE: Guide the student to download NOX emulator**	If the parent asks that they have only an IOS device and why can't they test on it. So ask them to arrange android phone if possible, and also inform them MIT is not yet completely compatible with IOS once it is completely compatible, the apps which *<student name>* will create will work on both android and IOS devices

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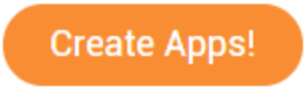
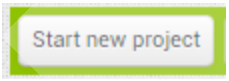
Let me show you the platform we are going to use to build our “myprofile app”, which I talked about in the previous class. We will be learning to use two platforms to build our apps in this course. 1. **Applab: where we make apps to practice.** 2. **MIT APP INVENTOR: where we make apps to publish** Click on the Student Module Activity 3 and follow the steps. 1. Click  2. Remember you have already created a google account. Let’s use that to login. Great!	Help the student understand the platform. This activity focuses only on the student getting to know the MIT platform. Students should login using the same gmail Id which he/she had used for signing in on MIT.
This is a MIT platform. 1. Start creating an App by clicking on the following button:  2. Provide a name to your project. Remember this name cannot be changed and press “OK”:	

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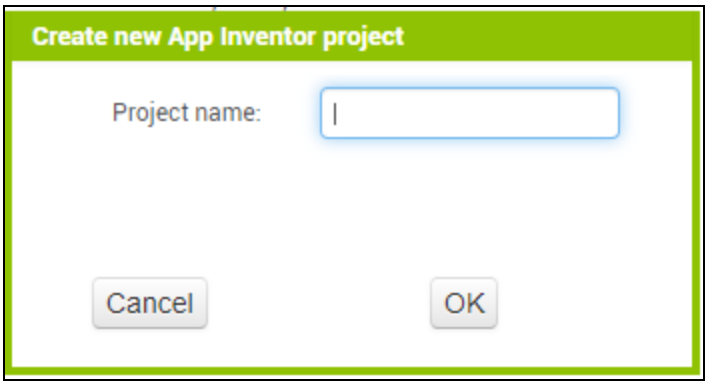

3. Design Section: If you remember from your trial class, every app has a **Design** and **Code**. **Components** is where all the added design components are displayed and **Properties** is the place where the properties of each component is being set:

4. **Mobile Simulator**: I hope you remember this from your trial class as well. Mobile simulator helps in displaying how different content such as button, text, menu, and so on, will appear on the phone screen.

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5. **Design Component**: This is where all the design elements are listed. You can just drag whichever element you want in your app such as a button, label, and so on, on the screen.

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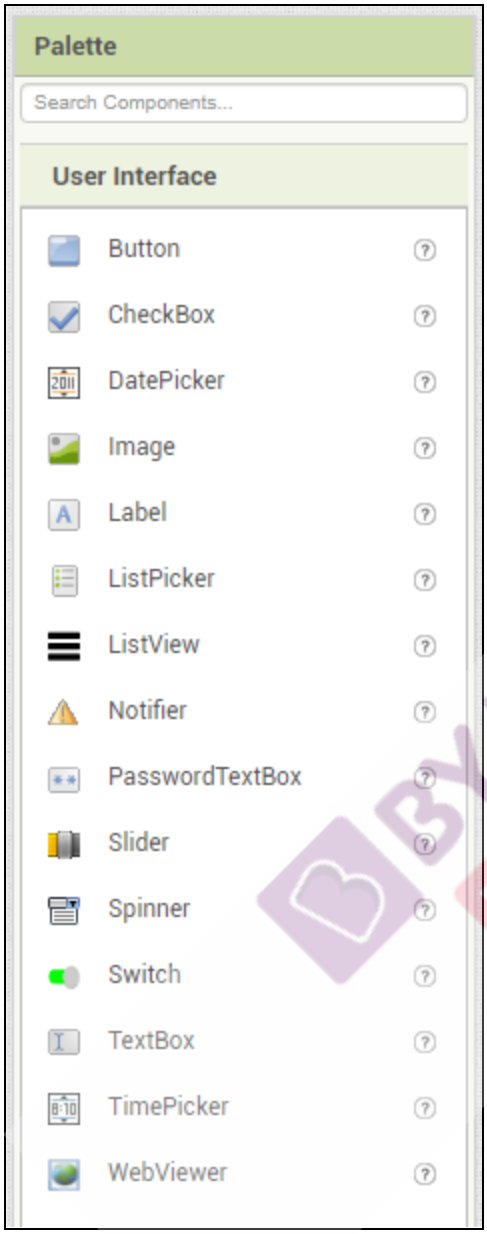

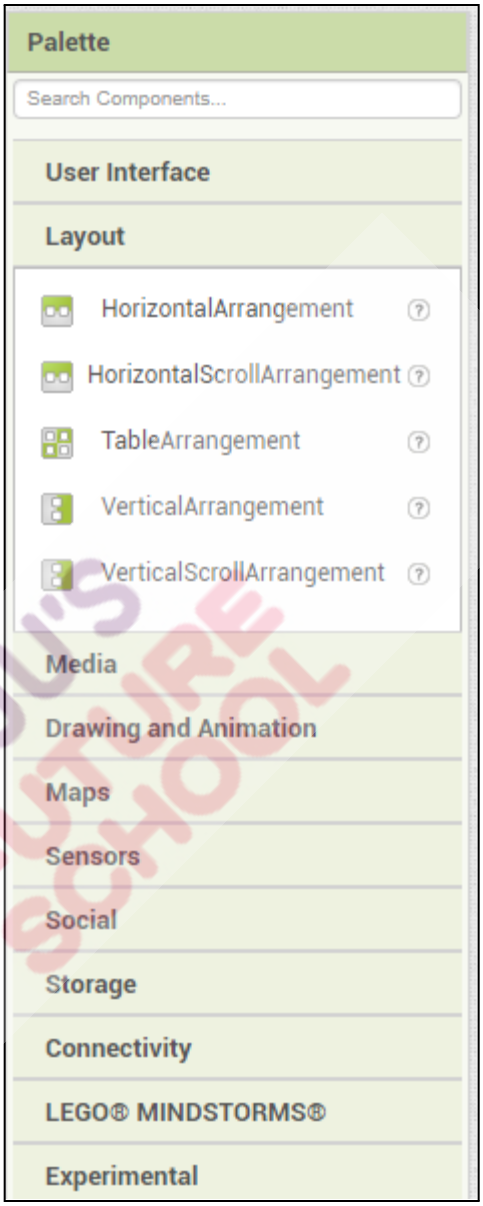

6. **Properties Tab**: This is where you can set the properties of each element. For example: To change the color and text of your button. Here, we haven't added any element except a screen.

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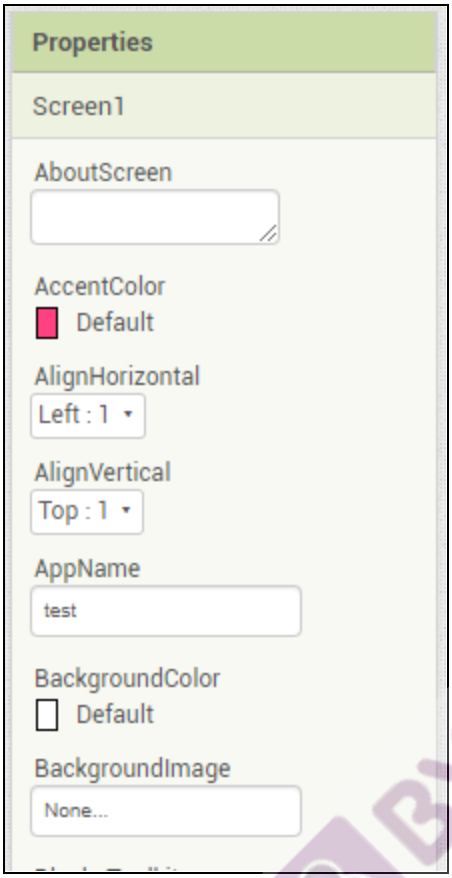

7. **Code Section**: This is where we code to make the app interactive.

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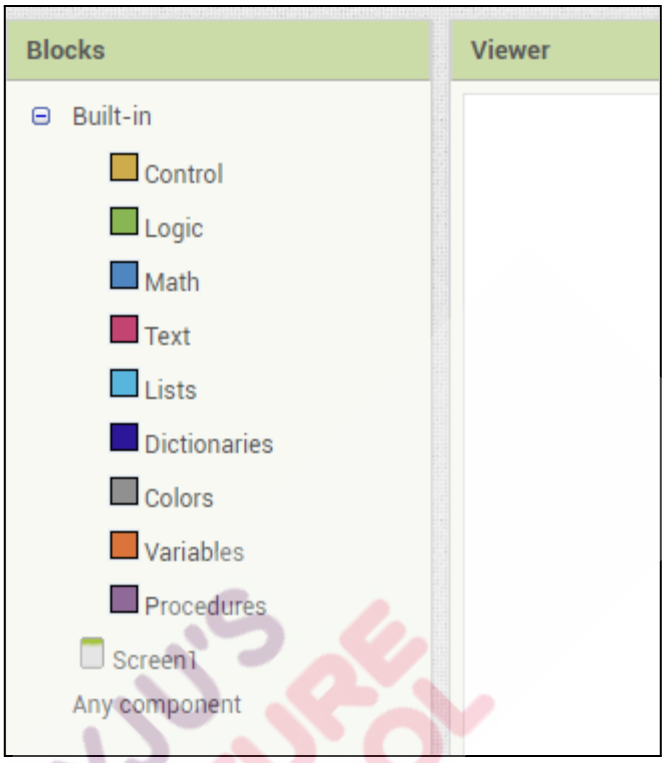

Great!

From the next class onwards we will start building your profile app. So, please keep your picture uploaded on your computer desktop. You can ask your parents to do it for you.

Teacher Guides Student to Stop Screen Share

WRAP UP SESSION - 5 mins

Teacher starts slideshow **from slides 21 to 25.**
Refer to speaker notes and follow the instructions on each slide.

FUN STUDENT ACTIVITY

- **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.**

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Student Initiates Screen Share	
Shall we begin with today's fun activity where we will be converting our emotions into emojis? When you open the website, it will ask you to give permission to access the webcam. Please allow it. Now, make a facial expression and press the Capture Image button. This will capture your image, and then press the Predict Emotion button. And wait for the computer to get the predictions. Prediction 1: The most accurate	Student Activity 6-EMOTION TO EMOJI *Before opening this website, close the webcam from all other websites where the camera is used, and then open this website.* *Ask the student to open the link for student activity 6.*

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Prediction 2: Is the computer suggesting that you might also have made this facial expression? If the prediction is not right, that is also fine. Emotion to Emoji is not trained on all the emotions in the world. Further in the course, when you will create your own Emotion to Emoji application there you can train the computer as per your facial expression, then the computer will never be wrong. Great! Let's move ahead.	
Student Stops Screen Share	
DID YOU KNOW, UPCOMING CLASS, AND PROJECT POINTERS AND CUES - 5 mins	
Teacher starts slideshow **from slide 26 to 28.** Refer to speaker notes and follow the instructions on the slide.	
Teacher Initiates Screen Share	
Say	**Do**
Project Name: BINARY CHALLENGE **Goal of the Project:** Today, you learned about binary strings which are created using 0 and 1. You drew different patterns using binary strings. In this project, you will have to practice and apply what you have learned in the class and make a design using binary strings of 0 and 1.	**Note: You can assign the project to the student in class itself by clicking on the Assign Project button which is available under the projects tab.** Open the **Project Solution** link and demo the project to the student

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Story: Reshma likes to draw. She has to draw a lock pattern - either a white lock on the black background or a black lock on the white background. Can you help her? **The project will take only 30 minutes to finish. You can try and finish it immediately after this class.** I am very excited to see your project solution and I know you both will do really well. Bye Bye!	
Teacher Stops Screen Share	
Teacher Clicks ✖ End Class	
Additional Activities	
Teacher starts slideshow **from slides 29 to 35.** Refer to speaker notes and follow the instructions on each slide.	
STUDENT ADDITIONAL ACTIVITY	
Student Initiates Screen Share	
Say	**Do**
Additional Activities	Additional Activity 1-BINARY ARTIST

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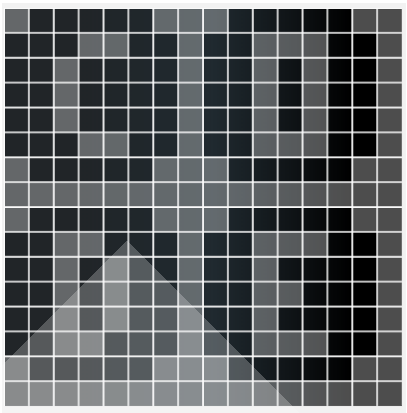
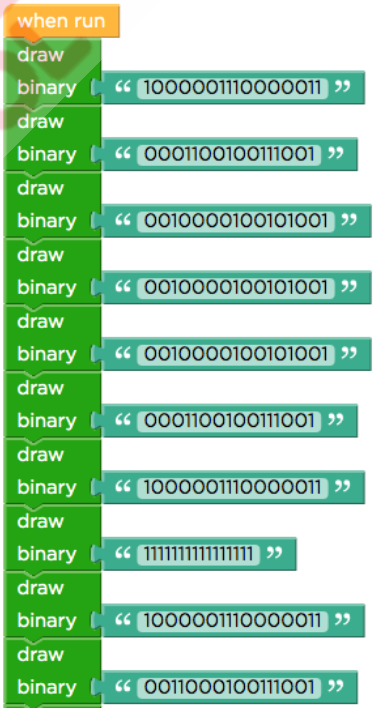


Solution



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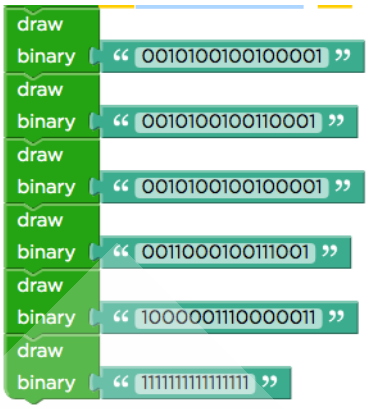
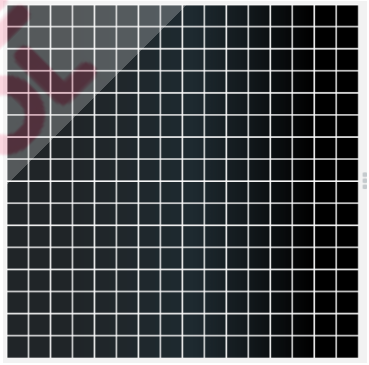
You can try some more challenging activities

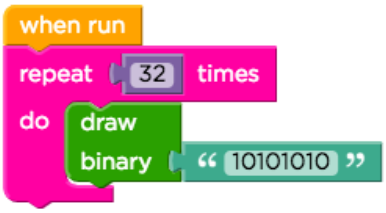


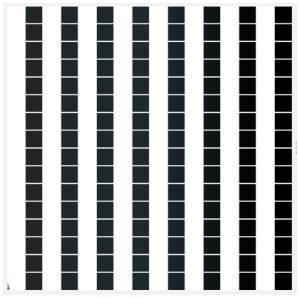
[Additional Activity 2- BINARY ARTIST]

Repeat **32** times the binary string **10101010** and see what happens



Solution A2





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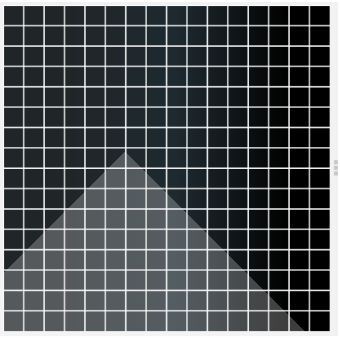
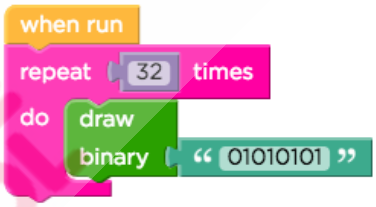
Now can you change the binary string to change white stripes to black and black stripes to white?

[Additional Activity A3- BINARY ARTIST]



Solution A3



[Additional Activity 4- BINARY ART 1]

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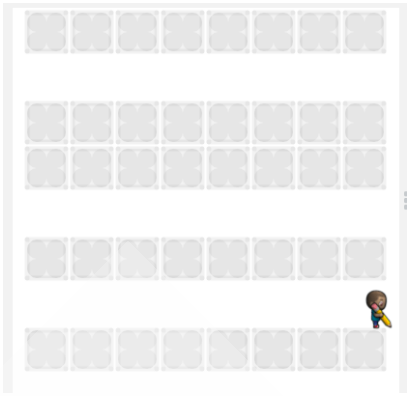
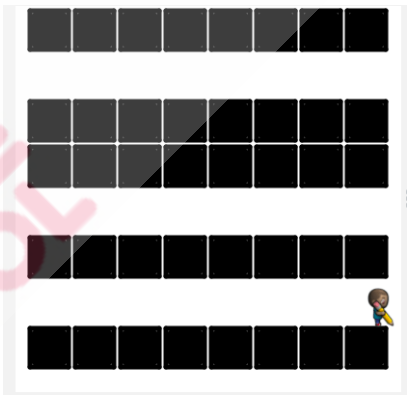
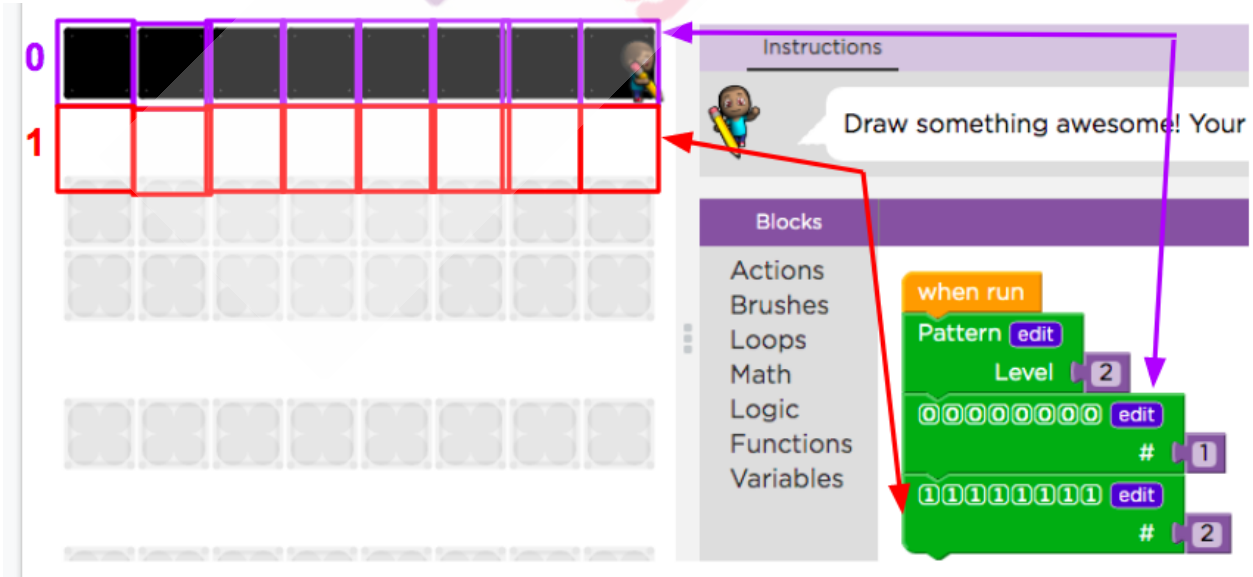


Required output





To get the function, click on function and drag and drop the function.

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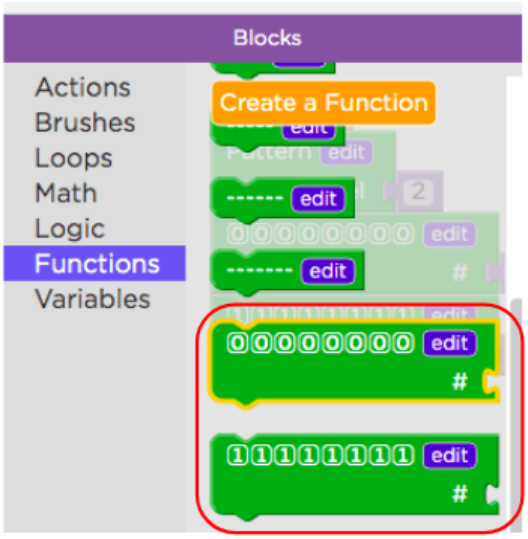
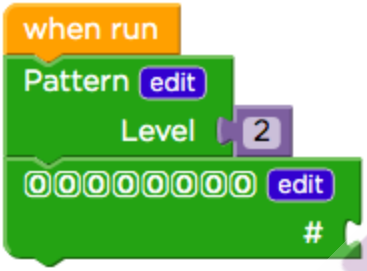


Like this -



Then add a math block and give value to it. The value will be the row number.

For example: If you want to add to row 1 the it will be:

Solution for AA 4 :

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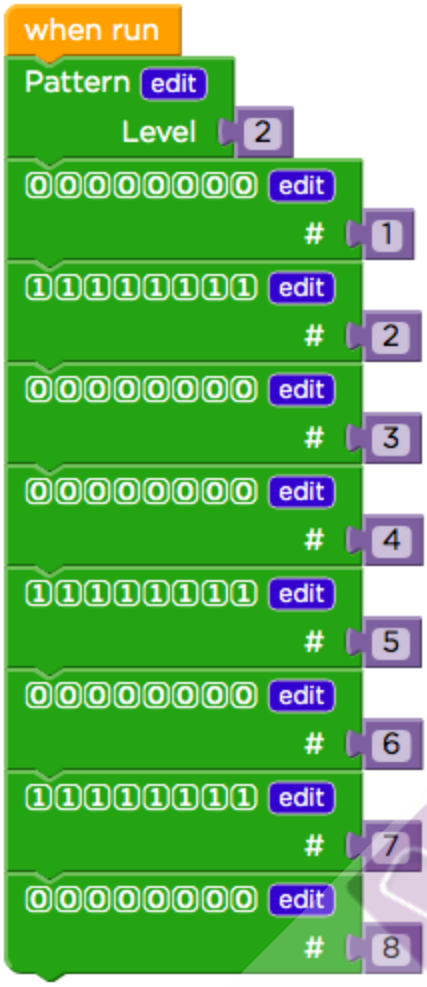
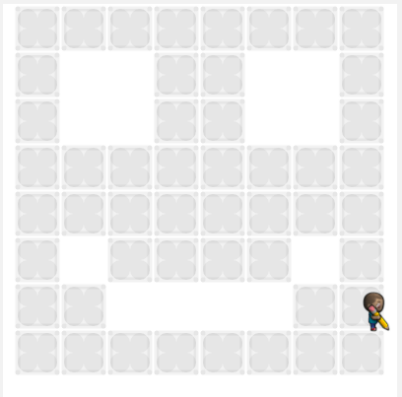


[Additional Activity-5
BINARY ART 2]



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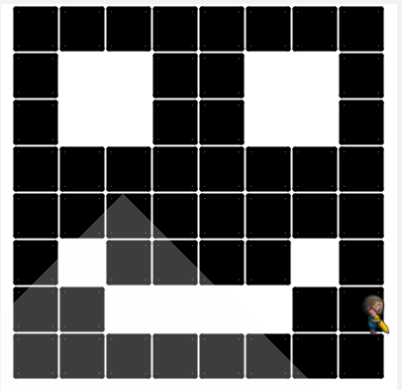
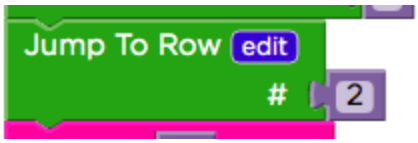
	Required output- 

We will use the “**Jump To Row**” function to jump at any row.

For example:



The above code will jump to row 2.

You can find this block inside the **Functions**.

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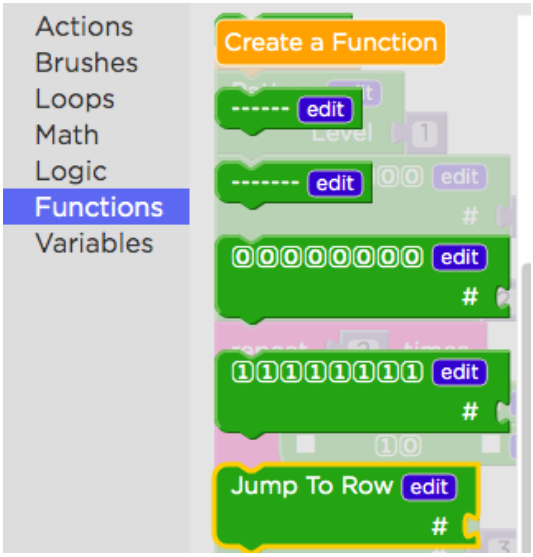
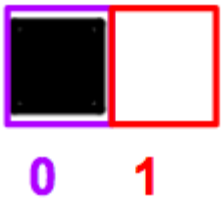


We will also use a repeat loop to repeat some tasks. You will find this block in the **Loops** tab.

this means -



Solution for AA 5 :

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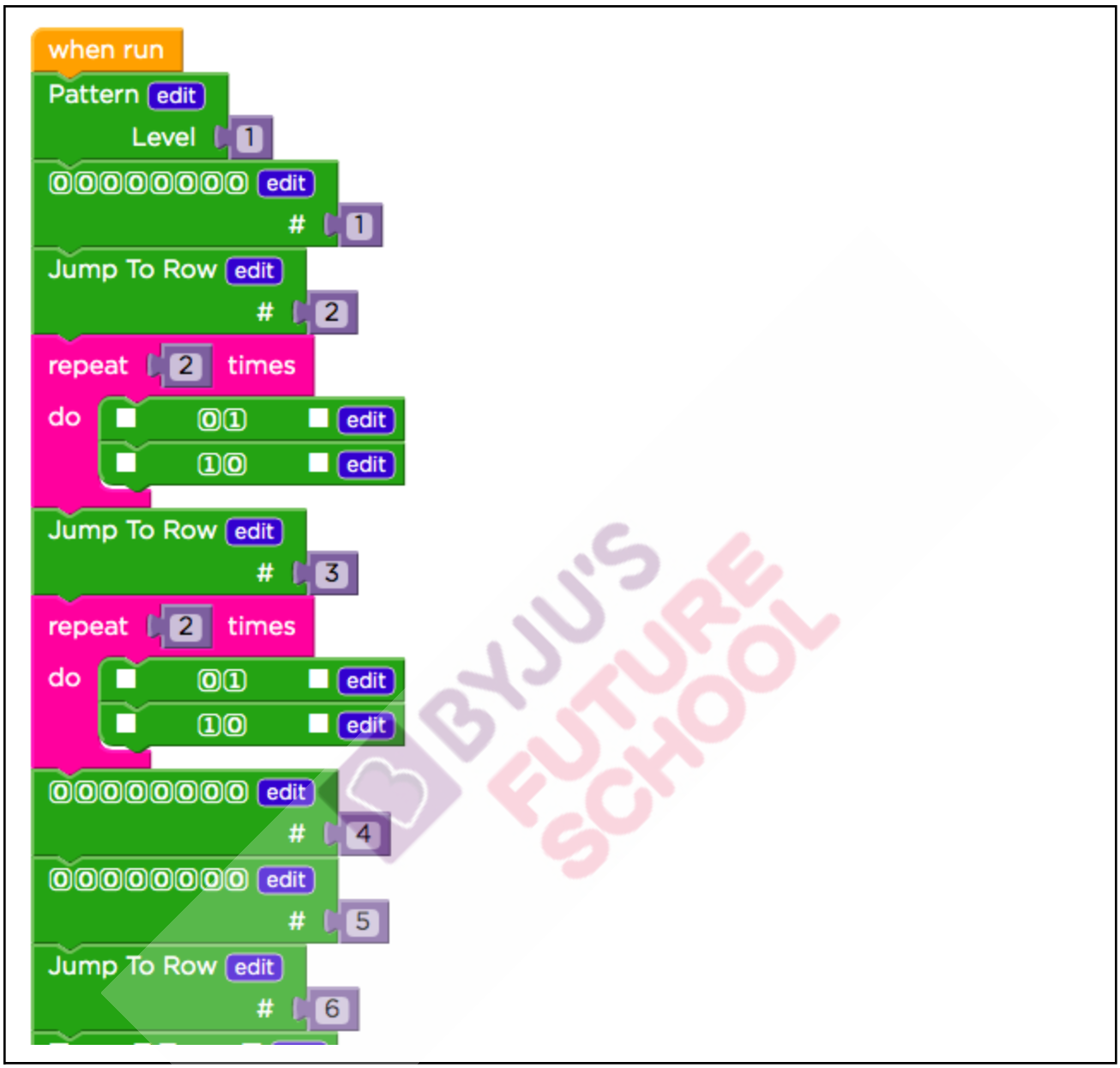

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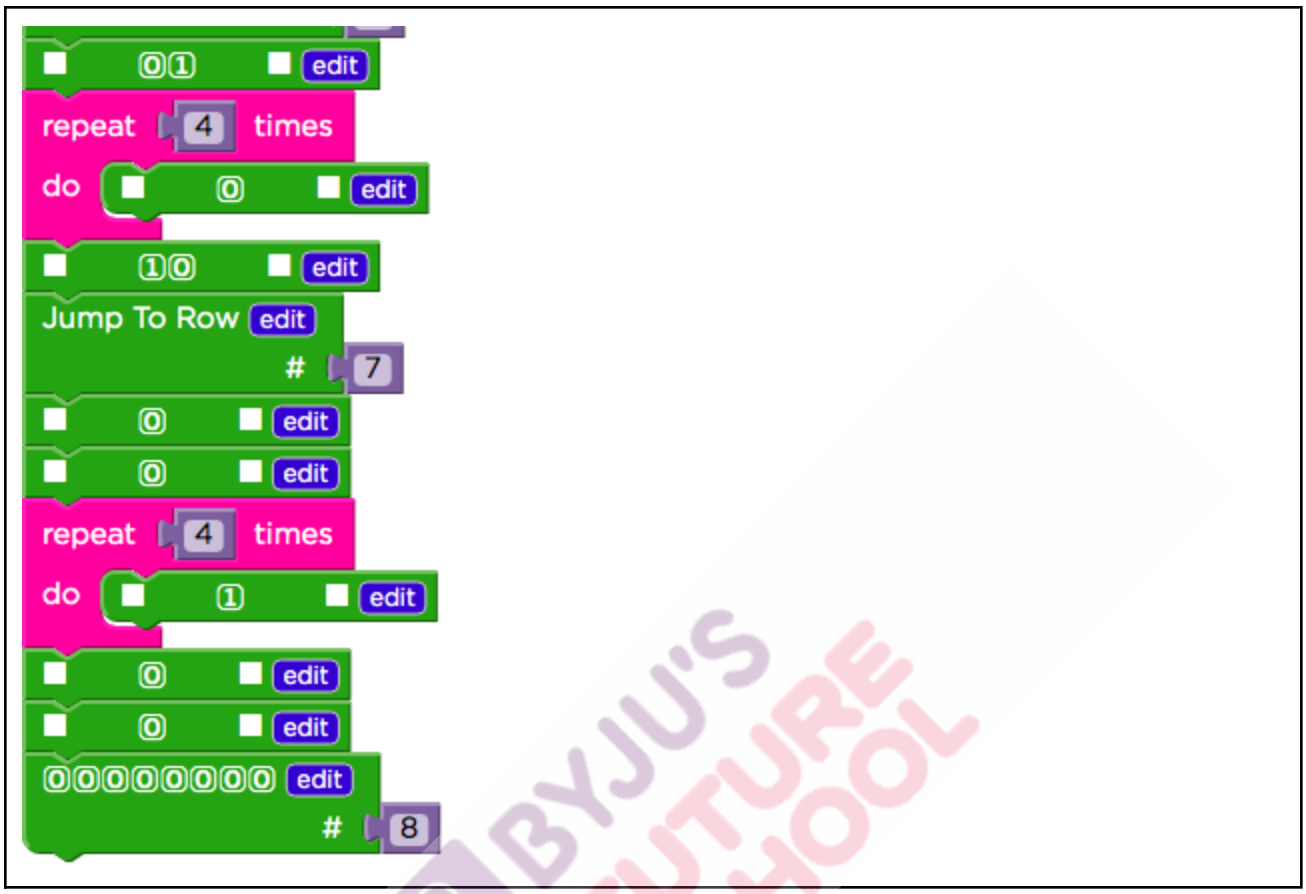

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Activity No.	Name of the Activity	Links
Teacher Activity 1	BINARY ARTIST	https://docs.google.com/document/d/e/2PACX-1vRNr9GMfsuIZrac_uogornyhpn5BMZ8eAKGL2LWxR7eOZSl0X1dIUAH0lkF7eJyaYvzB8Mg-0MtJUMJ/pub
Teacher Activity 2	BINARY ARTIST	https://studio.code.org/s/course4/lessons/18/levels/1
Teacher Activity 3	BINARY ARTIST	https://studio.code.org/s/course4/lessons/18/levels/6
Teacher Activity 4	BINARY ARTIST	https://studio.code.org/s/course4/lessons/18/levels/2
Teacher Reference Activity 1	MIT AI2 Companion App DOWNLOAD	https://play.google.com/store/apps/details?id=edu.mit.appinventor.aicompanion3&hl=en_IN&gl=US
Teacher Reference Activity 2	HOW TO TEST MIT ON ANDROID PHONE	https://drive.google.com/file/d/1n4b_5fuNLIu7xOHVnl90yshWa6Nxfb98/view?usp=sharing
Teacher Reference Activity 3	MIT TEACHER GUIDE	https://docs.google.com/document/d/e/2PACX-1vTSVSooc99svDx4SinvfenhP7QjytqupcivM-XuY-WwOshBUp6WaeQJvDCtyKFit7EeMRS2Lax9Ztsr/pub
Student Activity 1	BINARY ARTIST	https://studio.code.org/s/course4/lessons/18/levels/3
Student Activity 2	BINARY ARTIST	https://studio.code.org/s/course4/lessons/18/levels/4
Student Activity 3	BINARY ARTIST	https://studio.code.org/s/course4/lessons/18/levels/5
Student Activity 4	BINARY ARTIST	https://studio.code.org/s/course4/lessons/18/levels/7

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Student Activity 5	BINARY ARTIST	https://studio.code.org/s/course4/lessons/18/levels/8
Student Activity 6	EMOTION TO EMOJI	https://mahdihat791.github.io/emotion_to_emoji
Student Module Activity 3	MIT PLATFORM	https://appinventor.mit.edu
Student Module Activity 3.1	MIT AI2 Companion App DOWNLOAD	https://play.google.com/store/apps/details?id=edu.mit.appinventor.aicompanion3&hl=en_IN&gl=US
Student Module Activity 3.2	NOX STUDENT GUIDE	https://docs.google.com/document/d/e/2PACX-1vQ99Fa-L4Fy-j5apoqW82zj4ZvVWOXvAgjX4e3lWpZFHEaHqLx9b3kUqNuIKavG1CK4KCm5mT098Oyl/pub
Additional Activity 1	BINARY ARTIST	https://studio.code.org/s/coursed-2020/lessons/18/extras?id=175939
Additional Activity 2	BINARY ARTIST	https://studio.code.org/s/course4/lessons/18/levels/11
Additional Activity 3	BINARY ARTIST	https://studio.code.org/s/course4/lessons/18/levels/11
Additional Activity 4	BINARY ART 1	https://studio.code.org/projects/artist/FAgLMoUaSpYRR4cEhz0-UJVjdXnpbIH9ls83ltbpSfA/view
Additional Activity 5	BINARY ART 2	https://studio.code.org/projects/artist/2iTSaeVeSvkQxaC9wFmkZqqQ35S8aZDm62oabNoKutQ/view
PRACTICE ACTIVITY 1	PRACTICE	https://studio.code.org/s/course4/stage/18/puzzle/6
PRACTICE ACTIVITY 2	PRACTICE	https://studio.code.org/s/course4/stage/18/puzzle/7

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Student Reference Activity 1	HOW TO CREATE A YOUTUBE CHANNEL	https://youtu.be/l0eM1_JVqHE
Teacher Reference Visual aid link	Visual aid link	https://s3-whjr-curriculum-uploads.whjr.online/d9ac31fa-1182-4c0f-9fdc-47a734358bdd.html
Teacher Reference In-class quiz	In-class quiz	https://s3-whjr-curriculum-uploads.whjr.online/9c9a687c-d3e0-40df-8f93-cdaefe7ede0a.pdf
Project Solution	BINARY CHALLENGE	https://studio.code.org/projects/gamelab/WAPDyHp374xvTTW-dJKgJ8fXmoB9DkAyNp6RceCRnCk

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