



Mobile App Development

Course Overview:

Mobile devices have made it more convenient than ever to manage multiple things in our day to day lives through hundreds of smart apps and learning games. Go beyond just using apps, and join us in creating them! You will use simple and easy block-based coding software to create your own working app for Android devices. This curriculum will help you create some useful and interesting apps like **Calculator App**, **Bouncing Ball App**, **Pong Game**, **Piano App**, **Coloring App** etc. This course promotes logical thinking, problem solving skills, reasoning and deduction, and builds the students' confidence.

Grade Level: Middle School and Above

Time Required to Complete this Course: 20 Hours

Prerequisites: No

Requirements: Students must have a Chromebook or a computer with a Mac (Apple) or Windows Operating System. Students must have a Google account. Students must have access to a phone or tablet running Android software to test the app.

Course Layout:

This course is laid out in the following structure:

- **Teacher's Guide:** Include the learning objectives of each lesson and the list of modules that each lesson would cover.
- **Instructional material:** Include PowerPoint presentations through which the students gain the knowledge on all the concepts and programming behind creating the apps.
- **Homework:** Helps the students to gain the practical experience on what they have learned in the training.
- **Quiz:** Include the summative assessments that evaluate the student learning at the end of each lesson as necessary. Quizzes are set to auto grading.



Course Breakdown:

Lesson 1: MIT App Inventor

Objectives	<ul style="list-style-type: none">● List the pre-requisites for working with MIT App Inventor.● List the steps to connect your device to the AI Companion App, and an Emulator.● Explain the key elements of app inventor's designer screen and Built-in palette choices.● Understand the features of MS paint tool and learn how to resize the images using the tool.
Module 1:	Introduction to MIT App Inventor <ul style="list-style-type: none">- Definition- Account Setup in Chrome- Get started with MIT App
Module 2:	Test your App's Functionality <ul style="list-style-type: none">- AI Companion- Troubleshooting- Android Emulator- Download & Install Emulator
Module 3:	MIT Designer Screen <ul style="list-style-type: none">- Overview- Designer Tab: Palette- Designer Tab: Viewer- Designer Tab: Components/ Properties- Image Resizing using Paint Tool- Features of Paint
Module 4:	Change Screen1 using Component Properties



	<ul style="list-style-type: none"> - Button App: Components - Add Components to Screen1 - Changing Screen1 Properties
Module 5:	Blocks Tab <ul style="list-style-type: none"> - Overview - Programming Blocks <ul style="list-style-type: none"> • Event Handlers • Boolean
Built-in Blocks	A separate module that provides a basic knowledge on various built-in palette choices and the blocks associated with each of them.

Lesson 2: Working with Additional Screens

Objectives	<ul style="list-style-type: none"> • List the steps to add a screen and switch between two screens in MIT app inventor. • Understand the programming events to open “screen2”. • Explain the designer components for Screen2.
Module 1:	Working with Additional Screens <ul style="list-style-type: none"> - User Friendly Design - Examples - Procedure to add additional screens - Switching between screens - Programming – Event to open screen2
Module 2:	Designing Screen2’s Components <ul style="list-style-type: none"> - “Screen2” Components overview - Designing “Screen2” components - Programming the complete block sequence



Lesson 3: Bouncy Ball App

Objectives	<ul style="list-style-type: none">● Create a Bouncy Ball App and understand how the Ball Sprite works in the App Inventor.● Change colors of the bouncy ball based on which screen edge it reaches.
Module 1:	Design the Bouncy Ball App <ul style="list-style-type: none">- Overview- Terms & Definitions- Designer Components- Programming Bounce Ball
Module 2:	Add Colors to the Bouncy Ball <ul style="list-style-type: none">- Programming – Add Colors to the Bouncy Ball- How to Delete or Duplicate Blocks?

Lesson 4: Calculator App

Objective	Create a “Calculator” App and understand how the math operators “Add” and “Subtract” work using programming blocks.
	Design the Bouncy Ball App <ul style="list-style-type: none">- Designer Components- Programming Calculator

Lesson 5: Quiz App

Objectives	<ul style="list-style-type: none">● List the designer components to create the Quiz App.● Create a list of questions and answers using the “Make a List” block.
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	<ul style="list-style-type: none"> ● Add functionality to “Submit” and “Next” buttons using programming blocks.
Module 1	Quiz App – Designer Setup <ul style="list-style-type: none"> - Designer Components - Programming Calculator
Module 2	Programming Lists <ul style="list-style-type: none"> - Overview - Make a List Programming Steps
Module 3	Programming the “Submit” Button <ul style="list-style-type: none"> ● Overview ● Programming Steps in Detail ● Test your App
Module 4	Programming the “Next” Button <ul style="list-style-type: none"> ● Overview ● Programming Steps in Detail ● Test your App

Lesson 6: Pong App

Objectives	<ul style="list-style-type: none"> ● List the designer components to create a Pong App. ● Demonstrate the steps to program Score, Ball collisions, Start and Reset buttons. ● Explain the steps to add sound effects to different ball movements of the Pong app.
Module 1	Pong App – Designer Setup <ul style="list-style-type: none"> - Overview - Designer Setup
Module 2	Programming “Score”



	<ul style="list-style-type: none"> - Overview - Creating a Procedure
Module 3	Programming the Ball Collision <ul style="list-style-type: none"> • Overview • Collision with an Edge • Collision with the Paddle • Moving the Paddle
Module 4	Programming the Buttons <ul style="list-style-type: none"> • Overview • Programming the “Start” Button • Programming the “Reset” Button
Module 5	Adding Sound Effects to the “Pong” App <ul style="list-style-type: none"> • Overview • Finding a Sound File • Adding Sound Files to the App

Lesson 7: Recording App

Objectives	<ul style="list-style-type: none"> • List the designer components to create a Recording App. • Demonstrate the steps to program the Start, Save and View buttons and the Speech Recognizer of the app.
Module 1	Recording App – Designer Setup <ul style="list-style-type: none"> • Overview • Designer Setup
Module 2	Programming the Recording App <ul style="list-style-type: none"> • Programming the complete block sequence

Lesson 8: Piano App



Objectives	<ul style="list-style-type: none"> List the designer components to create a Piano App. Program the code to play the Note buttons of a Piano keyboard.
Module 1	Piano App – Designer Setup <ul style="list-style-type: none"> Introduction to a Piano App Designer Setup
Module 2	Programming the Piano App <ul style="list-style-type: none"> Programming the complete block sequence

Lesson 9: Cat and Mouse Chase App

Objectives	<ul style="list-style-type: none"> List the designer components to create a Cat and Mouse Chase App. Work with procedure blocks to program the Cat and Mouse Chase game.
Module 1	Cat and Mouse Chase App – Designer Setup <ul style="list-style-type: none"> Designer Components Overview Naming the App Adding Components to the Designer
Module 2	Programming the Mouse’s Energy Bar <ul style="list-style-type: none"> Draw Energy Line Procedure Display Energy Procedure
Module 3	Programming the Game Over Procedure <ul style="list-style-type: none"> Game Over Procedure Update Mouse Procedure Eat Cheese Procedure
Module 4	Programming the ImageSprites <ul style="list-style-type: none"> Update Cheese Procedure Update Cat Procedure Program the Reset Button and Clock Program the Mouse Collision



Lesson 10: Stopwatch App

Objectives	<ul style="list-style-type: none">• List the designer components to build a Stopwatch App.• Demonstrate the steps to program the Stopwatch buttons.
Module 1	Stopwatch App – Designer Setup <ul style="list-style-type: none">• Overview• Designer Setup
Module 2	Programming the Stopwatch App <ul style="list-style-type: none">• Programming the Stopwatch buttons

Lesson 11: Button Calculator App

Objectives	<ul style="list-style-type: none">• List the designer components to build a Button Calculator App.• Demonstrate the steps to program the Calculator buttons.
Module 1	Calculator App – Designer Setup <ul style="list-style-type: none">• Overview• Designer Setup
Module 2	Programming the Calculator App <ul style="list-style-type: none">• Get Started with Programming• Program the Reset Button• Program the Show Result Procedure
Module 3	Programming the Number buttons <ul style="list-style-type: none">• Programming the Number One Button• Programming the Number Two Button• Complete Programming
Module 4	Programming the Math Operations <ul style="list-style-type: none">• Programming the Plus Button• Programming the Minus Button



	<ul style="list-style-type: none"> • Programming the Multiplication Button • Programming the Division Button • Programming the Equal Button
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Lesson 12: Maze App

Objectives	<ul style="list-style-type: none"> • List the designer components to build a Maze App. • Demonstrate the steps to program the Maze app.
Module 1	Maze App – Designer Setup <ul style="list-style-type: none"> • Overview • Designer Setup
Module 2	Programming the Maze App <ul style="list-style-type: none"> • Programming the Kitten Flung Event • Programming the Wall Collisions • Programming the Restart Button

Lesson 13: Rex Paint App

Objectives	<ul style="list-style-type: none"> • List the designer components to build a Rex Paint App. • Demonstrate the steps to program the Maze app.
Module 1	Maze App – Designer Setup <ul style="list-style-type: none"> • Overview • Designer Setup
Module 2	Programming to Choose Colors <ul style="list-style-type: none"> • Programming the Global Variables • Choose Color Before Picking • Choose Color After Picking
Module 3	Programming the Canvas, Camera and Slider Events <ul style="list-style-type: none"> • When Canvas Touched



	<ul style="list-style-type: none">• When Canvas Dragged• Programming Camera• Programming Sliders
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Lessons 14 - 16: SDLC (Software Development Life Cycle)

Objectives	Students need to come up with the design of a fully functional app within the given time, based on the concept of SDLC.
SDLC	SDLC (Software Development Life Cycle) <ul style="list-style-type: none">• SDLC Steps• Project Requirements• Analysis• App Genre• Design Check• Development• Homework