Your Course Syllabus

CODDY - International Coding and Design School for Teens and Kids

Android App Development with Kotlin Course

Learning goals are to learn the basics of Android apps development with Kotlin in the Android Studio environment, apply the knowledge gained in practice, and create mobile app based on the online store model.

Module 1. Introduction to Kotlin and first steps

Day one

Introduction to the world of mobile development

− Getting to know the course and examples of mobile apps on Kotlin
− Install and configure IntelliJ IDEA using the step-by-step instructions
− Creating the first "Hello, World!" program
− Small game "Programmer detective" - search for code elements based on hints
− Questions and fixing the material in the form of an interactive survey

Learning outcome: ability to install and configure the development environment, knowledge of the basic concepts of the Kotlin language.
Practical task: create a program that displays information on the screen.

Day two

Variables and data types

− Explaining variables through the metaphor of "boxes for different things"
− Introduction to the main data types: Int, Double, String, Boolean
− Practical task: creatingan "out-of-pocket expense calculator"
− Mini-game "Guess the type" - determining the data type by value

Learning outcome: ability to create and use variables of various types.
Practical task: creating the program "Pocket Expenses Calculator".

Day three

Conditional statements

− Learn if-else conditions with the story about "choosing the hero's path"
− Getting to know when through the Magic Compass game
− Creating a Weather Detector program with multiple conditions
− Pinning with a mini-quiz on conditional operators

Learning outcome: the ability to use conditional operators to create logic in your programs.
Practical task: create a Weather Detector program with several conditions.

Day four

Loops in Kotlin

− Learning the for loop using the "traversing rooms in a castle" analogy
− Working with the while loop through the game scenario "Until you find a treasure"
− Creating a "Guess the Number" game using loops
− Summing up the results of the module and issuing a digital badge "Newbie programmer"

Learning outcome: ability to use loops to perform repetitive actions.
Practical task: create a game "Guess the number" using loops.

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Module 2. Functions and arrays

Day one

Functions-First steps

− Explaining functions through the metaphor of "magic spells"
− Creating simple functions without parameters and with parameters
− Practical task: developing a "set of tools" for your future store
− Interactive Function Comprehension Test

Learning outcome: ability to create functions, understanding the principles of working with functions.
Practical task: develop a "set of tools" for the future store.

Day two

Functions with return values

− Exploring the return values of functions using the "magic chest" analogy
− Creating functions for calculating the cost of goods with discounts
− Mini-project "Discount Calculator" for the future store
− Discuss results and correct errors

Learning outcome: ability to use functions, understanding the practical benefits of functions.
Practical task: add functions for different types of discounts to the "Discount Calculator".

Day three

Arrays and collections

− Explaining arrays using the "product shelves" analogy
− Working with array elements: adding, deleting, and modifying them
− Creating a "product catalog" using arrays
− Mini-game "Find a product" to search for elements in an array

Learning outcome: ability to work with arrays, understanding how to access and process arrays.
Practical task: create a "product catalog" using arrays for inventory management, with search and sorting functions.

Day four

Programming practice

− Repeat the completed material in the form of a quiz
− Group solution of programming problems (for a group lesson) or individual work on a mini-project
− Creating a Pet Shop game using arrays and functions
− Summing up the module results and displaying the "Function Wizard" icon

Learning outcome: consolidation of the completed material in practice.
Practical task: create a Pet Shop game using arrays and functions.

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Module 3. Classes and objects

Day one

Introduction to classes

− Explaining classes through the analogy of "blueprints for creating items"
− Creating a simple "Product" class with basic properties
− Working with objects of the Product class: creating and changing properties
− Discussion of the use of classes in our future application

Learning outcome: the ability to explain what a class and object are, the ability to create an object, access its properties and change them.
Practical task: create a "User" class with the required properties for the store.

Day two

Class methods

− Explanation of methods through the analogy of "actions that subjects can perform"
− Adding methods to the Product class (applyDiscount, displayInfo)
− Mini-project "Virtual showcase" with product information display
− Interactive Method Comprehension Test

Learning outcome: ability to explain methods through object behavior, add and call applyDiscount and displayInfo methods, and a mini-project for displaying product information.
Practical task: add methods for managing the product basket to the "User" class.

Day three

Inheritance - a simple explanation

− Explanation of inheritance through the" Product Family " history
− Creating a base class "Product" and child classes "Food", "Toy", "Book"
− Using inheritance to create a catalog of different product types
− Group discussion or individual retrospective of the acquired knowledge

Learning outcome: the ability to declare an open class and inherit from it via Parent(...), and override the base class method using override.
Practical task: add specific methods to the class hierarchy for each product type.

Day four

Practice programming with classes

− Repeating OOP concepts in a playful way
− Creating a mini-app "Store Catalog" using classes
− Presentation of the created catalogues (in a group) or discussion with the teacher (individually)
− Summing up the results of the module and presenting awards for the OOP.

Learning outcome: consolidation of the completed material in practice, a console application that works with a collection of objects.
Practical task: finalize the "Store Catalog" with the function of searching and filtering products.

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Module 4. Introduction to Android Development

Day one

Introduction to Android Studio

− Install and configure Android Studio with detailed instructions
− Overview of the interface through the analogy of the "spacecraft control panel"
− Structure of an Android project in the form of a "treasure map"
− Creating the first empty app and running it on the emulator

Learning outcome: installed and configured Android Studio with the SDK and AVD emulator, running the "Hello world" app.
Practical task: configure the emulator and run the app with the changed text.

Day two

User Interface Basics

− Getting to know LinearLayout through the analogy of "placing books on a shelf"
− Adding text elements and buttons using a graphical editor
− Creating a simple welcome screen for our store
− Discussion of the created interfaces and exchange of ideas

Learning outcome: a working Welcome screen with text and a button running in the emulator, the ability to commit changes to the user interface and push to the GitHub repository.
Practical task: add design elements and logos to the welcome screen.

Day three

Event Handling in Android

− Explaining events through the "Magic Buttons" story
− Adding button click handlers
− Creating transitions between screens and pop-up messages
− Reaction mini-game for practicing click events

Learning outcome: the ability to explain the "event listener" model and implement it via setOnClickListener, create a second screen and navigate to it via Intent, and show pop-up messages.
Practical task: create a screen with buttons for different actions and corresponding reactions.

Day four

Creating your First Android App

− Combining the studied elements into a single application
− Creating the My First Store app with multiple screens
− Presentation of applications (in a group) or discussion with a teacher (individually)
− Summing up the module results and issuing the "Android Beginner" icon

Learning outcome: a working application with the main page, product list, and product details screen, understanding how to build and navigate between screens, process clicks, and display data.
Practical task: refine the app design and add new functionality.

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Module 5. Working with lists and resources

Day one

Simple Lists in Android

– Explaining lists using the "storefront" analogy
– Creating a simple list using ListView
– Adding products to the list and configuring the display
– Discussion of created lists and possible improvements

Learning outcome: created a ListView with a simple adapter with an array of strings, the ability to expand list items by adding your own layouts.
Practical task: add items with different product types to the list.

Day two

Working with resources

– Getting to know the app's resources (strings, colors, images)
– Adding product images to resources and displaying them in the list
– Creating a color scheme for a store app
– Mini-competition for the best color scheme (for a group) or discussion of various options (individually)

Learning outcome: mastered the main Android resource folders and files, added ListView *или* RecyclerViewreal product images to ListView or RecyclerView, and the ability to create and apply your own color palette through the app theme.
Practical task: prepare a set of images and resources for your store.

Day three

Introduction to RecyclerView

– Explanation of RecyclerView using the "product conveyor belt" analogy
– Creating a simple adapter for RecyclerView with ready-made templates
– Configuring the display of product cards in a grid or list
– Interactive demonstration of various display methods

Learning outcome: ability to create adapters and element layouts, switch between LinearLayoutManager and GridLayoutManager, and handle clicks on list items.
Practical task: create a RecyclerView with product cards and visual design.

Day four

Detailed product display

– Creating a screen with detailed product information
– Configuring switching from a list to detailed information
– Updating the app with transitions between screens
– Summing up the module results and displayingthe" List Wizard " icon"

Learning outcome: ability to transfer a product object from RecyclerView to DetailActivity via Intent, commit code changes with clear messages, and push to your remote repository on GitHub.
Practical task: Complete the creation of the detailed information screen with the "Add to cart" button.

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Module 6. Data Storage

Day one

Saving simple settings

− Explaining SharedPreferences through the" app notebook " metaphor
− Saving user settings (theme, text size)
− Implementing app theme switching
− Group discussion or individual work on customizing the appearance

Learning outcome: understanding of SharedPreferences, implemented a settings screen with radio buttons, ability to apply saved settings when restarting the app.
Practical task: create an app settings screen with the selected options saved.

Day two

Working with Data via Intent

− Explanation of Intent using the analogy of "letters with instructions"
− Transfer data between screens using Intent
− Creating a shopping cart with the transfer of selected products
− Mini-game "Send a message" to fix the material

Learning outcome: ability to create an Intent and pass simple and complex data to it, transfer Product objects and lists between screens, ready-made shopping cart with a transition from the list of products.
Practical task: to improve the mechanism for adding products to the shopping cart.

Day three

Getting to know a Simple Data Warehouse

− Explaining local storage through the" storage cabinet " metaphor
− Creating a simple structure for storing product data
− Implementing saving a shopping cart between app launches
− Discussion of created solutions and exchange of ideas

Learning outcome: understanding the difference between local storage and databases, ability to create and parse JSON structures, implement storage with a mechanism for saving and loading data via SharedPreferences and JSON.
Practical task: create a function for saving "Favorite products".

Day four

Practice working with data

− Group or individual solution of data management tasks
− Creating a "Purchase History" system with saving and displaying
− Results presentation and discussion
− Summing up the module results and issuingthe "Data Keeper" icon"

Learning outcome: PurchaseHistoryStorage was designedPurchaseHistoryStorage, a screen was created with displaying the purchase history, clearing and re-ordering.
Practical task: finalize the "Purchase History" with the possibility of re-ordering.

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Module 7. Navigation and User Experience

Day one

Creating a Multi-screen App

− Explanation of navigation using the "shopping center maps" analogy
− Creating a navigation structure for a store
− Configuring transitions between the main screens
− Discussion of the created navigation schemes

Learning outcome: ability to create a navigation graph with main screens, configure transitions between fragments, make commits and push to GitHub.
Practical task: refine the navigation scheme and implement transitions between all screens.

Day two

Improving the user interface

− Introduction to the principles of design for children using colors and shapes
− Improving the visual design of store screens
− Adding icons and improving text readability
− Mini-contest for the most user-friendly interface (for a group) or discussion of options (individually)

Learning outcome: ability to improve the visual design of app store screens, add icons, adjust their sizes and colors.
Practical task: create a unique style for your app store.

Day three

Simple animations and effects

− Introduction to Animations through the "Animating an App" story
− Adding simple button click animations
− Creating transition animations between screens
− Demonstration of created animations and discussion of effects

Learning outcome: ability to run simple button click animations, add animations of transitions between screens.
Practical task: add animations to the product list and add to cart.

Day four

Feedback in the app

− Creating a pop-up message system (Toast) with clear notifications
− Adding dialog boxes to confirm actions
− Implementation of the "star" product rating system
− Summing up the module results and issuingthe" Interface Designer " icon"

Learning outcome: we confirmed the correctness of the list animations and icon flight, fixed possible bugs, implemented the ToastUtil utility classToastUtil, and added dialogs with correct headers, messages, and buttons to the project.
Practical task: Create a product review screen with the ability to add a comment.

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Module 8. Multimedia and interactive elements

Day one

Working with images

− Explaining how to work with images using the "photo album" analogy
− Uploading and displaying product images
− Create a simple image gallery for a product
− Discussion of created galleries and possible improvements

Learning outcome: understanding how Android stores and displays images, using the Glide library, and setting up a horizontal RecyclerView as a gallery.
Practical task: add the ability to enlarge product images.

Day two

Audio and simple effects

− Introduction to working with audio through the "Music App" story
− Adding sound effects when you click on buttons
− Create background music for the app with the ability to turn it on/off
− Group listening or individual testing of sound effects

Learning outcome: the ability to explain the difference between SoundPool and MediaPlayer, connect and play a sound effect when you click on a button, and set up a background track with Play/Pause.
Practical task: create different sound effects for different actions in the app.

Day three

Interactive controls

− Getting to know SeekBar, CheckBox, RadioButton through game metaphors
− Creating filters for products using interactive elements
− Implementation of product parameter settings before adding to cart
− Demonstration and discussion of the created controls

Learning outcome: ability to use SeekBar to select numeric values in the interface, use CheckBox and RadioButton to select options, configure product parameters and send the result to the shopping cart.
Practical task: create a screen with custom filters for product search.

Day four

Mini-game in the app

− Planning a simple mini-game to get discounts in the store
− Create a "Catch a Discount" or "Find a Match" game inside the app
− Presentation of created games and testing
− Summing up the module results and issuing the "Multimedia Developer" icon

Learning outcome: understanding the key stages of planning game mechanics, implementing Activity and View for a mini-game with object animation and touch processing, setting up a bonus system for successful completion.
Practical task: To complete a mini-game with a bonus system.

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Module 9. Final project and presentation

Day one

Planning your final project

− Discussion of ideas for the final app store project
− Creating a development plan using the technologies you've learned
− Developing the app's design concept
− Defining required screens and functionality

Learning outcome: a development plan for the final project was drawn up with a breakdown into stages and tasks, a basic design concept of the application was proposed, and a list of required Activities/Fragments and their functions was compiled.
Practical task: create a project plan and prepare the necessary resources.

Day two

Developing key components

− Creating the main app screens
− Setting up navigation between screens
− Implementation of basic functions (registration, product view, shopping cart)

Learning outcome: created XML layouts for three key screens, configured NavHostFragment and nav_graph.xml for traffic, features for viewing the list of products, product details, shopping cart viewing, and filtering are implemented.
Practical task: continue developing the app as planned.

Day three

Completing development

− Checking the current status of the project
− Adding final elements and correcting errors
− Testing the app and improving the user experience
− Preparing for the project presentation

Learning outcome: a code review was conducted and it was checked that all the stages from /docs/project_plan. md were completed, missing project elements were integrated, bugs were identified and fixed, and manual and automated testing of key scenarios was carried out.
Practical task: Complete development and prepare a presentation.

Day four

Projects presentation and course completion

− Presentation of completed projects (for group classes)
  or demonstration of the project to the teacher (for individual classes)
− Discussion of projects and exchange of impressions
− Discussion of possible directions for further development
− Presentation of course certificates and summing up the course results

Learning outcome: the application was presented (key screens, architecture, and tasks solved), feedback on implementation, design, and UX was received, and directions for further development of the project were determined.
Practical task: participation in the final presentation of projects.