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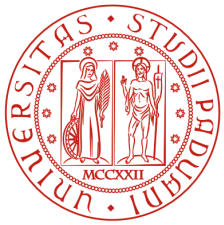

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Wireless Network for Mobile Applications

User Manual for the BluetoothTris application

Information about document

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1 Introduction

Welcome to **BluetoothTris**! This application allows you to play the classic Tic-Tac-Toe game with a friend using a Bluetooth connection. Designed for a smooth and interactive experience, the app enables two players to connect, compete, and enjoy a real-time match without the need for an internet connection.

1.1 Key Features

- **Multiplayer Over Bluetooth** – Play against a friend without requiring Wi-Fi or mobile data.
- **Automatic Turn Management** – The game keeps track of turns and enforces Tic-Tac-Toe rules.
- **Smart Connection Handling** – Ensures a stable connection and smooth gameplay.
- **Rematch Feature** – Easily start a new game without disconnecting.

This manual will guide you through setting up the application, connecting with another device, and starting a game.

2 System Requirements

This section outlines the minimum requirements for both developing and running the Tic-Tac-Toe Bluetooth application.

2.1 For Development

To develop, modify, and compile the application, ensure your system meets the following requirements:

- Android Studio (latest stable version)
- Java Development Kit (JDK) 17.0.12
- Grandle 7.5+

2.2 For Execution (Android Device)

To install and run the application, your Android device must meet the following requirements:

- **Operating System:** Minimum Android 10 (API 29), full support from Android 12 (API 31) onwards.
- **Permissions:** The app requires Bluetooth permissions:
  - `BLUETOOTH_SCAN` (Android 12+)
  - `BLUETOOTH_CONNECT` (Android 12+)
  - `BLUETOOTH` (Android 10 and earlier)

Warning: While the application can be installed on Android 10 and 11, it will **not be functional** as these versions do not support the required `BLUETOOTH_SCAN` and `BLUETOOTH_CONNECT` permissions. This means that the app cannot scan for or connect to other Bluetooth devices on these versions.

Both the development and execution environments must fulfill these conditions to ensure the proper functioning of the application.

3 Configuration

3.1 Download and Install OpenJDK 17.0.12 (LTS)

1. Go to Adoptium and select:
   - **Java Version:** 17 (LTS)
   - **Operating System:** (choose your operating system)
   - **Package Type:** JDK
2. Download and run the installer.
3. During installation, select the installation path:

```
C:\Program Files\Java\jdk-17
```

4. After the installation, configure the environment variable:

   - **JAVA_HOME** = `C:\Program Files\Java\jdk-17`
   - Add to the **Path**: `%JAVA_HOME%\bin`

3.2 Download and Configure Gradle 7.5+

Gradle is managed via the **Gradle Wrapper** in the project, so you don't need to install it manually when installing Android Studio.

3.3 Android Studio Configuration

1. Open Android Studio and go to:

   `File > Settings > Build, Execution, Deployment > Build Tools > Gradle`

2. Make sure the following options are selected:

   - **Use Gradle from:** *gradle-wrapper.properties*
   - **Gradle JDK:** select `JDK 17`

3.4 Configuration of the `gradle.properties` File

Make sure that the `gradle.properties` file contains:

```
org.gradle.jvmargs=-Xmx2048m -Dfile.encoding=UTF-8
android.useAndroidX=true
kotlin.code.style=official
android.nonTransitiveRClass=true
org.gradle.java.home=C:/Program Files/Java/jdk-17
```

Note: The line `org.gradle.java.home` is required to tell Gradle which version of Java to use.

3.5 Installation Verification

Open **Command Prompt** or **PowerShell** and type:

```
java -version
```

You should see an output similar to:

openjdk version ”17.0.12”

Check the Gradle version with:

```
gradle -v
```

Make sure the version is **7.5** or higher.

3.6 Cleaning and Rebuilding the Project

After configuring everything, rebuild the project to ensure there are no configuration errors:

```
Build > Clean Project
Build > Rebuild Project
```

3.7 Troubleshooting

- If you encounter issues with the Java configuration, double-check the path in `org.gradle.java.home`.
- Make sure there are no conflicting Java versions in the system **Path**.

3.8 End of Configuration

If you have followed all the steps, the project should now work correctly in Android Studio using **OpenJDK 17.0.12** and **Gradle 7.5** or higher.

At the end of the configuration, you need to synchronize the project with the Gradle files to apply all changes. Go to:

```
File > Sync Project with Gradle Files
```

This ensures that Android Studio updates all dependencies and recognizes the newly configured settings.

4 Installation

To install the application:

1. Download the APK file.
2. Enable installation from unknown sources in your device settings.
3. Install the APK and open the app.

5 Getting Started

This section explains how to use the application to start a game of Tic-Tac-Toe over a Bluetooth connection.

5.1 Starting a Game

When the application is launched, you will see a list of previously paired devices and available Bluetooth devices in range. To start a game, follow these steps:

1. **Setting up the Server:** One of the two players must activate the server mode by pressing the button located at the bottom right of the screen. The device will then wait for an incoming connection.

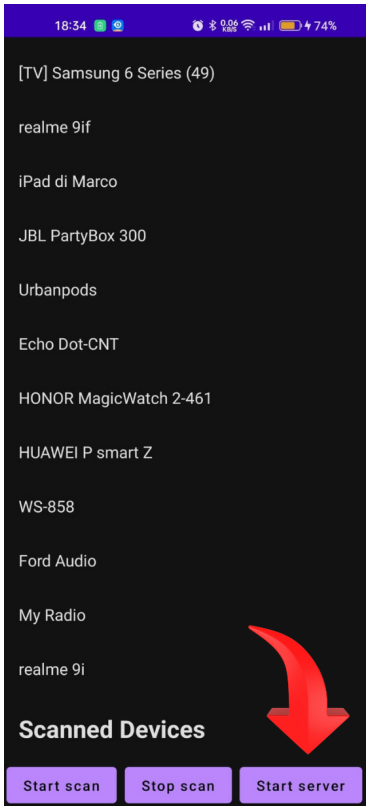


Figure 1: Start server

2. **Connecting as a Client:** The second player must scan for available devices by pressing the corresponding button. Once the scan is complete, select the desired device from the list to initiate the connection.

3. **Establishing the Connection:** Once the client selects the server device, the two devices will automatically establish a Bluetooth connection.

4. **Starting the Game:** As soon as the connection is established, the Tic-Tac-Toe game will begin.

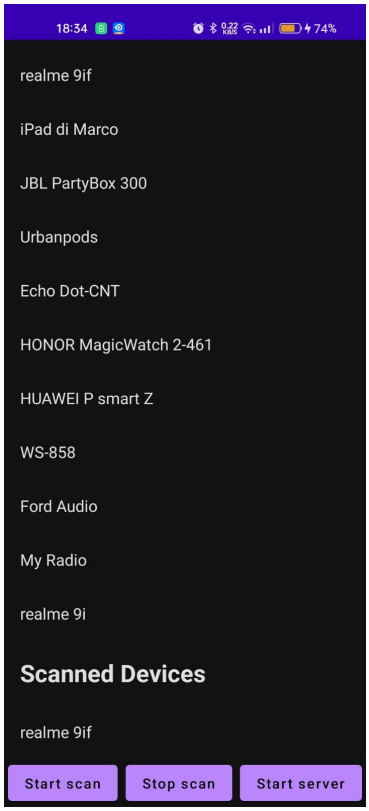


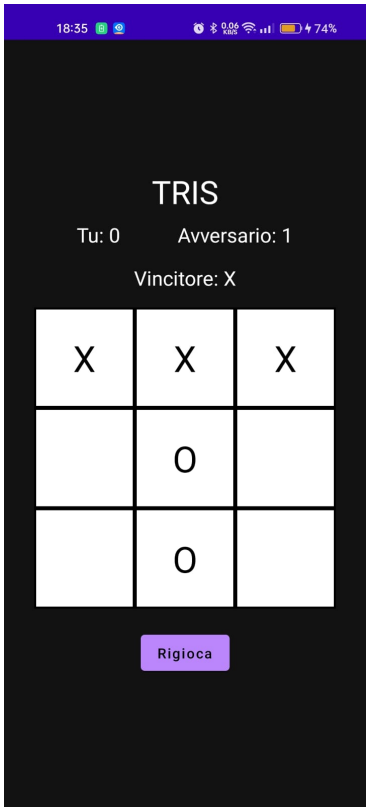
Figure 2: Scanning devices

5.2 Requesting a Rematch

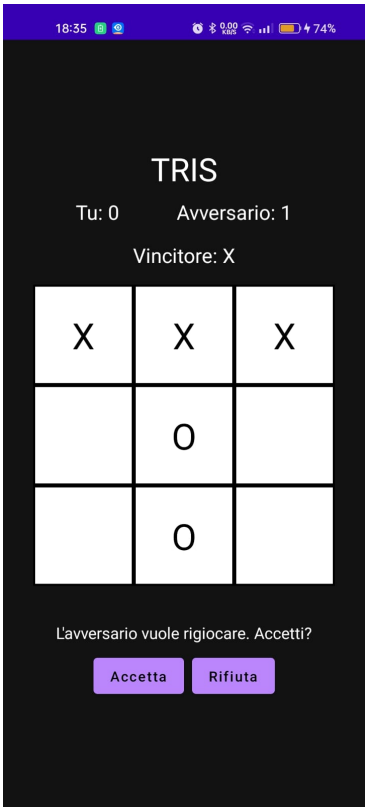
At the end of the game, players will have the option to request a rematch by pressing the designated button. If both players agree, a new game will start without the need to reconnect.

This simple process ensures a seamless and enjoyable multiplayer experience over Bluetooth.

Figure 3: Game homepage



(a) Send request



(b) Accept or reject request of rematch

Figure 4: Rematch