

1-AndroidManifest.xml

```
<uses-permission android:name="android.permission.BLUETOOTH"/>
<uses-permission android:name="android.permission.BLUETOOTH_ADMIN"/>

<!-- وما فوق، مسموح بالوصول إلى الموقع للبحث عن أجهزة بلوتوث Android 6.0 لأجهزة --!>
<uses-permission android:name="android.permission.ACCESS_FINE_LOCATION"/>

<!-- لأجهزة Android 12+ --!>
<uses-permission android:name="android.permission.BLUETOOTH_SCAN" />
<uses-permission android:name="android.permission.BLUETOOTH_CONNECT" />
```

2-MainActivity.kt

```
class MainActivity : AppCompatActivity() {

    private val REQUEST_PERMISSIONS = 1001
    private val requiredPermissions = arrayOf(
        Manifest.permission.BLUETOOTH,
        Manifest.permission.BLUETOOTH_ADMIN,
        Manifest.permission.ACCESS_FINE_LOCATION,
        Manifest.permission.BLUETOOTH_SCAN,
        Manifest.permission.BLUETOOTH_CONNECT
    )

    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_main)

        if (!hasPermissions()) {
            ActivityCompat.requestPermissions(this, requiredPermissions, REQUEST_PERMISSIONS)
        }
    }
}
```

```

    }
}

private fun hasPermissions(): Boolean {
    return requiredPermissions.all {
        ContextCompat.checkSelfPermission(this, it) == PackageManager.PERMISSION_GRANTED
    }
}
}
}

```

3-activity_main.xml

```

<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:orientation="vertical"
    android:padding="16dp"
    android:layout_width="match_parent"
    android:layout_height="match_parent">

    <Spinner
        android:id="@+id/spinnerDevices"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:prompt="@string/select_device_prompt"/>

    <Button
        android:id="@+id/btnConnect"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="اتصل بالذراع"

```

```
android:layout_marginTop="12dp"/>
```

```
<!-- لاحقاً نضيف هنا عناصر التحكم بالحركة -->
```

```
</LinearLayout>
```

4-strings.xml

```
<string name="select_device_prompt">اختر جهاز بلوتوث</string>
```

5-MainActivity.kt

```
import android.bluetooth.BluetoothAdapter
```

```
import android.bluetooth.BluetoothDevice
```

```
import android.bluetooth.BluetoothSocket
```

```
import android.os.Bundle
```

```
import android.widget.AdapterView
```

```
import android.widget.Button
```

```
import android.widget.Spinner
```

```
import androidx.appcompat.app.AppCompatActivity
```

```
import java.io.IOException
```

```
import java.util.*
```

```
class MainActivity : AppCompatActivity() {
```

```
    private lateinit var spinnerDevices: Spinner
```

```
    private lateinit var btnConnect: Button
```

```
    private val bluetoothAdapter: BluetoothAdapter? = BluetoothAdapter.getDefaultAdapter()
```

```
    private var socket: BluetoothSocket? = null
```

// UUID الموجود في متحكم البلوتوث UUID تأكد أنه يطابق الـ SPP عام لـ UUID

```
private val BT_UUID: UUID = UUID.fromString("00001101-0000-1000-8000-00805F9B34FB")
```

```
override fun onCreate(savedInstanceState: Bundle?) {
```

```
    super.onCreate(savedInstanceState)
```

```
    setContentView(R.layout.activity_main)
```

```
    spinnerDevices = findViewById(R.id.spinnerDevices)
```

```
    btnConnect = findViewById(R.id.btnConnect)
```

```
    loadPairedDevices()
```

```
    btnConnect.setOnClickListener { connectToSelectedDevice() }
```

```
}
```

```
private fun loadPairedDevices() {
```

```
    val pairedDevices: Set<BluetoothDevice>? = bluetoothAdapter?.bondedDevices
```

```
    val list = mutableListOf<String>()
```

```
    pairedDevices?.forEach { device ->
```

```
        // تظهر الاسم والعنوان لتمييز الأجهزة
```

```
        list.add("${device.name} - ${device.address}")
```

```
}
```

```
val adapter = ArrayAdapter(this,
```

```
    android.R.layout.simple_spinner_item,
```

```
    list)
```

```
adapter.setDropDownViewResource(android.R.layout.simple_spinner_dropdown_item)
```

```
spinnerDevices.adapter = adapter
```

```
}
```

```

private fun connectToSelectedDevice() {

    val item = spinnerDevices.selectedItem as? String ?: return
    val address = item.substringAfterLast(" - ").trim()
    val device = bluetoothAdapter?.getRemoteDevice(address) ?: return

    // جديد Thread محاولة الاتصال في
    Thread {
        try {
            socket = device.createRfcommSocketToServiceRecord(BT_UUID)
            bluetoothAdapter.cancelDiscovery()
            socket?.connect()
            runOnUiThread {
                btnConnect.text = "متصل"
                btnConnect.isEnabled = false
            }
            // لاستخدامه لاحقاً بإرسال البيانات socket هنا يمكن الاحتفاظ بالـ
        } catch (e: IOException) {
            e.printStackTrace()
            socket?.close()
        }
    }.start()
}
}

```

6-activity_main.xml

```

<?xml version="1.0" encoding="utf-8"?>

<ScrollView xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"

```

```
android:layout_height="match_parent"
android:padding="16dp">
```

```
<LinearLayout
```

```
    android:orientation="vertical"
    android:layout_width="match_parent"
    android:layout_height="wrap_content">
```

```
<Spinner
```

```
    android:id="@+id/spinnerDevices"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:prompt="@string/select_device_prompt"/>
```

```
<Button
```

```
    android:id="@+id/btnConnect"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:text="اتصل بالذراع"
    android:layout_marginTop="12dp"/>
```

```
<!------- عناصر التحكم بالحركة ----->
```

```
<TextView
```

```
    android:layout_marginTop="24dp"
    android:text="أوامر الحركة"
    android:textSize="18sp"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"/>
```

```
<LinearLayout

    android:orientation="horizontal"

    android:layout_width="match_parent"

    android:layout_height="wrap_content"

    android:gravity="center_vertical">

<TextView

    android:layout_width="0dp"

    android:layout_weight="1"

    android:text="كتف (°):"/>

<EditText

    android:id="@+id/etShoulder"

    android:layout_width="80dp"

    android:layout_height="wrap_content"

    android:inputType="number"

    android:text="90"/>

</LinearLayout>
```

```
<LinearLayout

    android:orientation="horizontal"

    android:layout_width="match_parent"

    android:layout_height="wrap_content"

    android:gravity="center_vertical"

    android:layout_marginTop="8dp">

<TextView

    android:layout_width="0dp"

    android:layout_weight="1"

    android:text="كوع (°):"/>
```

```
<EditText
    android:id="@+id/etElbow"
    android:layout_width="80dp"
    android:layout_height="wrap_content"
    android:inputType="number"
    android:text="90"/>
</LinearLayout>
```

```
<LinearLayout
    android:orientation="horizontal"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:gravity="center_vertical"
    android:layout_marginTop="8dp">
```

```
<TextView
    android:layout_width="0dp"
    android:layout_weight="1"
    android:text="قبضة (°):"/>
```

```
<EditText
    android:id="@+id/etGripper"
    android:layout_width="80dp"
    android:layout_height="wrap_content"
    android:inputType="number"
    android:text="90"/>
</LinearLayout>
```

```
<LinearLayout
    android:orientation="horizontal"
```



```
android:layout_width="match_parent"
android:layout_height="wrap_content"
android:gravity="center_vertical"
android:layout_marginTop="8dp"
android:layout_marginBottom="16dp">
```

```
<TextView
```

```
    android:layout_width="0dp"
    android:layout_weight="1"
    android:text="صمام PWM:"/>
```

```
<EditText
```

```
    android:id="@+id/etValve"
    android:layout_width="80dp"
    android:layout_height="wrap_content"
    android:inputType="number"
    android:text="0"/>
```

```
</LinearLayout>
```

```
<Button
```

```
    android:id="@+id/btnSendCmd"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:text="أرسل أمر الحركة"/>
```

```
<!-- عرض القراءات -->
```

```
<TextView
```

```
    android:layout_marginTop="24dp"
    android:text="قراءات المستشعرات"
    android:textSize="18sp"
```

```
android:layout_width="wrap_content"
android:layout_height="wrap_content"/>
```

```
<TextView
    android:id="@+id/tvDist"
    android:layout_marginTop="8dp"
    android:text="المسافة: -- cm"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"/>
```

```
<TextView
    android:id="@+id/tvPress"
    android:layout_marginTop="4dp"
    android:text="الضغط: -- kPa"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"/>
```

```
<TextView
    android:id="@+id/tvTemp"
    android:layout_marginTop="4dp"
    android:text="درجة الحرارة: -- °C"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"/>
```

```
</LinearLayout>
```

```
</ScrollView>
```

```
-7Command.kt
```

```
data class Command(
```

```
    val shoulder: Int,  
    val elbow: Int,  
    val gripper: Int,  
    val valve: Int  
)
```

-8Telemetry.kt

```
data class Telemetry(  
    val dist: Double,  
    val press: Double,  
    val temp: Double  
)
```

-9MainActivity.kt

```
import android.widget.EditText  
import android.widget.TextView  
import com.google.gson.Gson  
import java.io.BufferedReader  
import java.io.InputStreamReader  
import java.io.OutputStreamWriter  
  
class MainActivity : AppCompatActivity() {  
  
    // spinnerDevices و btnConnect بعد تعريف  
    private lateinit var etShoulder: EditText  
    private lateinit var etElbow: EditText  
    private lateinit var etGripper: EditText  
    private lateinit var etValve: EditText
```

```
private lateinit var btnSendCmd: Button
```

```
private lateinit var tvDist: TextView
```

```
private lateinit var tvPress: TextView
```

```
private lateinit var tvTemp: TextView
```

```
private var writer: OutputStreamWriter? = null
```

```
private var reader: BufferedReader? = null
```

```
private val gson = Gson()
```

```
override fun onCreate(savedInstanceState: Bundle?) {
```

```
    // الكود الحالي لمسح/اتصال البلوتوث ...
```

```
    // ربط الواجهات
```

```
    etShoulder = findViewById(R.id.etShoulder)
```

```
    etElbow = findViewById(R.id.etElbow)
```

```
    etGripper = findViewById(R.id.etGripper)
```

```
    etValve = findViewById(R.id.etValve)
```

```
    btnSendCmd = findViewById(R.id.btnSendCmd)
```

```
    tvDist = findViewById(R.id.tvDist)
```

```
    tvPress = findViewById(R.id.tvPress)
```

```
    tvTemp = findViewById(R.id.tvTemp)
```

```
    btnSendCmd.setOnClickListener { sendCommand() }
```

```
}
```

```
private fun onBluetoothConnected(socket: BluetoothSocket) {
```

```
    // إعداد القارئ والكاتب بعد الاتصال
```

```
writer = OutputStreamWriter(socket.outputStream)
reader = BufferedReader(InputStreamReader(socket.inputStream))
```

```
// بدء مهمة قراءة مستمرة
```

```
Thread { readTelemetryLoop() }.start()
}
```

```
private fun sendCommand() {
    val cmd = Command(
        shoulder = etShoulder.text.toString().toInt(),
        elbow   = etElbow.text.toString().toInt(),
        gripper  = etGripper.text.toString().toInt(),
        valve    = etValve.text.toString().toInt()
    )
    val json = gson.toJson(cmd) + "\n"
    Thread {
        writer?.let {
            it.write(json)
            it.flush()
        }
    }.start()
}
```

```
private fun readTelemetryLoop() {
    try {
        while (true) {
            val line = reader?.readLine() ?: break
            val tel = gson.fromJson(line, Telemetry::class.java)
            runOnUiThread {
```

```
tvDist.text = "المسافة: ${"%1f".format(tel.dist)} cm"
tvPress.text = "الضغط: ${"%1f".format(tel.press)} kPa"
tvTemp.text = "درجة الحرارة: ${"%1f".format(tel.temp)} °C"
    }
}
} catch (_: Exception) { }
}
}
```

```
10connections :
socket = device.createRfcommSocketToServiceRecord(BT_UUID)
bluetoothAdapter.cancelDiscovery()
socket?.connect()
socket?.let { onBluetoothConnected(it) }
```