# Getting started:
## Software for the MeArm Robot Arm Raspberry Pi Maker Kit project

This Raspberry Pi Maker Kit project allows a MeArm v0.4 robot arm to be built, connected to the PCB of a Raspberry Pi Maker Kit and controlled by software running on the Pi.

The Python code made available allows the movement of the robot arm to be explored and any model of Pi can be used but the Raspberry Pi 4 or a Pi 400 is recommended as well as a SD card that is at least 16GB. You should also be using the latest 'Bullseye' version of the OS, and if you have an earlier operating system version, it is recommended that you upgrade before installing the project software and documentation.

The physical build of the robot arm is described in detail in the downloadable document:
*RPi_Maker_Kit-MeArm_V0-4_robot_arm_build_and_usage_documentation_v1-1.pdf*
and the detailed designs for all the 3D printable parts are available at the Prusa web site:

***https://www.printables.com/model/113779-robot-arm-controlled-by-a-raspberry-pi***

All the software and documentation is downloadable from the GitHub repository ***https://github.com/gbrickell/MeArmv0-4_robot_arm***.

Depending upon how you have downloaded the files it is suggested that they should be stored on your Raspberry Pi in a folder as follows:

*/home/YOURUSERNAME/RPi_maker_kit5/complete_projects/MeArm_v0-4/*

The various Python scripts can then either be run from the Thonny IDE or from a CLI window using the suggested command shown near the top of the code for each script, which is typically something like:

```
python3 ./RPi_maker_kit5/complete_projects/MeArm_v0-4/DemoIK.py
```

.. where this generic ./ command format assumes that the user is currently 'in' their home folder.

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The downloaded software and documentation files provide you with very detailed information on the project, but overleaf is a short summary of the components needed and some basic usage/safety information.

## Component summary:

<table>
<tr><td colspan="2">A set of 3D printed PLA robot arm components: designs from here.</td></tr>
<tr><td colspan="2">Raspberry Pi Maker Kit assembled PCB with:<br>• a 4AA battery box connected to the PCB's power bus, and<br>• a PCA9685 I$^2$C PWM control board inserted into its dedicated female header on the PCB and the control board's power input connected to the PCB's power bus</td></tr>
<tr><td>4x SG90 micro servos</td><td>9x 6mm M3 pozi pan head screws</td></tr>
<tr><td>4x self-adhesive rubber feet</td><td>12x 8mm M3 pozi pan head screws</td></tr>
<tr><td>4x 3x-male-to-female jumper leads to extend the reach of the SG90s' three connection leads</td><td>11x 12mm M3 pozi pan head screws</td></tr>
<tr><td>12x M3 nuts</td><td>3x 10mm M3 pozi pan head screws</td></tr>
</table>

The robot arm components listed above are for use with a Raspberry Pi Maker Kit. The components are used to build a MeArm v0.4 robot arm for which detailed build and usage instructions are provided in the downloaded documents. Please note that the *readme_1.0_mearm0-4.txt* file that is downloaded as part of the documentation is a version control file that lists all the download material. Please review this file once downloaded as additional documents are added from time to time to the support materials.

At no time should mains voltages or any power supply, other than that which supplies the Raspberry Pi or is an allowed input to the Maker Kit power bus, be used in the activities described in the robot arm documentation: the Raspberry Pi Maker Kit documentation provides addition support for the overall use of the Maker Kit.

Please also refer to any Regulatory Compliance and Safety Information provided with your Raspberry Pi.

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This project is aimed at ages 12 and above, although with some adult supervision ages as young as 9 may be able to assemble and run the robot arm, although at this early age not all the software, physics and maths associated with operating the robot arm may be fully understood.