LAB 1

1 Target:

Hello World in an embedded system.

2 Demonstration:

2.1 Show the output of your code. It should show your student ID. (70%)

Ex. `0886015_helloworld`.

2.2 Answer the questions when demonstrating to TAs. (10%)

2.3 Upload your source code to New E3.

2.4 Last date to demo: **Oct. 14th, 2021**.

3 Hints:

3.1 To view the standard output of the development board, you can either connect the board with the screen inside the box or connect the board to the host computer with an RS-232 interface on the board.

3.2 If you view the output through the RS-232 interface on the host computer, the baud rate is 115200.

4 Instructions:

4.1 Prepare a host computer installed with **Ubuntu 14.04**.

4.1.1 You could do this with a VM in Windows or macOS.

4.1.2 You also can do this with a laptop installed with the required OS.

4.1.3 The computers in the lab are not recommended.

4.2 Install cross compiler in the host computer prepared above.

4.2.1 Follow the instructions in the section "一" in "**TQIMX6Q(V3) QT5.5 开发境搭建_2017-02-20.pdf**".

- Most of the commands in this manual should run with `sudo`.
- The environment parameters modification on page 3 should be

```
PATH="ReplaceYourPATHHere:${ARM_GCC_IMX6_V3}:${QMAKE_ARM_IMX6_V3}"
```

- The last command on page 3, should be

```
arm-linux-gnueabihf-gcc -v
```

4.3 Install OS on the development board.

4.3.1 Follow the instructions in the section "**3.1**" and "**3.4**" in "**TQSDMaker 用户使用手册.pdf**".

- Most of the commands in this manual should run with `sudo`.
- While doing step 3.1.2, the disk should not be mounted, otherwise, it may fail.
- The tool using in 3.1.3 and 3.1.4 is packed in `image_new_v11.tar.bz2`.
- The files mention in 3.4.1 are packed in `E9V3_Linux4.1_image.tar.bz2`.

4.3.2 After you have done the instructions, you should be able to boot with **emmc** mode and log in to the system.

4.4 Compile program.

4.4.1 Prepare a `hello_world.c` source code.

4.4.2 Compile with cross-compiler on the host computer.

```
arm-linux-gnueabihf-gcc hello_world.c -o hello_world
```

4.4.3 Run the executable `hello_world` on the embedded system.

5 Questions:

5.1 Please explain what is `arm-linux-gnueabihf-gcc`? Why don't we just compile with `gcc`? (5%)

5.2 Can executable `hello_world` run on the host computer? Why or Why not? (5%)