

# Mohanad Mohamed Abdelmonem Eissa

## Lab 3

### Building project using Makefile

```
MINGW64:/d/ks_diploma/Assignments/Unit 3/Lecture 4/Lab 3

Mohanad@LAPTOP-D8I0DKRS MINGW64 /d/ks_diploma/Assignments/Unit 3/Lecture 4/Lab 3
$ make
arm-none-eabi-gcc.exe -c -I . -mthumb -mcpu=cortex-m4 -gdwarf-2 main.c -o main.o
arm-none-eabi-gcc.exe -c -I . -mthumb -mcpu=cortex-m4 -gdwarf-2 startup.c -o startup.o
arm-none-eabi-ld.exe -T linker_script.ld main.o startup.o -o lab3_cortex_m4.elf -Map=Map_file.map
arm-none-eabi-objcopy.exe -O binary lab3_cortex_m4.elf lab3_cortex_m4.bin
====build is done=====
```

### Debugging on Keil using simulator

The screenshot shows the Keil uVision IDE interface during a simulation. The main window displays the C code for `main.c`, which includes a delay function and GPIO setup. The left pane shows the Register window with `R15 (PC)` selected. The right pane shows the GPIOF peripheral registers. The bottom pane shows the Call Stack with the `main` function and `delay_count` variable.

**Registers:**

Register	Value
R0	0x00000000
R1	0x00000000
R2	0x000047A4
R3	0x000047A4
R4	0x00000000
R5	0x00000000
R6	0x00000000
R7	0x2000F0D0
R8	0x00000000
R9	0x00000000
R10	0x00000000
R11	0x00000000
R12	0x00000000
R13 (SP)	0x2000F0D0
R14 (LR)	0x0000019D
R15 (PC)	0x00000002

**GPIOF Registers:**

Property	Value
DATA	0x00000011
DIR	0x08080808
IS	0x00000000
IBE	0x00000000
IEV	0x00000000
IM	0
RIS	0
MIS	0
ICR	0
AFSEL	0x00000000
DR2R	0xFFFFFFFF
DR4R	0x00000000
DR8R	0x00000000
ODR	0x00000000
PUR	0x00000000
PDR	0x00000000
SLR	0x00000000
DEN	0x08080808
LOCK	0x01010101
CR	0x1E1E1E1E
AMSEL	0x00000000
PCR	0x00000000

**Call Stack:**

Name	Location/Value	Type
main	0x0000001C	int f0
delay_count	0x000047A4	auto - uint

## Debugging on Keil using TivaC board and Stellaris ICDI

