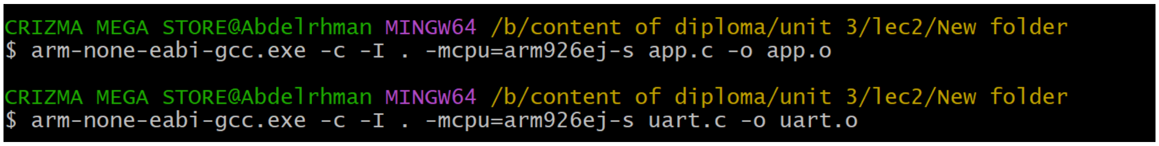
Report about lab1

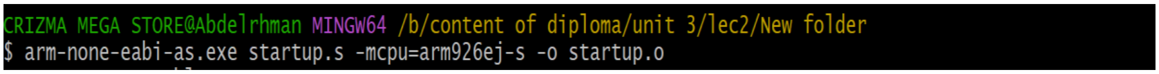
lab1: create a BareMetal software to send.

“Learn-in-depth: <Abdelrhman>” using UART.

Generate app.o & uart.o & startup.o :

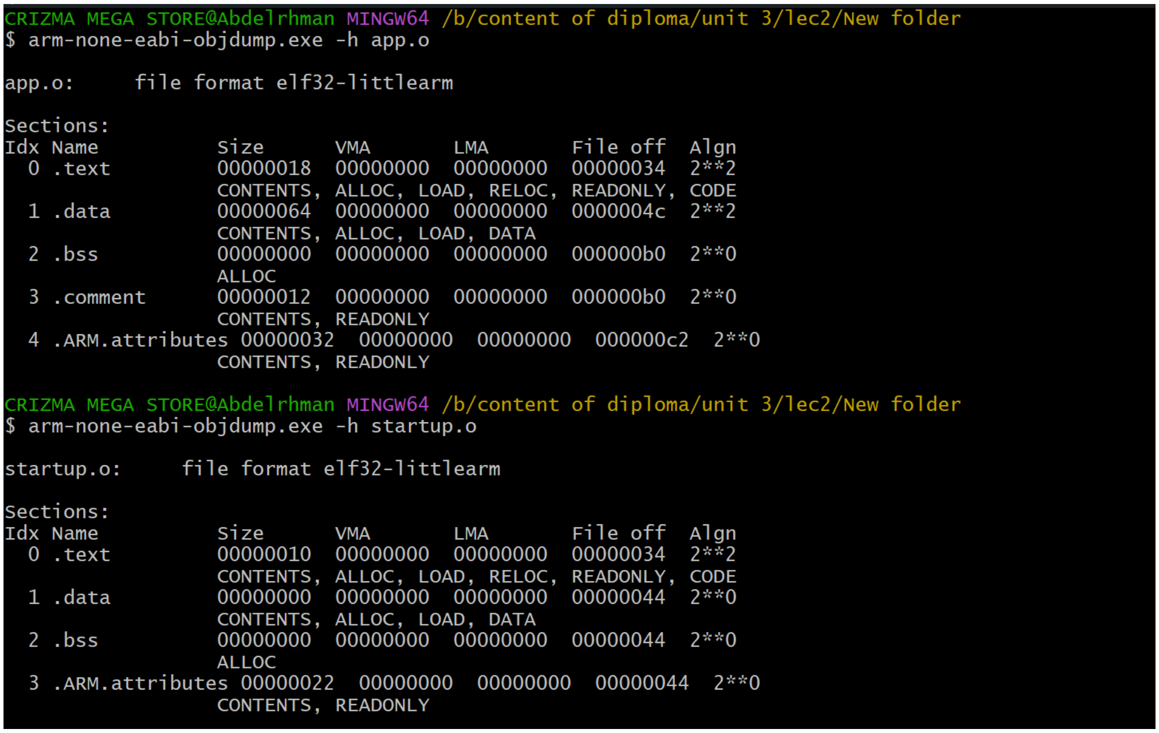


```
CRIZMA MEGA STORE@Abdelrhman MINGW64 /b/content of diploma/unit 3/lec2/New folder
$ arm-none-eabi-gcc.exe -c -I . -mcpu=arm926ej-s app.c -o app.o

CRIZMA MEGA STORE@Abdelrhman MINGW64 /b/content of diploma/unit 3/lec2/New folder
$ arm-none-eabi-gcc.exe -c -I . -mcpu=arm926ej-s uart.c -o uart.o
```



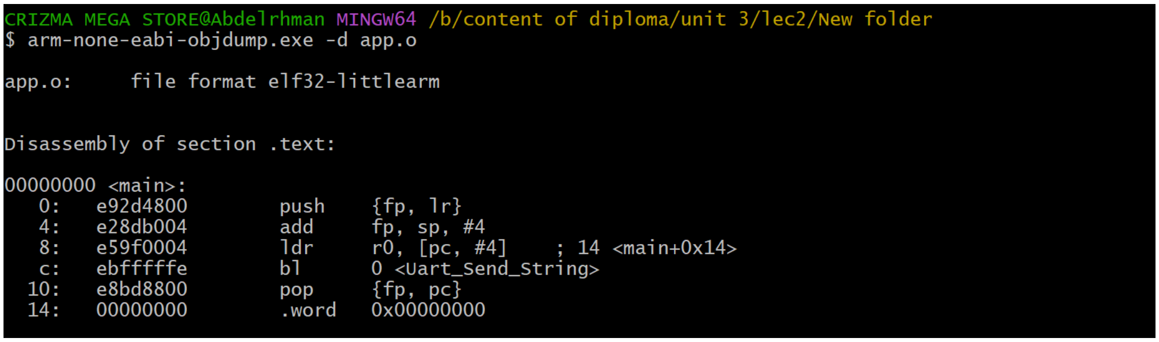
```
CRIZMA MEGA STORE@Abdelrhman MINGW64 /b/content of diploma/unit 3/lec2/New folder
$ arm-none-eabi-as.exe startup.s -mcpu=arm926ej-s -o startup.o
```

Sections of app.o & startup.o :



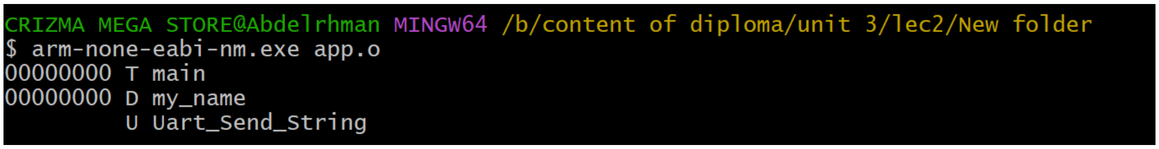
```
CRIZMA MEGA STORE@Abdelrhman MINGW64 /b/content of diploma/unit 3/lec2/New folder
$ arm-none-eabi-objdump.exe -h app.o

app.o:     file format elf32-littlearm

Sections:
Idx Name          Size      VMA       LMA       File off  Algn
  0 .text         00000018  00000000  00000000  00000034  2**2
                  CONTENTS, ALLOC, LOAD, RELOC, READONLY, CODE
  1 .data         00000064  00000000  00000000  0000004c  2**2
                  CONTENTS, ALLOC, LOAD, DATA
  2 .bss          00000000  00000000  00000000  000000b0  2**0
                  ALLOC
  3 .comment      00000012  00000000  00000000  000000b0  2**0
                  CONTENTS, READONLY
  4 .ARM.attributes 00000032  00000000  00000000  000000c2  2**0
                  CONTENTS, READONLY

CRIZMA MEGA STORE@Abdelrhman MINGW64 /b/content of diploma/unit 3/lec2/New folder
$ arm-none-eabi-objdump.exe -h startup.o

startup.o:     file format elf32-littlearm

Sections:
Idx Name          Size      VMA       LMA       File off  Algn
  0 .text         00000010  00000000  00000000  00000034  2**2
                  CONTENTS, ALLOC, LOAD, RELOC, READONLY, CODE
  1 .data         00000000  00000000  00000000  00000044  2**0
                  CONTENTS, ALLOC, LOAD, DATA
  2 .bss          00000000  00000000  00000000  00000044  2**0
                  ALLOC
  3 .ARM.attributes 00000022  00000000  00000000  00000044  2**0
                  CONTENTS, READONLY
```

Sections of disassemble app.o :



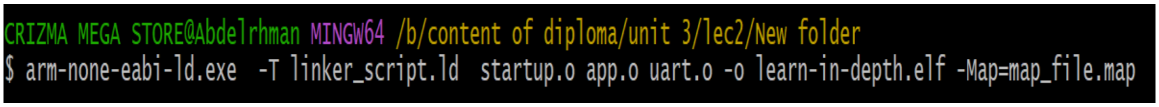
```
CRIZMA MEGA STORE@Abdelrhman MINGW64 /b/content of diploma/unit 3/lec2/New folder
$ arm-none-eabi-objdump.exe -d app.o

app.o:     file format elf32-littlearm


Disassembly of section .text:

00000000 <main>:
   0:   e92d4800        push    {fp, lr}
   4:   e28db004        add     fp, sp, #4
   8:   e59f0004        ldr     r0, [pc, #4]    ; 14 <main+0x14>
   c:   ebfffffe        bl      0 <Uart_Send_String>
  10:   e8bd8800        pop     {fp, pc}
  14:   00000000        .word   0x00000000
```

Symbols of app.o :



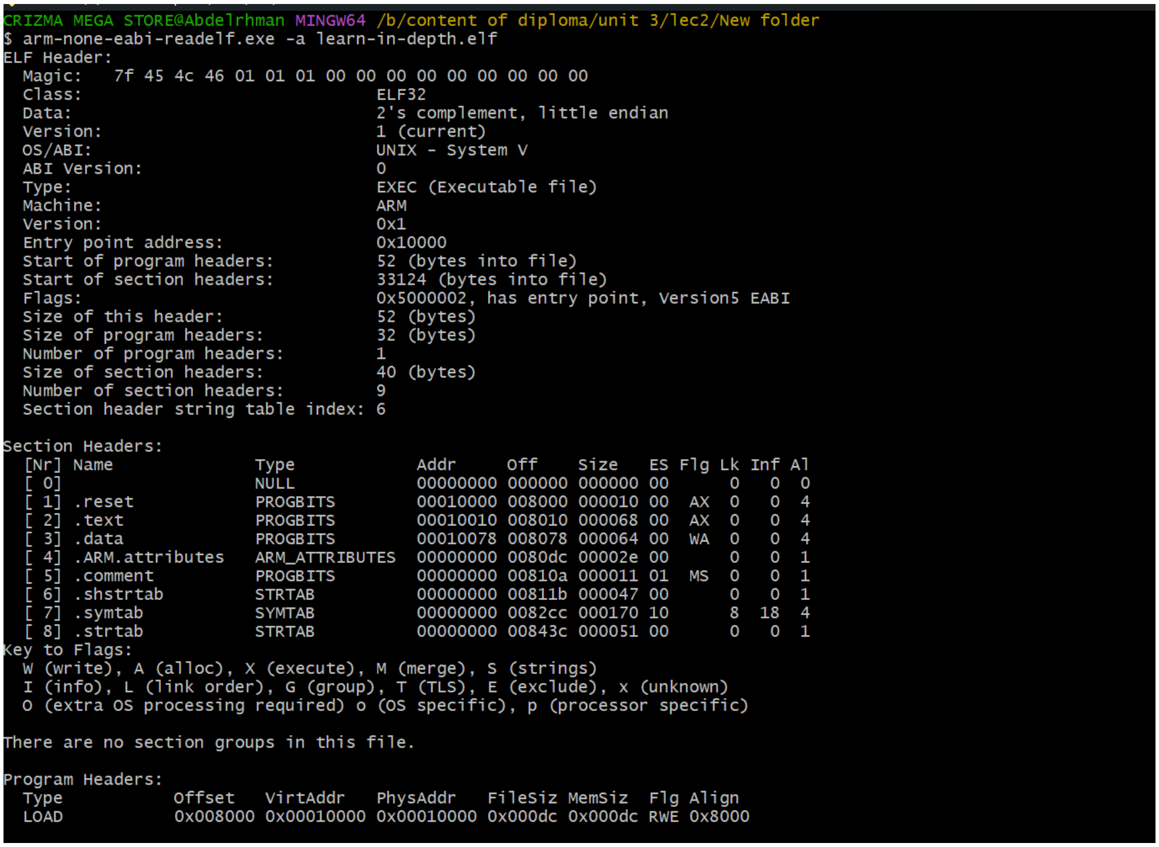
```
CRIZMA MEGA STORE@Abdelrhman MINGW64 /b/content of diploma/unit 3/lec2/New folder
$ arm-none-eabi-nm.exe app.o
00000000 T main
00000000 D my_name
         U Uart_Send_String
```

Generate learn-in-depth.elf :



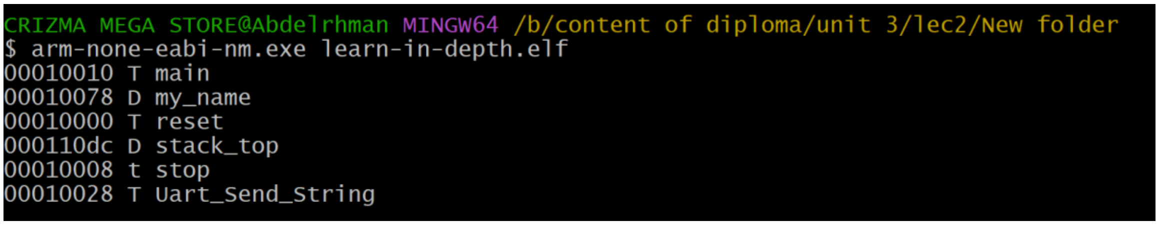
```
CRIZMA MEGA STORE@Abdelrhman MINGW64 /b/content of diploma/unit 3/lec2/New folder
$ arm-none-eabi-ld.exe  -T linker_script.ld  startup.o app.o uart.o -o learn-in-depth.elf -Map=map_file.map
```

Sections of learn-in-depth.elf :



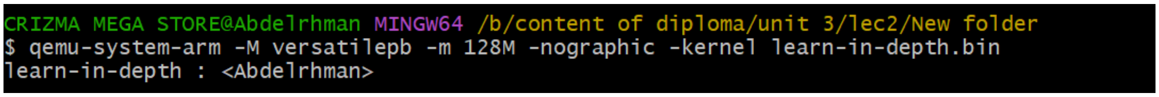
```
CRIZMA MEGA STORE@Abdelrhman MINGW64 /b/content of diploma/unit 3/lec2/New folder
$ arm-none-eabi-readelf.exe -a learn-in-depth.elf
ELF Header:
  Magic:   7f 45 4c 46 01 01 01 00 00 00 00 00 00 00 00 00
  Class:                             ELF32
  Data:                              2's complement, little endian
  Version:                           1 (current)
  OS/ABI:                            UNIX - System V
  ABI Version:                       0
  Type:                              EXEC (Executable file)
  Machine:                           ARM
  Version:                           0x1
  Entry point address:               0x10000
  Start of program headers:          52 (bytes into file)
  Start of section headers:          33124 (bytes into file)
  Flags:                             0x5000002, has entry point, Version5 EABI
  Size of this header:               52 (bytes)
  Size of program headers:           32 (bytes)
  Number of program headers:         1
  Size of section headers:           40 (bytes)
  Number of section headers:         9
  Section header string table index: 6

Section Headers:
  [Nr] Name              Type            Addr     Off    Size   ES Flg Lk Inf Al
  [ 0]                   NULL            00000000 000000 000000 00      0   0  0
  [ 1] .reset            PROGBITS        00010000 008000 000010 00  AX  0   0  4
  [ 2] .text             PROGBITS        00010010 008010 000068 00  AX  0   0  4
  [ 3] .data             PROGBITS        00010078 008078 000064 00  WA  0   0  4
  [ 4] .ARM.attributes   ARM_ATTRIBUTES  00000000 0080dc 00002e 00      0   0  1
  [ 5] .comment          PROGBITS        00000000 00810a 000011 01  MS  0   0  1
  [ 6] .shstrtab         STRTAB          00000000 00811b 000047 00      0   0  1
  [ 7] .symtab           SYMTAB          00000000 0082cc 000170 10      8  18  4
  [ 8] .strtab           STRTAB          00000000 00843c 000051 00      0   0  1
Key to Flags:
  W (write), A (alloc), X (execute), M (merge), S (strings)
  I (info), L (link order), G (group), T (TLS), E (exclude), x (unknown)
  O (extra OS processing required) o (OS specific), p (processor specific)

There are no section groups in this file.

Program Headers:
  Type           Offset   VirtAddr   PhysAddr   FileSiz MemSiz  Flg Align
  LOAD           0x008000 0x00010000 0x00010000 0x000dc 0x000dc RWE 0x8000
```

Symbols of learn-in-depth.elf :



```
CRIZMA MEGA STORE@Abdelrhman MINGW64 /b/content of diploma/unit 3/lec2/New folder
$ arm-none-eabi-nm.exe learn-in-depth.elf
00010010 T main
00010078 D my_name
00010000 T reset
000110dc D stack_top
00010008 t stop
00010028 T Uart_Send_String
```

Simulation of code on qemsu :



```
CRIZMA MEGA STORE@Abdelrhman MINGW64 /b/content of diploma/unit 3/lec2/New folder
$ qemu-system-arm -M versatilepb -m 128M -nographic -kernel learn-in-depth.bin
learn-in-depth : <Abdelrhman>
```