

# Learn-in-depth Online Diploma

# **Embedded C Lecture 2 assignment report**

## **app.o file header section**

```
$ 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          00000020  00000000  00000000  0000004c  2**2
                CONTENTS, ALLOC, LOAD, DATA
  2 .bss           00000000  00000000  00000000  0000006c  2**0
                ALLOC
  3 .comment       00000012  00000000  00000000  0000006c  2**0
                CONTENTS, READONLY
  4 .ARM.attributes 00000032  00000000  00000000  0000007e  2**0
                CONTENTS, READONLY
```

## **Uart.o file header section**

```
e_2
$ arm-none-eabi-objdump.exe -h Uart.o

Uart.o:     file format elf32-littlearm

Sections:
Idx Name          Size      VMA           LMA           File off  Algn
  0 .text          00000050  00000000  00000000  00000034  2**2
                CONTENTS, ALLOC, LOAD, READONLY, CODE
  1 .data          00000000  00000000  00000000  00000084  2**0
                CONTENTS, ALLOC, LOAD, DATA
  2 .bss           00000000  00000000  00000000  00000084  2**0
                ALLOC
  3 .comment       00000012  00000000  00000000  00000084  2**0
                CONTENTS, READONLY
  4 .ARM.attributes 00000032  00000000  00000000  00000096  2**0
                CONTENTS, READONLY
```

## Full content of all sections requested in app.o file

```
$ arm-none-eabi-objdump.exe -s app.o

app.o:      file format elf32-littlearm

Contents of section .text:
 0000 00482de9 04b08de2 04009fe5 feffffeb  .H-.....
 0010 0088bde8 00000000                .....
Contents of section .data:
 0000 6c656172 6e2d696e 2d646570 74683a20  learn-in-depth:
 0010 3c416264 656c7261 686d616e 3e000000  <Abdelrahman>...
Contents of section .comment:
 0000 00474343 3a202847 4e552920 342e372e  .GCC: (GNU) 4.7.
 0010 3200                2.
Contents of section .ARM.attributes:
 0000 41310000 00616561 62690001 27000000  A1...aeabi..'...
 0010 0541524d 39323645 4a2d5300 06050801  .ARM926EJ-S.....
 0020 09011204 14011501 17031801 19011a01  .....
 0030 1e06                ..
```

## Startup.o file header section

```
$ 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          0000000c  00000000  00000000  00000034  2**2
                CONTENTS, ALLOC, LOAD, RELOC, READONLY, CODE
 1 .data          00000000  00000000  00000000  00000040  2**0
                CONTENTS, ALLOC, LOAD, DATA
 2 .bss           00000000  00000000  00000000  00000040  2**0
                ALLOC
 3 .ARM.attributes 00000022  00000000  00000000  00000040  2**0
                CONTENTS, READONLY
```

### **Symbols of app.o file**

```
$ arm-none-eabi-nm.exe app.o
00000000 T main
00000000 D message
          U Uart_Send_text
```

### **Symbols of uart.o**

```
$ arm-none-eabi-nm.exe uart.o
00000000 T Uart_Send_text
```

### **Symbol of startup.o**

```
e_2
$ arm-none-eabi-nm.exe startup.o
          U main
00000000 T reset
          U stack_top
00000008 t stop
```

### **Symbol of learn-in-depth.elf**

```
$ arm-none-eabi-nm.exe learn-in-depth.elf
0001000c T main
00010074 D message
00010000 T reset
00011094 D stack_top
00010024 T Uart_Send_text
```

## Learn-in-depth.elf file header section

```
$ arm-none-eabi-objdump.exe -h learn-in-depth.elf

learn-in-depth.elf:      file format elf32-littlearm

Sections:
Idx Name          Size      VMA       LMA       File off  Algn
  0 .startup       0000000c  00010000  00010000  00008000  2**2
                     CONTENTS, ALLOC, LOAD, READONLY, CODE
  1 .text          00000068  0001000c  0001000c  0000800c  2**2
                     CONTENTS, ALLOC, LOAD, READONLY, CODE
  2 .data          00000020  00010074  00010074  00008074  2**2
                     CONTENTS, ALLOC, LOAD, DATA
  3 .ARM.attributes 0000002e  00000000  00000000  00008094  2**0
                     CONTENTS, READONLY
  4 .comment       00000011  00000000  00000000  000080c2  2**0
                     CONTENTS, READONLY
```

## Output of Simulation

```
HP@DESKTOP-57KLB6E MINGW32 /d/Embedded Course/Assignments/Units/Embedded_C_Lecture_2
$ qemu-system-arm -M versatilepb -m 128M -nographic -kernel learn-in-depth.bin
learn-in-depth: <Abdelrahman>
```