```
Units/Unit 3/Lesson2/Lab
$ 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
```

```
Units/Unit 3/Lesson2/Lab
$ 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 .rodata       00000064  00000000  00000000  000000b0  2**2
                  CONTENTS, ALLOC, LOAD, READONLY, DATA
  4 .comment      00000012  00000000  00000000  00000114  2**0
                  CONTENTS, READONLY
  5 .ARM.attributes 00000032  00000000  00000000  00000126  2**0
                  CONTENTS, READONLY
```

```
Units/Unit 3/Lesson2/Lab
$ 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_SendString>
  10:   e8bd8800        pop     {fp, pc}
  14:   00000000        andeq   r0, r0, r0

Disassembly of section .data:

00000000 <string_buffer>:
   0:   7261656c        rsbvc   r6, r1, #108, 10        ; 0x1b000000
   4:   6e692d6e        cdpvs   13, 6, cr2, cr9, cr14, {3}
   8:   7065642d        rsbvc   r6, r5, sp, lsr #8
   c:   203a6874        eorscs  r6, sl, r4, ror r8
```

```
Units/Unit 3/Lesson2/Lab
$ 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 3c4d6f68 616d6564 3e000000 00000000  <Mohamed>.......
 0020 00000000 00000000 00000000 00000000  ................
 0030 00000000 00000000 00000000 00000000  ................
 0040 00000000 00000000 00000000 00000000  ................
 0050 00000000 00000000 00000000 00000000  ................
 0060 00000000                             ....
Contents of section .rodata:
 0000 43726561 74652052 6f646174 61207365  Create Rodata se
 0010 6374696f 6e000000 00000000 00000000  ction...........
 0020 00000000 00000000 00000000 00000000  ................
 0030 00000000 00000000 00000000 00000000  ................
 0040 00000000 00000000 00000000 00000000  ................
 0050 00000000 00000000 00000000 00000000  ................
 0060 00000000                             ....
```

```
Units/Unit 3/Lesson2/Lab
$ arm-none-eabi-objdump.exe  -h final.elf

final.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         000000cc  0001000c  0001000c  0000800c  2**2
                  CONTENTS, ALLOC, LOAD, READONLY, CODE
  2 .data         00000064  000100d8  000100d8  000080d8  2**2
                  CONTENTS, ALLOC, LOAD, DATA
  3 .ARM.attributes 0000002e  00000000  00000000  0000813c  2**0
                  CONTENTS, READONLY
  4 .comment      00000011  00000000  00000000  0000816a  2**0
                  CONTENTS, READONLY
```

```
Units/Unit 3/Lesson2/Lab
$ arm-none-eabi-nm.exe final.elf
0001000c T main
00010000 T reset
0001113c D stack_top
00010008 t stop
000100d8 D string_buffer
00010074 T string_buffer2
00010024 T UART_SendString
```

```
Units/Unit 3/Lesson2/Lab
$ arm-none-eabi-nm.exe Uart.o
00000000 T UART_SendString
```

```
Units/Unit 3/Lesson2/Lab
$ arm-none-eabi-nm.exe App.o
00000000 T main
00000000 D string_buffer
00000000 R string_buffer2
         U UART_SendString
```

```
$ 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
```

```
Units/Unit 3/Lesson2/Lab
$ arm-none-eabi-readelf.exe  -a final.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:          33220 (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] .startup          PROGBITS        00010000 008000 00000c 00  AX  0   0  4
  [ 2] .text             PROGBITS        0001000c 00800c 0000cc 00  AX  0   0  4
```