CS1520 Practical 4 - solutions

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Listing 1: decimals.asm

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.global main
main:
ldr r1, =num  @ load the address of the
              @   string of digits into r1
mov r0, #0    @ initialize the resull
mov r10, #10  @ we will need to multiply
              @   by 10

@ check if the number is negative
ldrb r2, [r1] @ store the first character
              @   of the string in r2
cmp r2, #45   @ check if the first character
              @   is '-' (ASCII code 45)
moveq r11, #1 @ if it is, store 1 in r11
addeq r1, #1  @   and advance r1 to the next
              @   character
movne r11, #0 @ ... otherwise, store 0 in r11

loop:
ldrb r2, [r1], #1 @ load the current character
                  @   and advance r1
cmp r2, #0    @ if we reached the end of the
beq finish    @   string (ASCII code 0), stop
mul r0, r10   @ r0 = r0*10
sub r2, #48   @ r2 = number corresponding to
```

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                @   the digit ('0' is 48 in ASCII)
add r0, r2      @ after this, r0 = r0*10 + r2
b loop          @ repeat the loop

finish:
cmp r11, #1     @ if the '-' character was found,
rsbeq r0, #0    @   reverse the sign: r0 = -r0

mov r7, #1
svc #0

.data
num:    .asciz "-107"   @ digit string to be
                        @   converted to number
```