Question Test5.1

After execution of the following instructions, what value will be in register \( r1 \)?

```
00 E59F0020  LDR  r0, =str
04 E3A01000  MOV  r1, #0
08 E4D02001  loop  LDRB r2, [r0], #1
0c E2811001  ADD  r1, r1, #1
10 E3520000  CMP  r2, #0
14 1AFFFB  BNE  loop
18 E2411001  SUB  r1, r1, #1
```

Data Segment Little Endian Format

```
20 6D435135  str  DCB  "mCQ5Gtq",0
47747100
```

(A) 0x0000000D  (B) 0x0000000A  (C) 0x00000007  (D) 0x00000002  (E) 0x00000003  (F) OTHER

---

Question Test5.2

After execution of the following instructions, what value will be in register \( r3 \)?

```
00 E59F0020  LDR  r0, =eoa
04 E59F1020  LDR  r1, =arr
08 E3A03000  MOV  r3, #0
0c E4D12001  loop  LDRB r2, [r1], #1
10 E0823003  ADD  r3, r2, r3
14 E1510000  CMP  r1, r0
18 1AFFFFFB  BNE  loop
```

Data Segment Little Endian Format

```
20 CBF90B81  arr  DCB  0xCB, 0xF9, 0xB, 0x81
24 00  eoa  DCB  0
```

(A) 0x00000000E92  (B) 0x000000E16  (C) 0x00000C9F  (D) 0x000000002  (E) 0x00282192  (F) OTHER

---

Question Test5.3

After execution of the following instructions, what value will be in register \( r0 \)?

```
00 E3A02000  MOV  r2, #0
04 E59F1038  LDR  r1, =nums
08 E5910000  LDR  r0, [r1]
0c E3A03005  LDR  r3, =5
10 E7914002  do1  LDR  r4, [r1, r2]
14 E1500004  CMP  r0, r4
18 AA000000  BGE  next
1c E1A00004  MOV  r0, r4
20 E2822004  next  ADD  r2, r2, #4
24 E2533001  SUBS  r3, r3, #1
28 1AFFFB  BCS  do1
```

Data Segment Big Endian Format

```
30 00000054  nums  DCD  0x554, 0xC9F
38 000000CF  DCD  0xC8F, 0xBC8
40 000008D5  DCD  0xBD5
```

(A) 0x000000E92  (B) 0x000000E16  (C) 0x00000C9F  (D) 0x000000002  (E) 0x00282192  (F) OTHER

---

Question Test5.4

After execution of the following instructions, what value will be in register \( r1 \)?

```
00 E59F002C  LDR  r0, =test
04 E3A01000  MOV  r1, #0
08 E5D02000  loop  LDRB r2, [r0]
0c E352005A  CMP  r2, #Z'
10 3A000000  BLO  skip
14 E2811001  ADD  r1, r1, #1
18 E2800001  skip  ADD  r0, #1
1c E3520006  CMP  r2, #0
20 1AFFFB  BNE  loop
```

Data Segment Little Endian Format

```
28 396C6F36  test  DCB  "9lo6NDhk",0
4E44686B
```

(A) 0x00000009  (B) 0x00000014  (C) 0x00000003  (D) 0x00000004  (E) 0x00000000  (F) OTHER
Condition Code Flags

Endianness

For ease of reading machine code and integer data in the second column are displayed in big endian format, byte data and strings in little endian format.

ASCII Table

Conditional Branch Instructions

Summary of LDR/STR Addressing Modes

<table>
<thead>
<tr>
<th>Addressing mode</th>
<th>Syntax</th>
<th>W, B</th>
<th>H, SH, SB</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediate-Offset</td>
<td>[&lt;Rn&gt;, #/&lt;offset&gt;]</td>
<td>✓</td>
<td>✓</td>
<td>address + Rn +/- offset</td>
</tr>
<tr>
<td>Register Offset</td>
<td>[&lt;Rn&gt;, +/-&lt;Rm&gt;]</td>
<td>✓</td>
<td>✓</td>
<td>address + Rn +/- Rm</td>
</tr>
<tr>
<td>Scaled Register Offset</td>
<td>[&lt;Rn&gt;, +/-&lt;Rm&gt;, &lt;shift&gt; &lt;count&gt;]</td>
<td>✓</td>
<td>✓</td>
<td>address + Rn +/- (Rm &lt;shift&gt; &lt;count&gt;)</td>
</tr>
<tr>
<td>Immediate Pre-Indexed</td>
<td>[&lt;Rn&gt;, #/&lt;offset&gt;]</td>
<td>✓</td>
<td>✓</td>
<td>Rn + Rn +/- offset</td>
</tr>
<tr>
<td>Register Pre-Indexed</td>
<td>[&lt;Rn&gt;, +/-&lt;Rm&gt;]</td>
<td>✓</td>
<td>✓</td>
<td>Rn + Rn +/- Rm</td>
</tr>
<tr>
<td>Scaled Register Pre-Indexed</td>
<td>[&lt;Rn&gt;, +/-&lt;Rm&gt;, &lt;shift&gt; &lt;count&gt;]</td>
<td>✓</td>
<td>✓</td>
<td>Rn + Rn +/- (Rm &lt;shift&gt; &lt;count&gt;)</td>
</tr>
<tr>
<td>Immediate Post-Indexed</td>
<td>[&lt;Rn&gt;], #/&lt;offset&gt;</td>
<td>✓</td>
<td>✓</td>
<td>address + Rn</td>
</tr>
<tr>
<td>Register Post-Indexed</td>
<td>[&lt;Rn&gt;], +/-&lt;Rm&gt;</td>
<td>✓</td>
<td>✓</td>
<td>address + Rn</td>
</tr>
<tr>
<td>Scaled Register Post-Indexed</td>
<td>[&lt;Rn&gt;], +/-&lt;Rm&gt;, &lt;shift&gt; &lt;count&gt;</td>
<td>✓</td>
<td>✓</td>
<td>address + Rn +/- (Rm &lt;shift&gt; &lt;count&gt;)</td>
</tr>
</tbody>
</table>

Branch Instruction | Condition Code Flag Evaluation | Description
--- | --- | ---
B (or BAI) | don't care | unconditional (branch always)
BEQ | Z | equal
BNE | Z | not equal
BCS / BHS | C | unsigned z
BCC / BLD | C | unsigned <
BMI | N | negative
BPL | R | positive or zero
BVS | V | overflow
BVC | V | no overflow
BHI | C2 | unsigned >
BHS | C | signed
BLE | Z + NV + NV | signed >
BGreater than | Z | signed

Name | Student Number | Signature | Date
--- | --- | --- | ---
Question 5.1 | Question 5.2 | Question 5.3 | Question 5.4

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