Adding **relative mode** to x295++

- Defn: Operand is a displacement value to be added to the program counter, hence generating the memory address of the next instruction, should the branching occur

- 2-operand instructions:
  - Program control instructions: `BRle rA, label`
  - `BRle r0, $250`

  **Branch**

  **Meaning**: if rA <= 0, jump to label

- **Format/Template**:

<table>
<thead>
<tr>
<th>Opcode</th>
<th>L-2</th>
<th>Src</th>
<th>Label-1 (L-1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>12</td>
<td>8</td>
<td>6</td>
</tr>
</tbody>
</table>

  `Label = Label-1 + L-2 - L-1`

- Size of operands?

  - Limited to 9-bit size -> \(2^9 = [-256 \text{ to } 255]\)

- Range of label operand?

  - Can only jump forwards/backwards by +/- 256
  - Handles most loops, ifs, etc, ...

- Memory address of next instruction (label + PC) 

- Displacement
When BRle is executed
PC → 3
BRle (assuming RA <= 0)
L→branches to
memory address 253₁₀

Label → 250₁₀ = \[011111010₂\]