On the Subject of Busy Beaver

Turing's been busy turning things on and off again.

On the module, there is a 2-character display and 10 blue/white buttons with a '0' or '1' on them. The 10 buttons' texts are colored differently to differentiate between the bits. Underneath each of the 10 buttons is an arrow which each denote if the pointer is in the given position or not. There is also a stage indicator underneath the 2-character display.

Before the first solve, the module will display an initial tape and position. The stage indicator will also say "INITIAL" to denote this. Afterwards, upon every non-ignored solved module, the 2-character display updates to display 2 letters. The tape will update to respect the given letters or blank out completely after a certain number of stages has passed. Take note of the initial tape and the 2 letters on each stage. The current tape displayed on the first few stages can be noted if the expert is unable to confirm the resulting tape for that stage.

When the module is ready for input, toggle the state of the button by pressing that respective button to alternate it being a 1 or a 0. Confirm the tape by pressing the button labeled "SUBMIT" to disarm the module. If the tape submitted is incorrect, the module will strike and show how many bits in the tape you submitted were correct on the 2-character display (noted as "# C"). Then the module will proceed to reshow the initial tape, followed by the stages that were shown on the module. This can be interrupted by pressing the submit button again or by pressing the given bits.

If there are 1 or fewer non-ignored modules present, the module will instead enter a special state. From there, the defuser may press the stage indicator to freely advance the stage at the defuser's pace. To distinguish this, "START" will be shown as the initial stage instead of "INITIAL" and "NEXT(#)" replaces the stage number. Do note the actual stage number is 10 minus the number shown in the text "NEXT(#)."

Modifying The Tape

For each stage, the first letter corresponds to the value to make the current digit, and the second letter corresponds which way to move. Both conditions read from the tape first before modifying the tape and pointer.

If the condition for the first letter returns true, make the selected digit a 1, or a 0 otherwise. Likewise, if the condition for the second letter returns true, move the pointer to the left, otherwise, move the pointer to the right. The tape wraps around.

- 'I' refers to the value of the currently selected tile.
- 'P' refers to the currently selected tile's index (0 to 9).
- 'T_X' refers to the value of the tile at index (X % 10). For example, T_9 represents the value of the tile in the 10th position or index 9.
- 'S' refers to the stage number when the letters were obtained. This can typically be seen on the stage indicator.

Letter	Condition	Letter	Condition	Letter	Condition
A	$I = 0$	J	$S-(P+1)+10$ is Odd	S	$T_{P+5} = 0$
B	$P \leq 4$	K	$I+P+1$ is Even	T	S is Odd
C	$T_S = 1$	L	$S-(P+I+1)+10$ is Odd	U	$S+P+1$ is Even
D	$P+1$ is Even	M	$T_{S+P+I+5} = 0$	V	$T_{S+P+I+1} = 1$
E	$T_{S+P+1} = 0$	N	$I = 1$	W	$S-(P+1)+10$ is Even
F	$T_{P+5} = 1$	O	$P \geq 5$	X	$I+P+1$ is Odd
G	S is Even	P	$T_S = 0$	Y	$S-(P+I+1)+10$ is Even
H	$S+P+1$ is Odd	Q	$P+1$ is Odd	Z	$T_{S+P+I+5} = 1$
I	$T_{S+P+I+1} = 0$	R	$T_{S+P+1} = 1$		