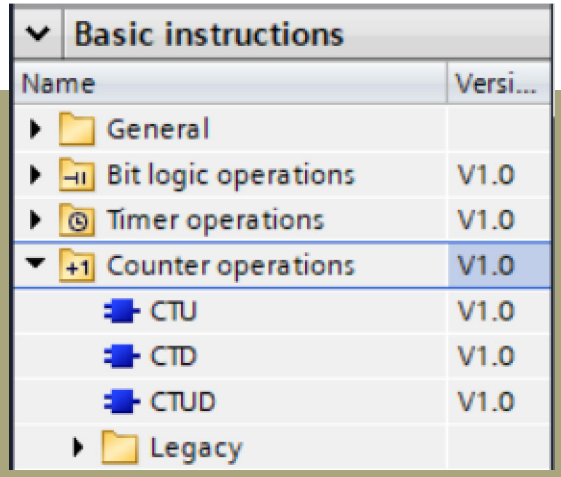
Lecture 2- Part 3 Programming PLC

Counters for PLC



IEC Counters Parameters

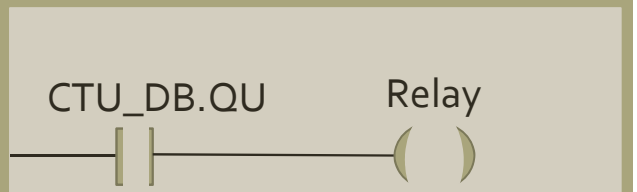
Parameters	Declaration	Data Type	Description
CU/CD	Input	BOOL	Count Up / Count Down Input
R	Input	BOOL	Input to Reset CV = Zero
LD	Input	BOOL	Input to Load CV = PV
PV	Input	Integers	Preset Value to Assign to counter
QU/QD	Output	BOOL	QU bit set when CV ≥ PV QD bit set when CV ≤ Zero
CV	Output	Integers	Current Value of Counter

- IEC Counters are function blocks (FB) with pre-defined functions that could allow programmer to reuse the functions
- Each FB require an instance to be declared, and there are several variables associated
- DataBlock (DB) declaration is required for the instance, with an unique name and has it's own data area (global)

Format	Data type	Number of bits	Value range
Integer (w/sign)[a]	*SINT*	8	−128 to + 127
	INT	16	−32 768 to + 32 767
	DINT	32	-2^{31} to + 2^{31}-1
	LINT	64	-2^{63} to + 2^{63}-1

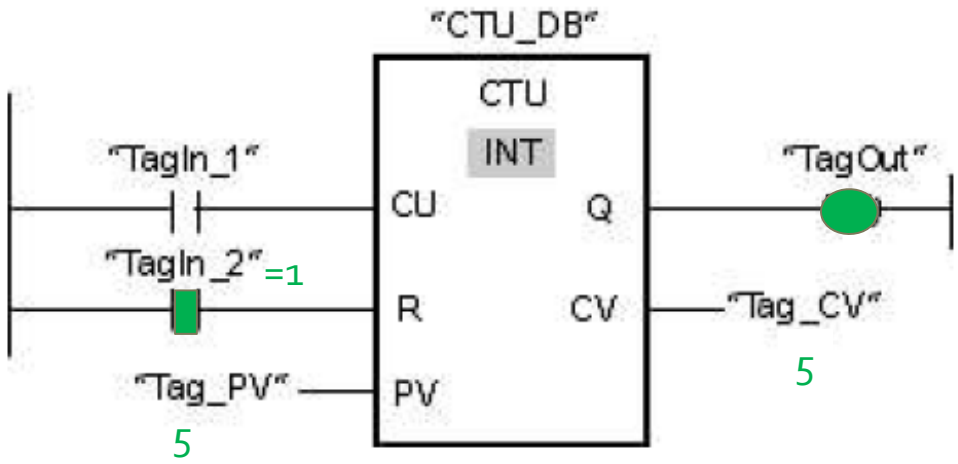
Counters are used to count up or count down and as the counter value reaches or exceeds the preset value, it would change the state of the Boolean bit.

Counters



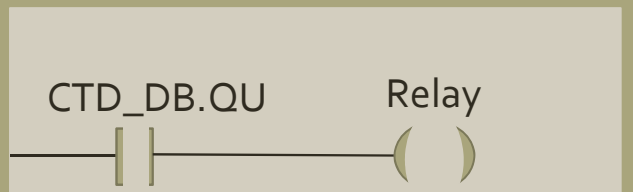
Count up Counter (CTU)

- Counts up, increment of count value (CV) each time when the count up (CU) input transit from 0 to 1 (positive signal edge)
- Output bit Q is set when count value (CV) reaches or exceed preset value (PV). CTU_DB.QU = 1
- When reset (R) = 1, CV =zero **(whenever R = 1, CU has no effect)**



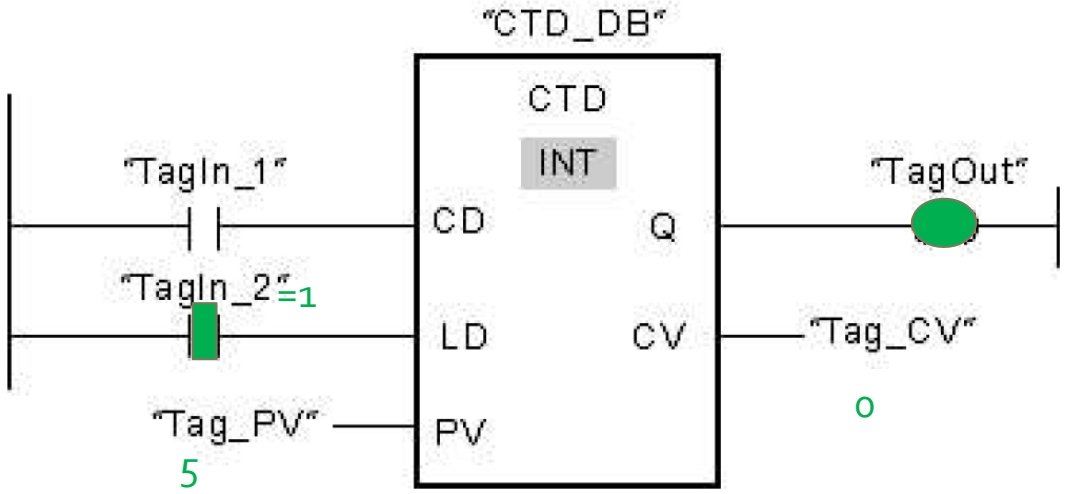
Counters are used to count up or count down and as the counter value reaches or exceeds the preset value, it would change the state of the Boolean bit.

Counters



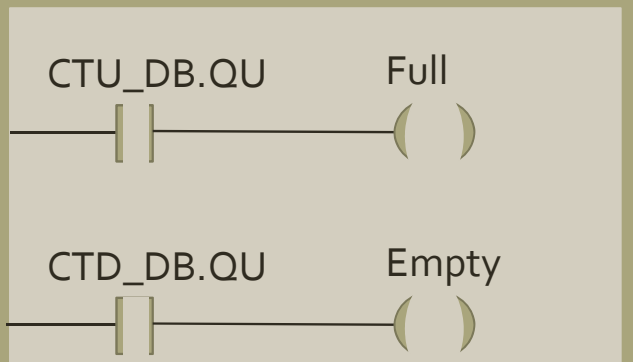
Count Down Counter (CTD)

- Counts down, decrement of count value (CV) each time when the count down (CD) input transit from 0 to 1 (positive signal edge)
- Output bit Q is set when count value (CV) reaches Zero or below zero
- When Load (LD) = 1, CV =PV **(whenever LD = 1, CD has no effect)**



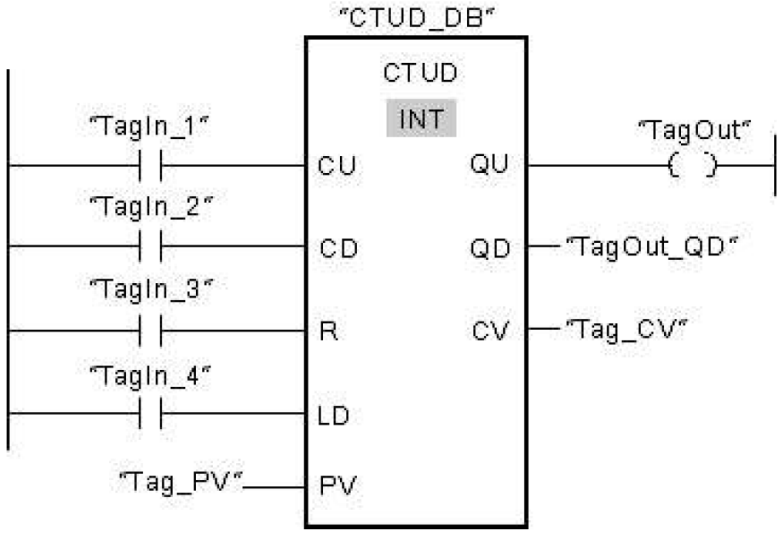
Counters are used to count up or count down and as the counter value reaches or exceeds the preset value, it would change the state of the Boolean bit.

Counters



Count Up Count Down Counter (CTUD)

- Counts up, increment of count value (CV) each time when the count up (CU) input transit from 0 to 1 (positive signal edge)
- Counts down, decrement of count value (CV) each time when the count down (CD) input transit from 0 to 1 (positive signal edge)
- Output bit QU is set when count value (CV) ≥ PV
- Output bit QD is set when count value (CV) ≤ Zero
- When Reset (R) = 1, CV = Zero
- When Load (LD) = 1, CV =PV **(whenever R or LD = 1, CU or CD has no effect)**



Count up Count down Counter in Action: https://youtu.be/pjLodoDrGn8

Quiz

Click the **Quiz** button to edit this object

Select the correct statement about count up counter:

- When current Counter Value (CV) reaches PV, Output Q bit would be set
- When current Counter Value (CV) reaches zero, Output Q bit would be set
- When reset R = 1, Output Q bit would be set