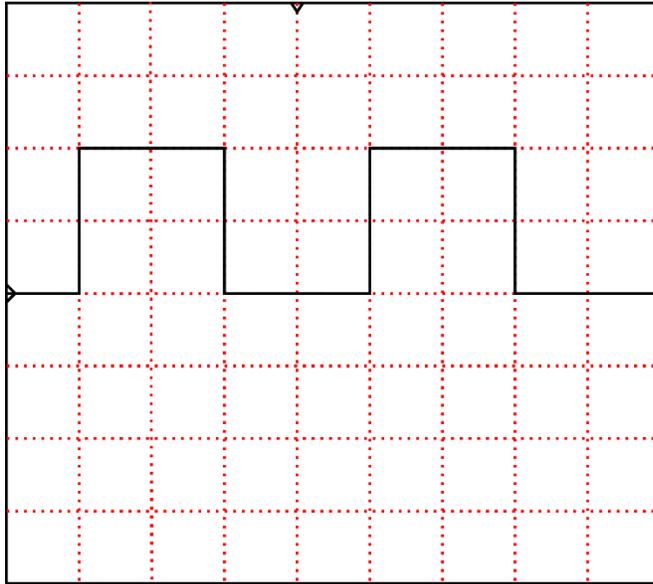


สัปดาห์ที่ 10

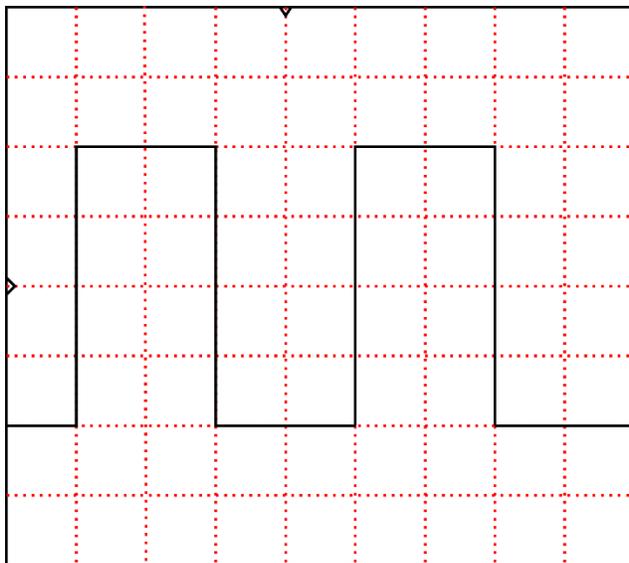
10.1 สัญญาณพัลส์ หรือสัญญาณสี่เหลี่ยม



CH1 5 V

200 us

1. $V_p = 2 \times 5V = 10 V$
2. $V_{pp} = 2 \times 5V = 10 V$
3. คาบเวลา (T) = $4 \times 200us = 800us$
4. ความถี่ (Frequency, f) = $1/T = 1/800us$
= 1250 Hz
5. Duty cycle = 50%
6. แรงดันไฟฟ้าเฉลี่ย (Vdc)
 $V_{dc} = V_p \times 0.5 = 5V$



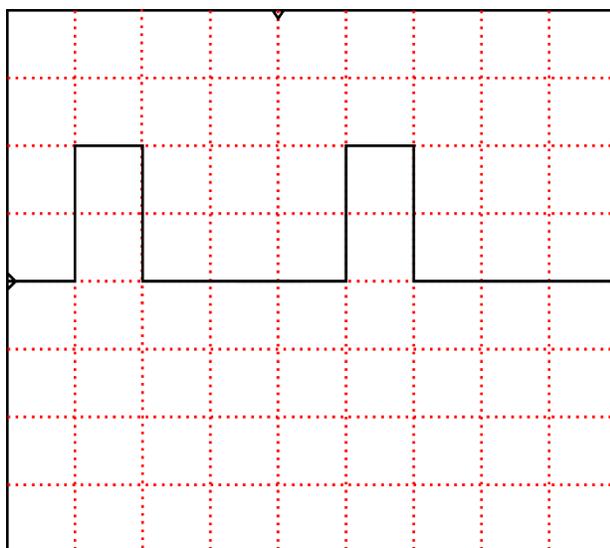
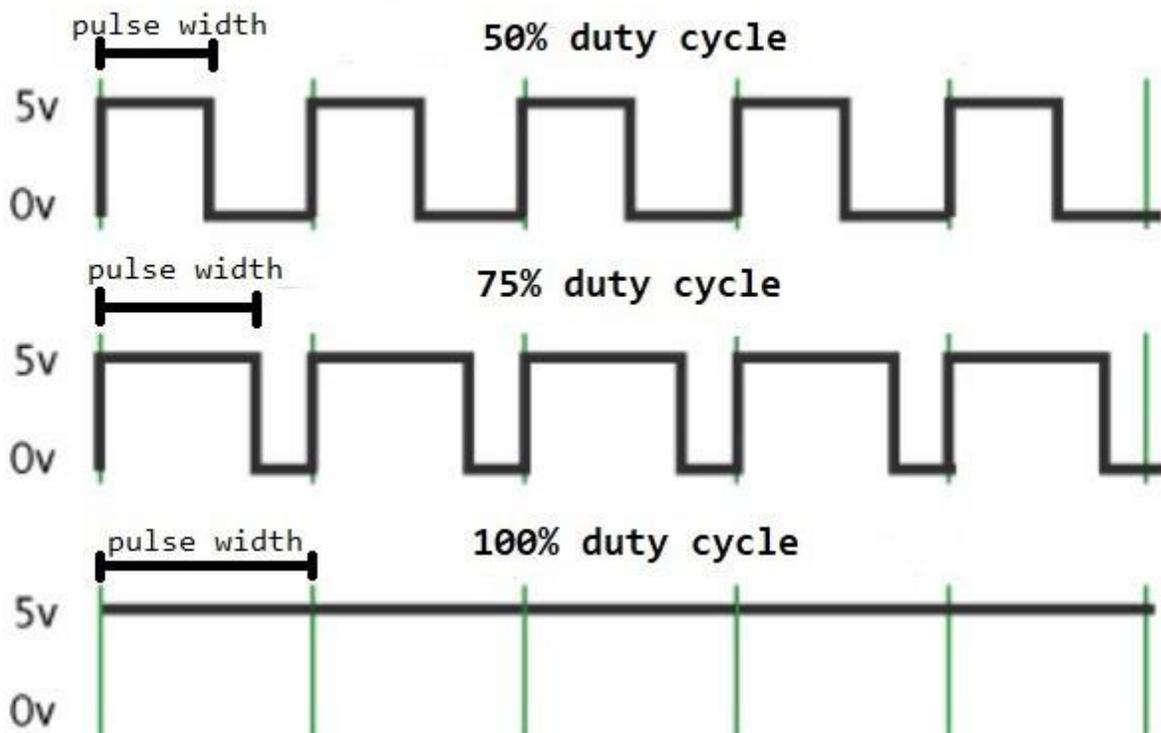
CH1 1 V

50 us

1. $V_p = 2 \times 1V = 2 V$
2. $V_{pp} = 4 \times 1V = 4 V$
3. คาบเวลา (T) = $4 \times 50us = 200us$
4. ความถี่ (Frequency, f) = $1/T = 1/200us$
= 5000 Hz = 5 kHz
5. Duty cycle = 50%
6. แรงดันไฟฟ้าเฉลี่ย (Vdc)
 $V_{dc} = (V_{max} - V_{min}) \times 0.5 + V_{min}$
= $(2 - 2) \times 0.5 + 2$
= $2 - 2 = 0V$

10.2 สัญญาณ PWM

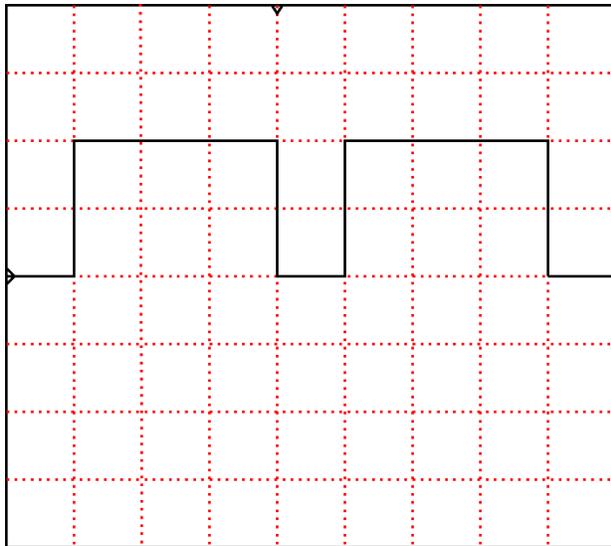
Pulse Width Modulation



CH1 5 V

200 us

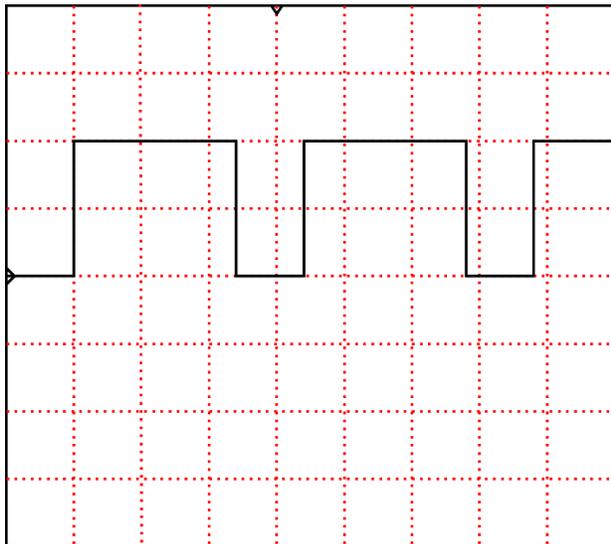
1. $V_p = 2 \times 5V = 10 V$
2. $V_{pp} = 2 \times 5V = 10 V$
3. คาบเวลา (T) = $4 \times 200\mu s = 800\mu s$
4. ความถี่ (Frequency, f) = $1/T = 1/800\mu s$
= 1250 Hz
5. Duty cycle = $(d/T) \times 100\%$
= $(1/4) \times 100\% = 25\%$
6. แรงดันไฟฟ้าเฉลี่ย (Vdc)
 $V_{dc} = V_p \times \text{Duty cycle} = 10 \times 0.25 = 2.5 V$



CH1 5 V

200 us

1. $V_p = 2 \times 5V = 10 V$
 2. $V_{pp} = 2 \times 5V = 10 V$
 3. คาบเวลา (T) = $4 \times 200us = 800us$
 4. ความถี่ (Frequency, f) = $1/T = 1/800us$
= 1250 Hz
 5. Duty cycle = $(d/T) \times 100\%$
= $(3/4) \times 100\% = 75\%$
- $V_{dc} = V_p \times \text{Duty cycle} = 10 \times 0.75 = 7.5 V$



CH1 5 V

200 us

1. $V_p = 2 \times 5V = 10 V$
 2. $V_{pp} = 2 \times 5V = 10 V$
 3. คาบเวลา (T) = $3.4 \times 200us = 680us$
 4. ความถี่ (Frequency, f) = $1/T = 1/680us$
= 1470.6 Hz
 5. Duty cycle = $(d/T) \times 100\%$
= $(2.4/3.4) \times 100\% = 70.6\%$
- $V_{dc} = V_p \times \text{Duty cycle} = 10 \times 0.706 = 7.06 V$