Converting Clock Signal (periods and frequency)

Use the following table of prefixes and their values to assist in the following conversions:

Prefix	Value	Standard Form	Symbol
Tera	1,000,000,000,000	10^{12}	T
Giga	1,000,000,000	10^{9}	G
Mega	1,000,000	10^{6}	M
Kilo	1,000	10^{3}	K
mili	0.001	10^{-3}	m
micro	0.000 001	10^{-6}	μ
nano	0.000 000 001	10^{-9}	n
pico	0.000 000 000 001	10^{-12}	p

Follow the steps below to convert between clock frequency and period length. These steps will help you to convert between:
1.7GHz to picoseconds
2KHz to milliseconds
4.25 MHz to nanoseconds
0.666666 nanoseconds to GHz
0.347 milliseconds to KHz
5.7 microseconds to MHz

1. Convert the following to their base units by multiplying the value by the standard form found in the table above.

Example: to change 1.7 GHz to Hz, multiply 1.7GHz by it's standard form, $(1.7 * 10^{9} = 1{,}700{,}000{,}000)$ or 1,700,000,000 Hz

a. 2 KHz to Hz
    a. $2 * 10^{3} = 2{,}000$ Hz
b. 4.25 MHz to Hz
    a. $4.25 * 10^{6} = 4{,}250{,}000$ Hz
c. 0.666666 nanoseconds to seconds
    a. $.666\,666 * 10^{-9} = 0.000000000666666$ seconds
d. 0.347 milliseconds to seconds
    a. $.347 * 10^{-3} = .000347$ seconds
e. 5.7 microseconds to seconds
    a. $5.7 * 10^{-6} = .0000057$ seconds

2. Convert your answers from the previous section from frequency to period or vice versa by dividing 1 by the base unit.

Formula: 1/period length or 1/frequency

Example: to convert 1,700,000,000 Hz to Seconds (1/1,700,000,000 = .000000000588235) or .000000000588235 seconds

a. Hz to Seconds
    a. 1 / 2,000 = .0005 seconds
b. Hz to Seconds
    a. 1 / 4,250,000 Hz = .000000235294118 seconds
c. Seconds to Hz
    a. 1 / .000000000666666 = 1,500,001,500 Hz
d. Seconds to Hz
    a. 1 / .000347 = 2,881 Hz
e. Seconds to HZ
    a. 1 / .0000057 = 175,438 Hz

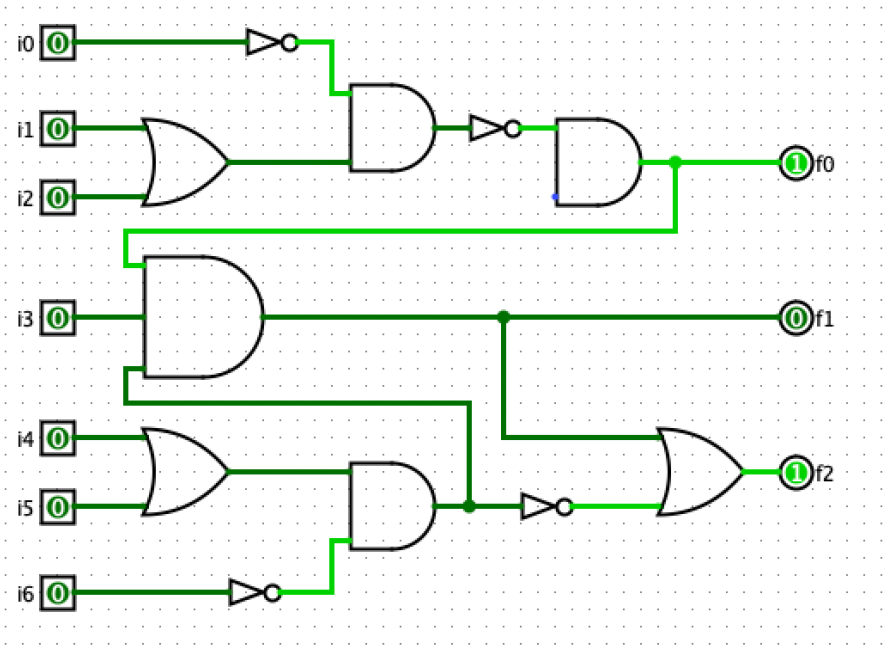
3. Convert your answers from the previous section to the indicated units.

Example: to convert .000000000588235 seconds to picoseconds, divide .000000000588235 by the standard form for picoseconds 10^{-12}. ($0.000000000588235/10^{-12} = 588.235$) or 588.235 picoseconds.

So, a clock frequency of 1.7GHz has a period length of 588.235 picoseconds.

a. Seconds to milliseconds
    a. $.0005/10^{-3} = 0.5$ milliseconds
b. Seconds to nanoseconds
    a. $.000000235294118/10^{-9} = 235.294118$ nanoseconds
c. Hz to GHz
    a. $1{,}500{,}001{,}500/10^{9} = 1.5$ GHz
d. Hz to KHz
    a. $2{,}881/10^{3} = 2.881$ KHz
e. Hz to MHz
    a. $175{,}438/10^{6} = .175438$ MHz

Find the longest and shortest gate delays for the following circuits:

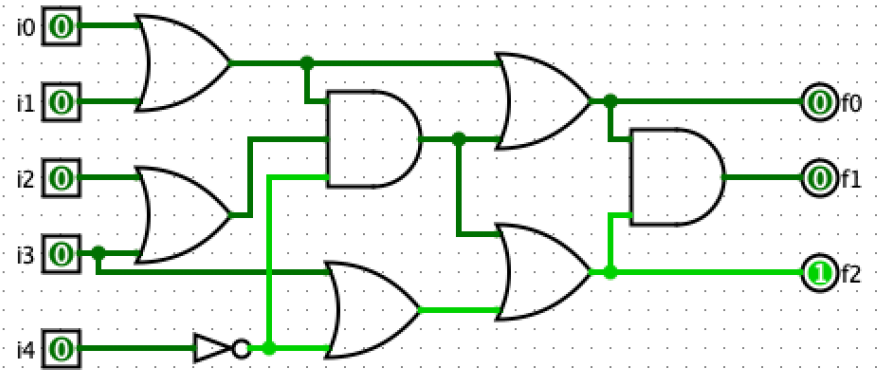


Longest Delay –

a. 6 gates

Shortest Delay –

a. 1 gate

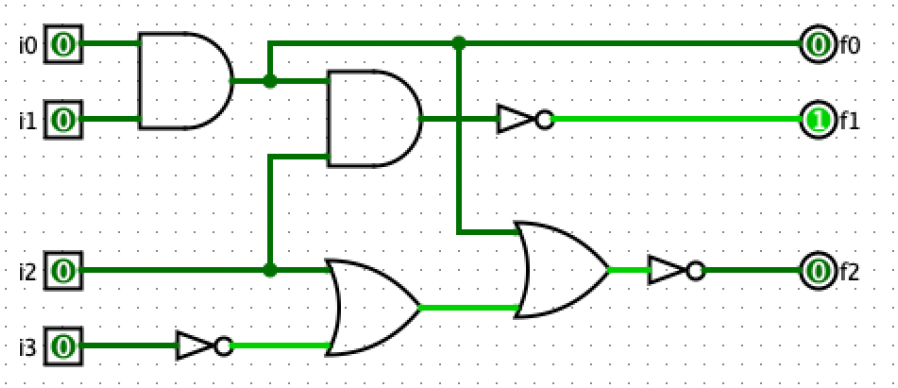


Longest Delay –

a. 4 gates

Shortest Delay –

a. 2 gates



Longest Delay –

a. 4 gates

Shortest Delay –

a. 1 gate