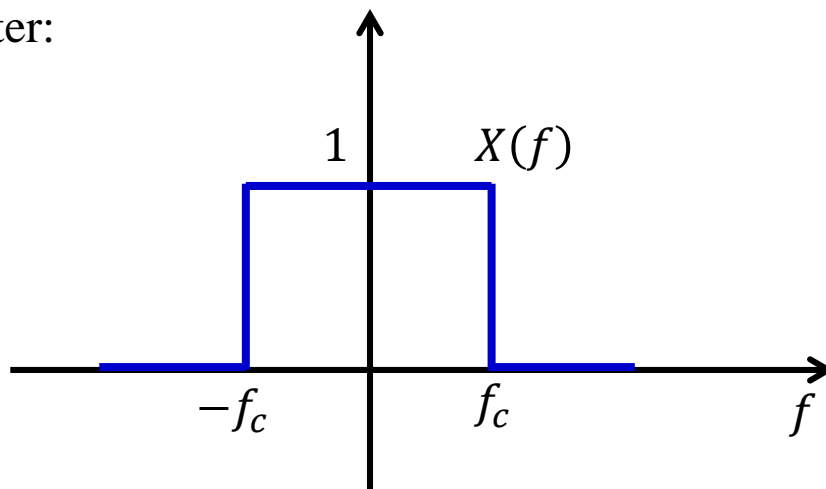




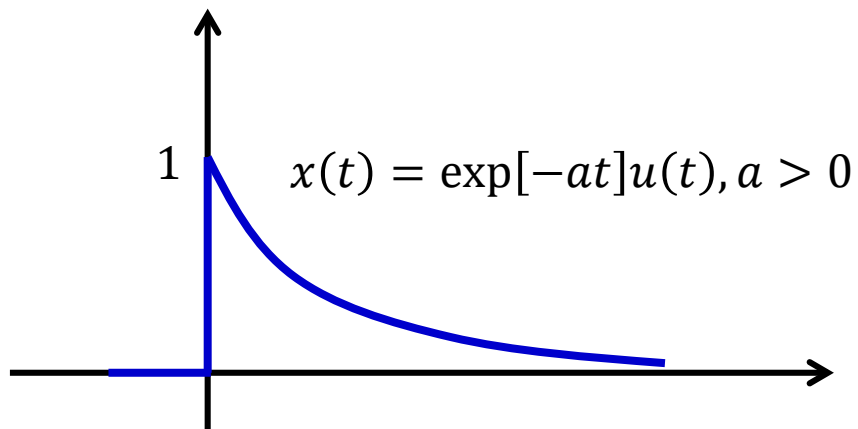
# HW Problems

1. Find the time domain signal that has the following Fourier Transform, which is called Low-Pass Filter:



$$x(t) = \int_{-\infty}^{+\infty} X(f) e^{+j2\pi ft} df$$

2. Find the Fourier Transform of the one-sided exponential signal.





# HW Problems

3. Find the Discrete Fourier Transform of the following signals:

3.a  $x(n) = \delta(n - 1), n = 0, 1, \dots, N - 1$

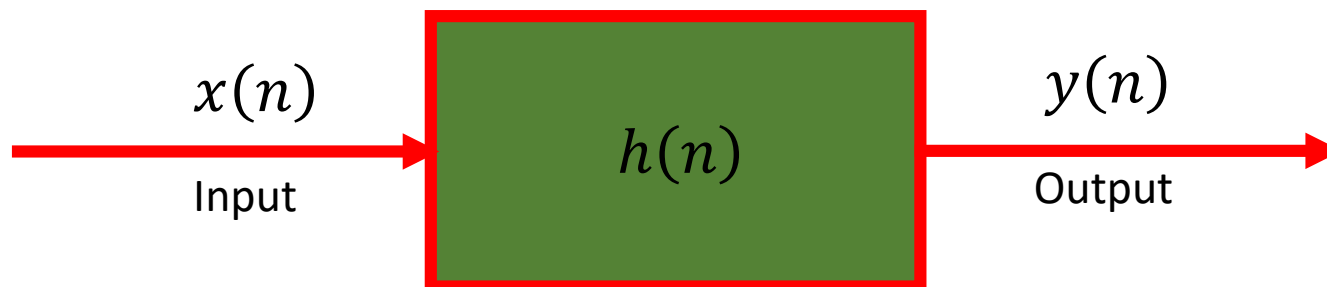
3.b  $x(n) = a^n, n = 0, 1, \dots, N - 1$

3.c  $x(n) = \sin(2\pi f_0 n), n = 0, 1, \dots, N - 1$



# HW Problems

4. Let  $y(n)$  be the filtering output when inputting  $x(n)$ , determine the output with the following inputs:



- 4.a  $x(n - n_0)$ ,  $n_0$  is a fixed natural number
- 4.b  $ax(n)$ ,  $a$  is a fixed real number
- 4.c  $e^{j2\pi f_0 n}$ ,  $f_0$  is a fixed real number