# Signals and Systems HW3
## Deadline: 2019/03/29 before 18:30
## (You should submit hand-writing paper to BL B1 EE student office.)

1. Let $x(t)$ and $y(t)$ be two periodic signals with the same period *T*, while $a_k$ and $b_k$ are their Fourier series coefficients. Please show that performing periodic convolution in time domain will result in Fourier series coefficients multiplications $Ta_kb_k$ in frequency domain. (50%)

$$\int_T x(\tau)y(t-\tau)d\tau \quad \text{(Time Domain)} \quad \leftrightarrow \quad Ta_kb_k \quad \text{(Frequency Domain)}$$

2. Find the discrete-time Fourier series representations of the following signals:

$(a)$ (25%) $x[n] = \sin(\frac{4\pi n}{15} + \frac{2\pi}{3})$

$(b)$ (25%) $x[n] = \sum_{m=-\infty}^{\infty} (-1)^m(\delta[n-2m] + \delta[n+3m])$