

$$\begin{array}{ccccccccc}
\dots & \xrightarrow{d_3} & P_2 & \xrightarrow{d_2} & P_1 & \xrightarrow{d_1} & P_0 & \xrightarrow{d_0} & \mathbb{Z} & \longrightarrow & 0 \\
\downarrow & & f \downarrow & & f \downarrow & & f \downarrow & & \downarrow \text{id}_{\mathbb{Z}} & & \\
\dots & \xrightarrow{d_3} & Q_2 & \xrightarrow{d_2} & Q_1 & \xrightarrow{d_1} & Q_0 & \xrightarrow{d_0} & \mathbb{Z} & \longrightarrow & 0 \\
\downarrow & & g \downarrow & & g \downarrow & & g \downarrow & & \downarrow \text{id}_{\mathbb{Z}} & & \\
\dots & \xrightarrow{d_3} & P_2 & \xrightarrow{d_2} & P_1 & \xrightarrow{d_1} & P_0 & \xrightarrow{d_0} & \mathbb{Z} & \longrightarrow & 0
\end{array}$$