Problem 2. (May § 15.2 Problems 3 and 4) Let \( n \geq 1 \) and let \( G \) be an abelian group.

a. Construct a connected CW complex \( X \) whose reduced integral homology is given by:

\[
\tilde{H}_i(X; \mathbb{Z}) \simeq \begin{cases} 
G & \text{if } i = n \\
0 & \text{if } i \neq n.
\end{cases}
\]

Such a space is called a Moore space and is denoted \( M(G, n) \).

b. Construct a connected CW complex \( Y \) whose homotopy groups are given by:

\[
\pi_i(Y) \simeq \begin{cases} 
G & \text{if } i = n \\
0 & \text{if } i \neq n.
\end{cases}
\]

Such a space is called an Eilenberg-MacLane space and is denoted \( K(G, n) \).