

# Dirac Notation

$$\psi(x) \rightarrow |\psi\rangle$$

$$\psi^*(x) \rightarrow \langle\psi|$$

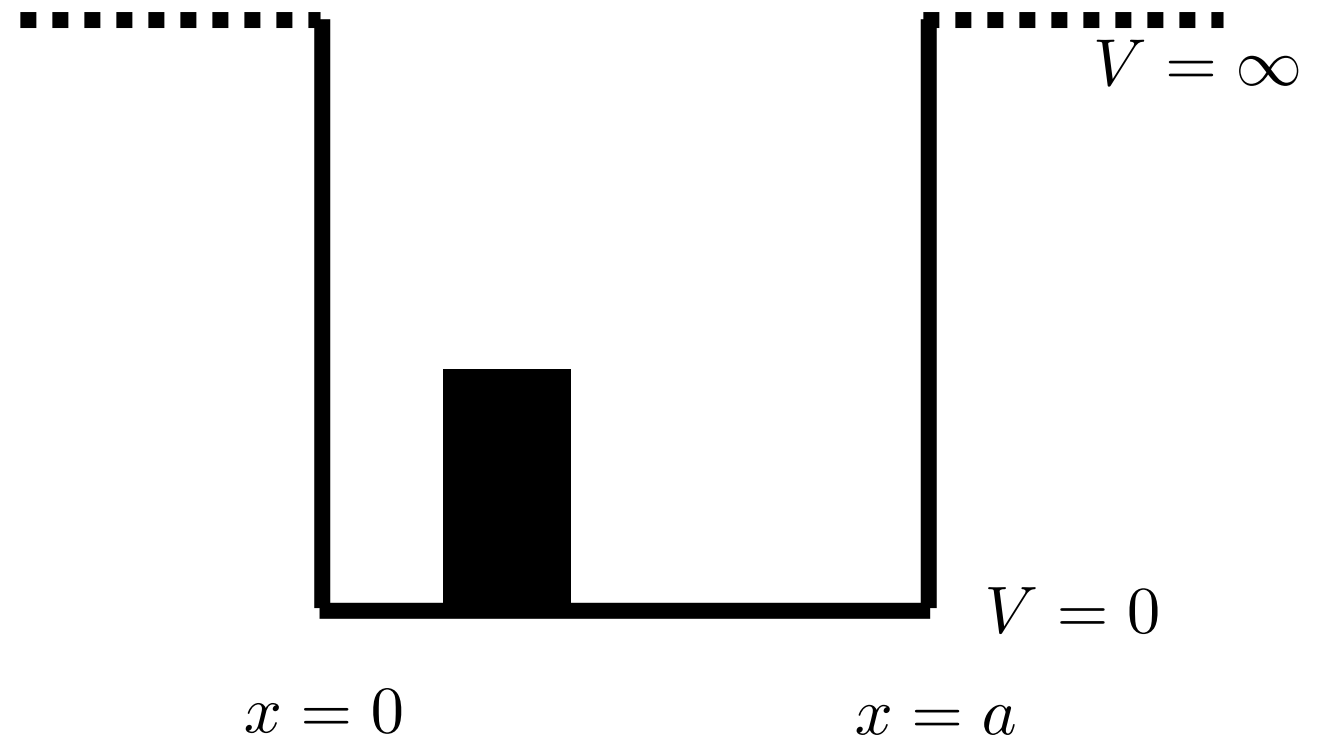
$$\int \psi^*(x)\psi(x)dx \rightarrow \langle\psi|\psi\rangle$$

$$\langle E \rangle = \int \psi^*(x) \hat{H} \psi(x) dx \rightarrow \langle\psi|\hat{H}\psi\rangle$$

$$c_n = \int \psi_n^*(x)\psi(x)dx = \langle\psi_n|\psi\rangle$$

# Time-independent Schrodinger Equation

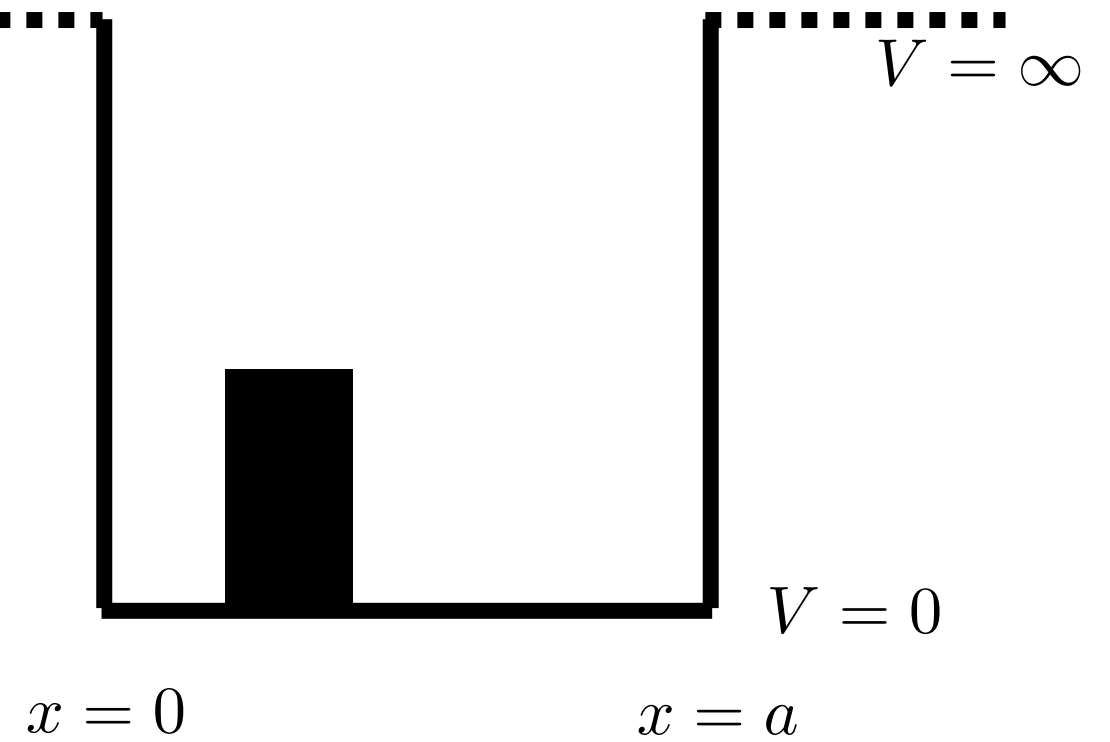
$$\mathbf{H}|\psi\rangle = E|\psi\rangle$$



# Time-independent Schrodinger Equation

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$$\mathbf{H} \sum_n c_n |\psi_n\rangle = E \sum_n c_n |\psi_n\rangle$$

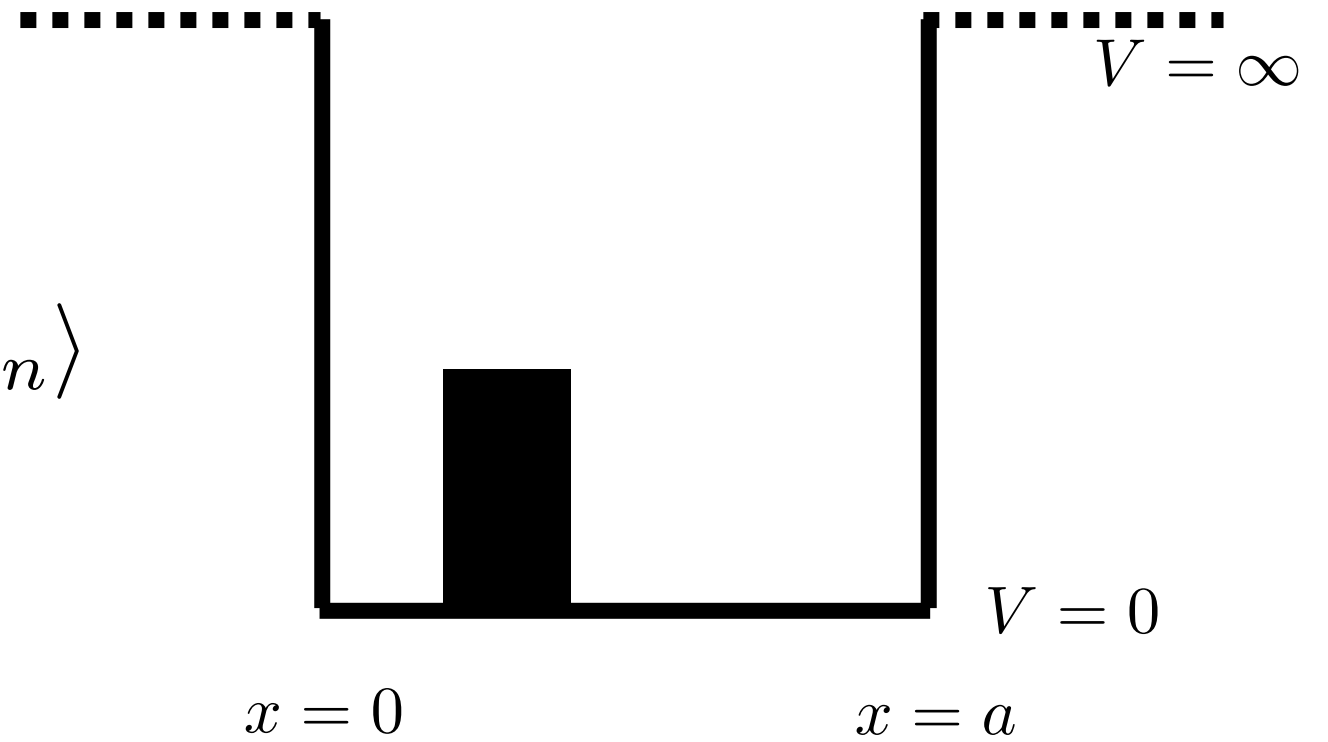


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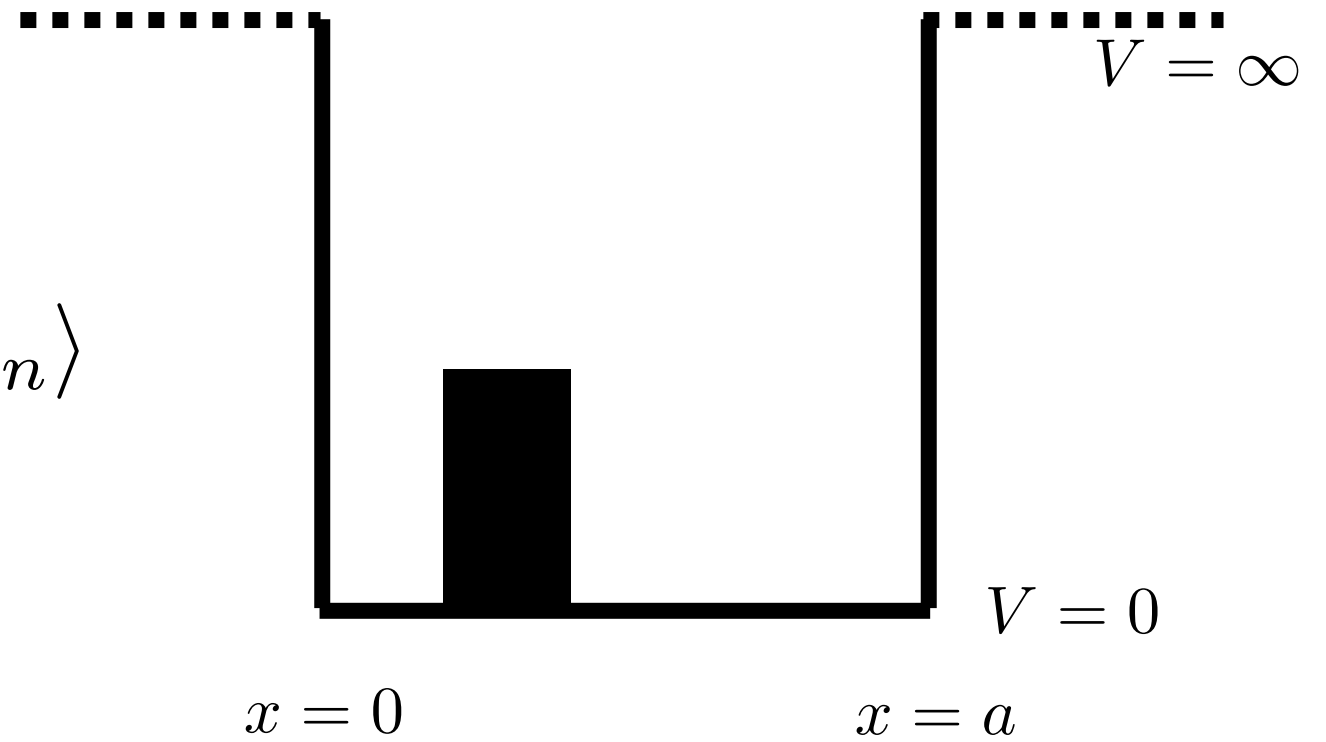
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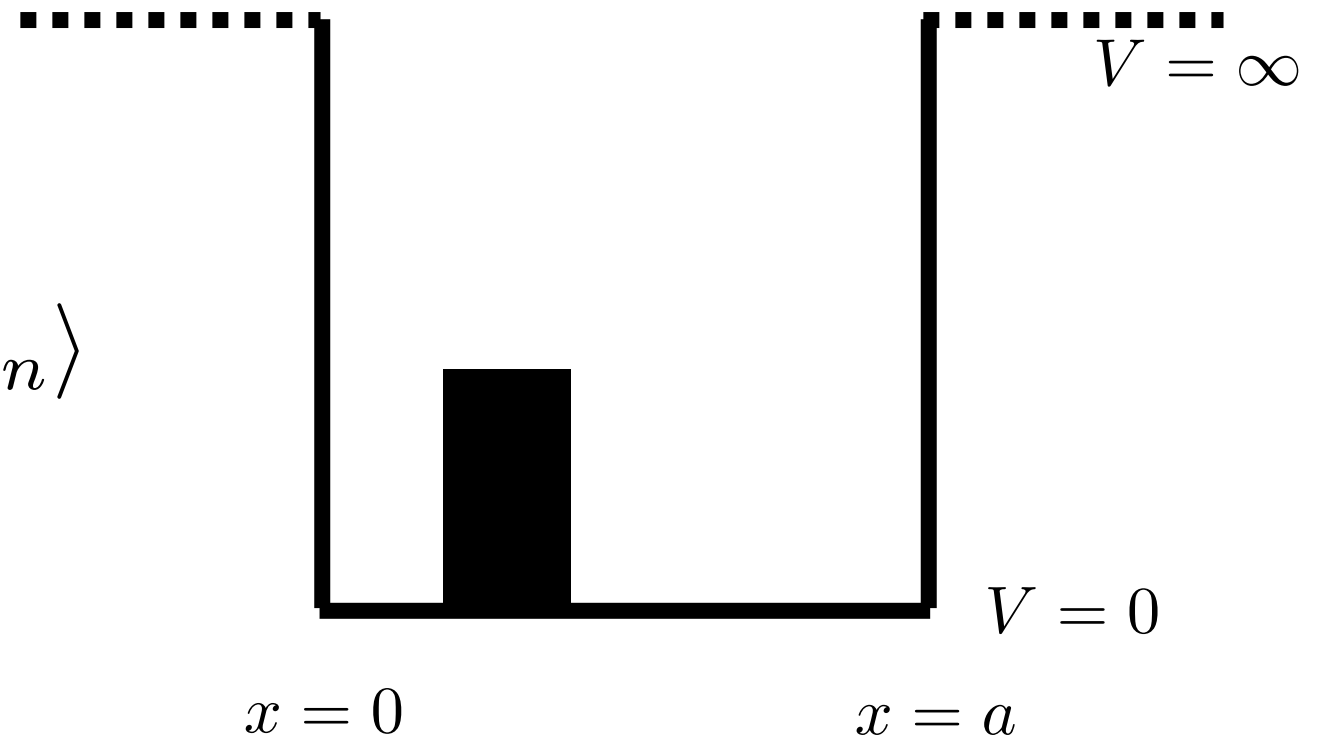
$$\sum_n c_n \langle\psi_m|\mathbf{H}|\psi_n\rangle = E \sum_n c_n \langle\psi_m|\psi_n\rangle$$



# Time-independent Schrodinger Equation

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$$\langle\psi_m|\mathbf{H} \sum_n c_n |\psi_n\rangle = E \langle\psi_m| \sum_n c_n |\psi_n\rangle$$

$$\sum_n c_n \langle\psi_m|\mathbf{H}\psi_n\rangle = E \sum_n c_n \langle\psi_m|\psi_n\rangle$$

$$\begin{bmatrix} \langle\psi_1|\mathbf{H}\psi_1\rangle & \langle\psi_1|\mathbf{H}\psi_2\rangle & \langle\psi_1|\mathbf{H}\psi_3\rangle & \cdots \\ \langle\psi_2|\mathbf{H}\psi_1\rangle & \langle\psi_2|\mathbf{H}\psi_2\rangle & \langle\psi_2|\mathbf{H}\psi_3\rangle & \cdots \\ \cdots & & & \end{bmatrix} \begin{bmatrix} c_1 \\ c_2 \\ \cdots \end{bmatrix} = E \begin{bmatrix} c_1 \\ c_2 \\ \cdots \end{bmatrix}$$