DAY-12 TASK

Measurement and wave function collapse

$$\frac{-\hbar^2}{2m}\frac{\partial^2 \psi}{\partial x^2} + V\psi = i\hbar\frac{\partial \psi}{\partial t}$$

$$\psi_{j,k} \longrightarrow \psi_{j,k+1}$$

when you measure...

1. you find an eigenvalue.
2. ψ becomes an eigenstate.

Collapse of wave function

eigen = special

Position X

$|x_0\rangle$ = Position e.state w/ e.value x_0

$$X|x_0\rangle = x_0|x_0\rangle$$

$$|x_0\rangle = \delta(x - x_0)$$

Momentum P

$|p_0\rangle$ = Momentum e.state w/ e.value p_0

$$P|p_0\rangle = p_0|p_0\rangle$$

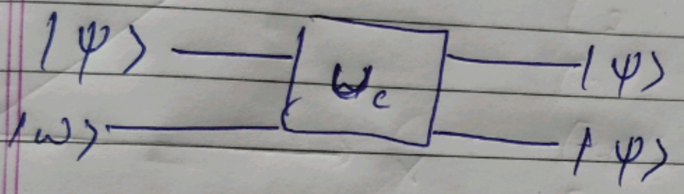
$$|p_0\rangle = e^{ipx/\hbar}$$

Date : __/__/__
Page: ____

$P = \frac{\hbar}{i}\frac{\partial}{\partial x}$

$\frac{\hbar}{i}\frac{\partial}{\partial x} e^{ipx/\hbar} = \frac{\hbar}{i}\frac{ip_0}{\hbar} e^{ip_0x/\hbar}$

No Cloning Theorem.
There is no unitary operator that clone arbitary qubit.



$|\omega\rangle = |0\rangle$

$$\boxed{U_c|\psi\rangle|\omega\rangle = |\psi\rangle|\psi\rangle}$$

All unitary operators is linear.

$U_c(a|\psi\rangle + b|\psi\rangle)$

$= aU_c|\psi\rangle + bU_c|\psi\rangle$

$|\psi\rangle = \alpha|0\rangle + \beta|1\rangle$

$|\psi\rangle|0\rangle = \alpha|00\rangle + \beta|1\rangle$

$U_c(\alpha|00\rangle + \beta|10\rangle) = \alpha U_c|00\rangle + \beta U_c|10\rangle$