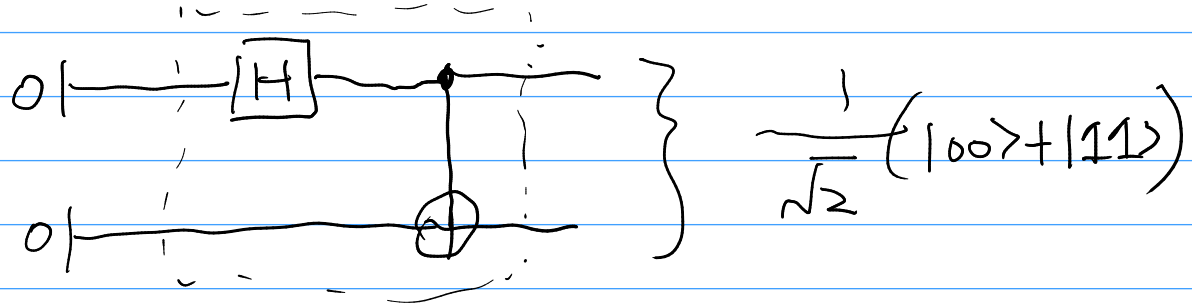
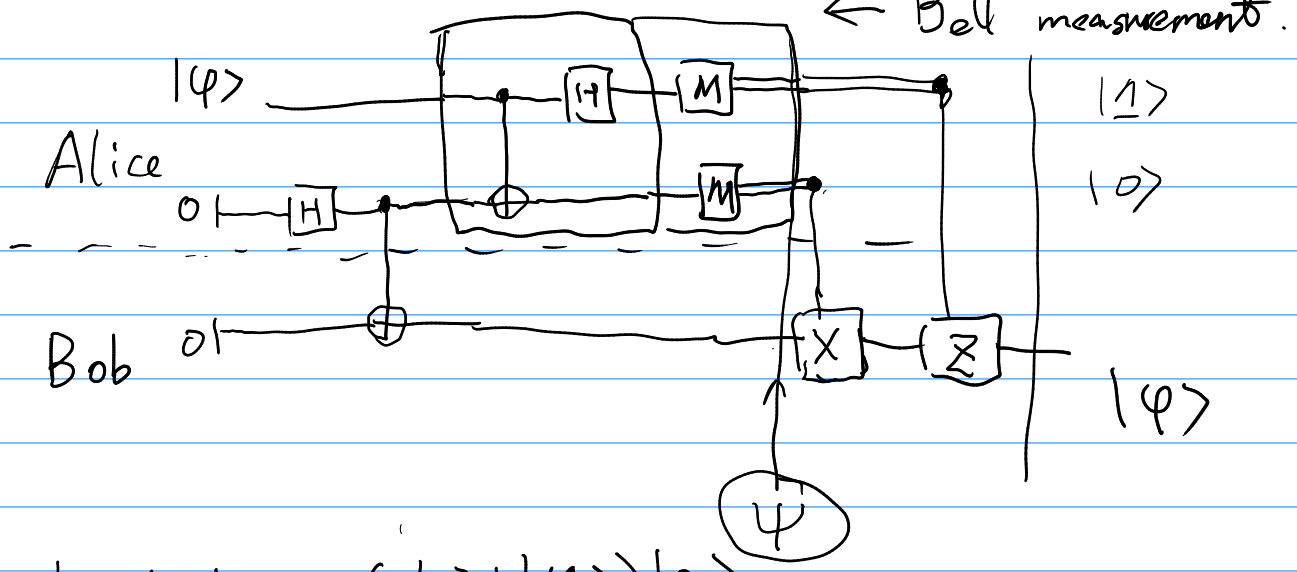


$= |$

← Bell measurement.



$|\varphi\rangle|00\rangle = (a|0\rangle + b|1\rangle)|00\rangle$

$\xrightarrow{\text{Bell}} (a|0\rangle + b|1\rangle) \otimes \frac{|00\rangle+|11\rangle}{\sqrt{2}}$

$= \frac{1}{\sqrt{2}}(a|000\rangle + a|011\rangle + b|100\rangle + b|111\rangle)$

$\xrightarrow{CX} \frac{1}{\sqrt{2}}(a|000\rangle + a|011\rangle + b|110\rangle + b|101\rangle)$

$\xrightarrow{H} \frac{1}{2}(a|000\rangle + a|100\rangle + a|011\rangle + a|111\rangle$
$+ b|010\rangle - b|110\rangle + b|001\rangle - b|101\rangle)$

$= |+\rangle$

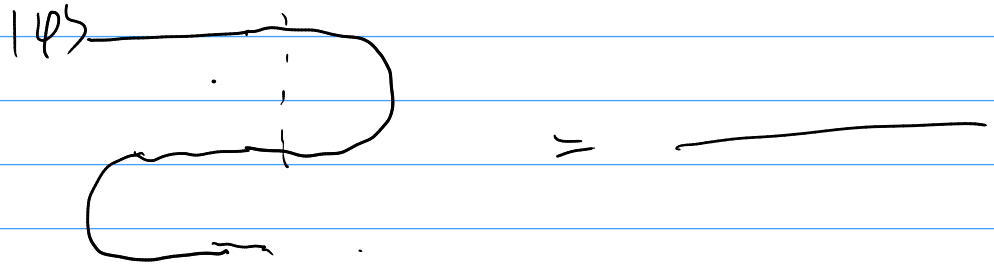
$|+|0\rangle = \frac{1}{\sqrt{2}}(|0\rangle+|1\rangle)$

$H|1\rangle = \frac{1}{\sqrt{2}}(|0\rangle-|1\rangle)$

$= |-\rangle$

$$= \frac{1}{2}\Big(|00\rangle \otimes (a|0\rangle + b|1\rangle) + |10\rangle \otimes (a|0\rangle - b|1\rangle) + |01\rangle \otimes (a|1\rangle + b|0\rangle) + |11\rangle \otimes (a|1\rangle - b|0\rangle)\Big)$$

$|\psi\rangle$



ex1: No cloning