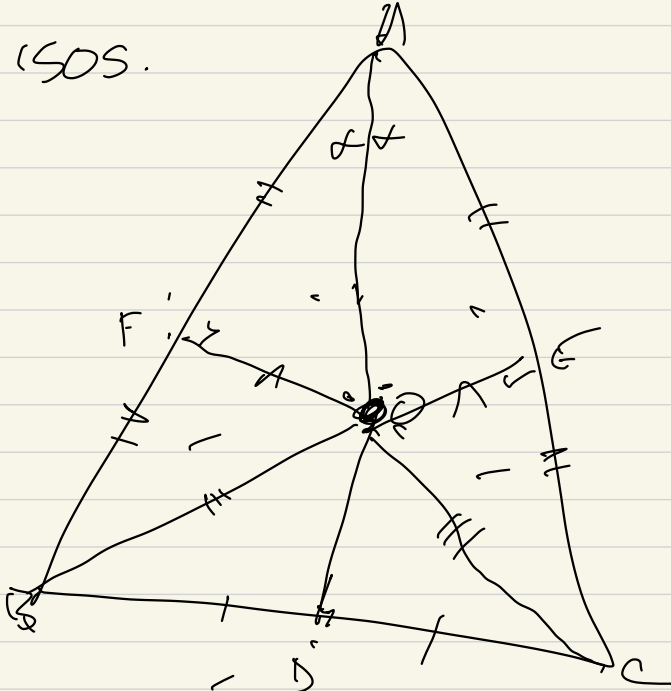


CLASS 4 R9/8/22 -1

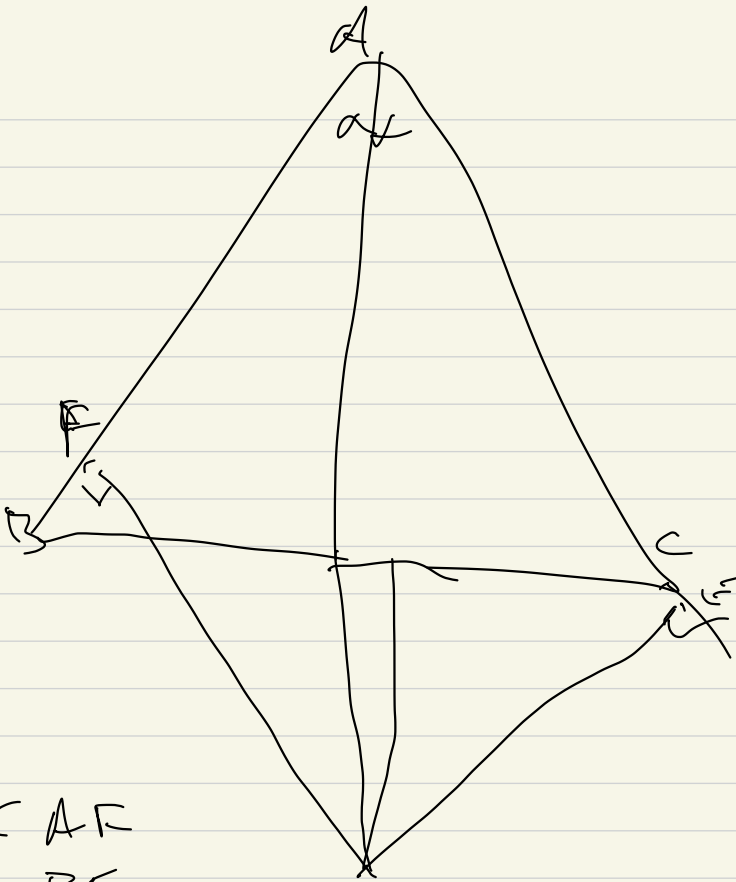
- WHAT DOES Q. CHANGE?
 - DOES IT WORK?
 - DOES IT MATTER?
 - CAN I USE IT?
 - DOES IT DECREASE COMPUTATIONAL COST?
 - WHEN WILL WE GET THEM?
 - DOES Q ALWAYS BEAT CLASSICAL?
-

PROOF THAT $\triangle ABC$ IS
ISOS.



$$\begin{array}{l}
 AF = AE \\
 BE = CE \\
 \hline
 AB = AC
 \end{array}$$

O IS OUTSIDE \triangle .

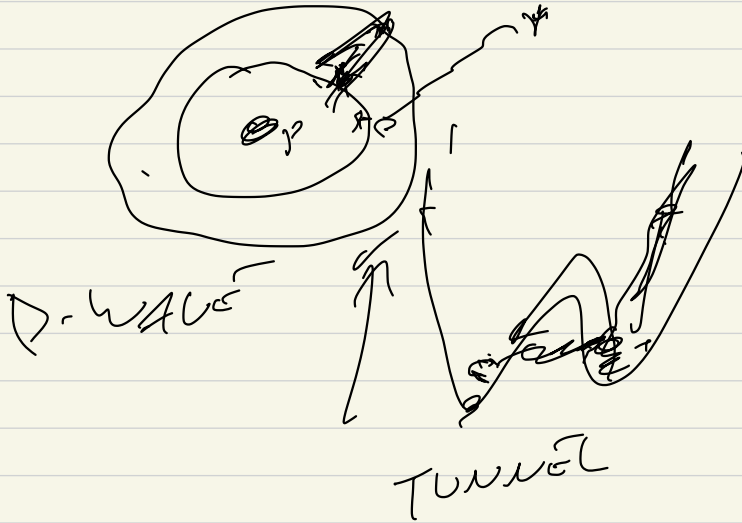


$$AE = AF$$

$$BE = BF$$

$$AE + BF = AE - CE$$

OLD VIDEOS



$$\frac{M}{\psi} \rightarrow \rightarrow \psi_c$$

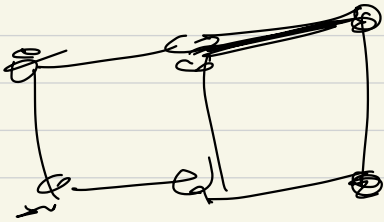
$$\frac{M}{\psi} \rightarrow \psi_c$$

$$|q_1\rangle = \begin{pmatrix} a_0 \\ a_1 \end{pmatrix} \rightarrow a_0 \begin{pmatrix} 1 \\ 0 \end{pmatrix} + a_1 \begin{pmatrix} 0 \\ 1 \end{pmatrix}$$

$$|q_2\rangle = \begin{pmatrix} b_0 \\ b_1 \end{pmatrix} \rightarrow$$

$$|q_1 q_2\rangle = \begin{pmatrix} a_0 \\ a_1 \\ a_2 \\ a_3 \end{pmatrix} \quad \text{DF}$$

$$|0\rangle \rightarrow \frac{1}{\sqrt{2}} \begin{pmatrix} 1 \\ 1 \end{pmatrix}$$

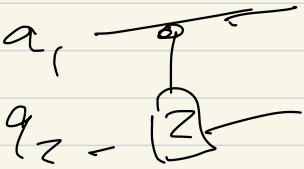


IF INPUTS ARE CLASSICAL,
OUTPUT IS SENSIBLE.

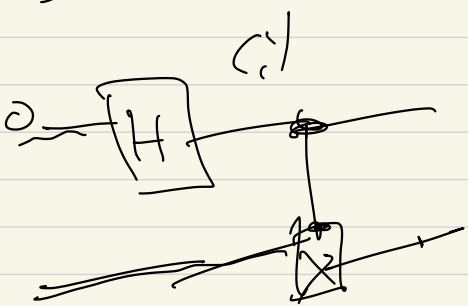
IF INPUTS ARE SUPERPOSED
OUTPUTS ARE WEIRD

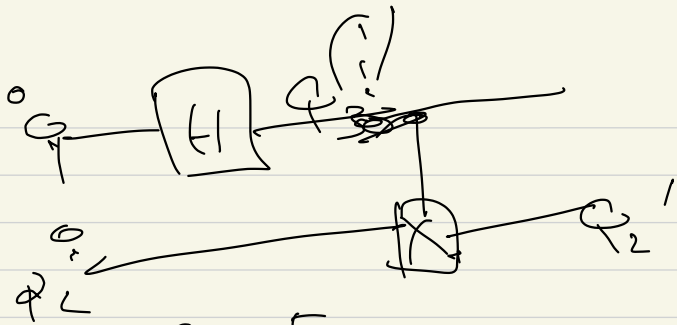
RESULT MAY KICK BACK

AND CHANGE AN INPUT.



IF Q_1 TRUE
COMPLEMENT
 Q_2





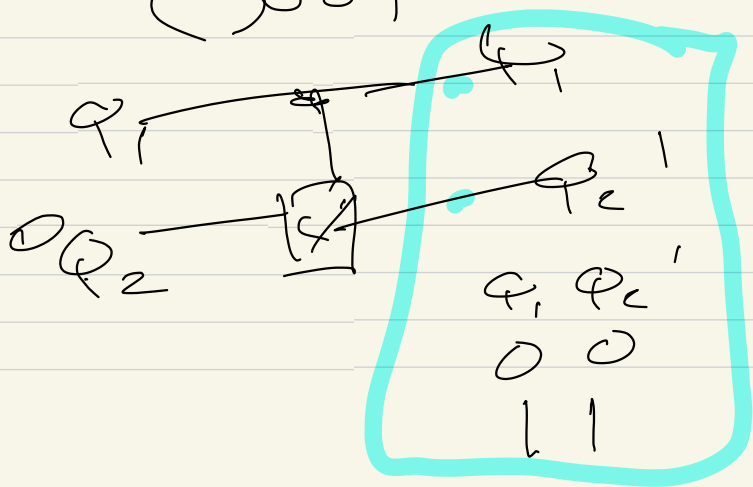
CNOT

Q_0	Q_2	Q_2'
0	0	0
0	1	1
1	0	1
1	1	0

WITH H , Q_3'

~~scribble~~

CNOT

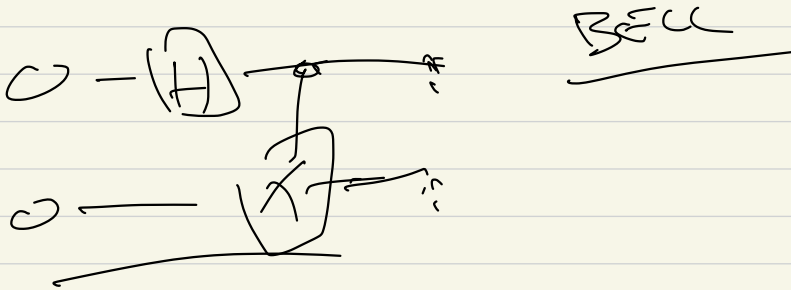


OUT

ϕ_1, ϕ_2 ARE SAME

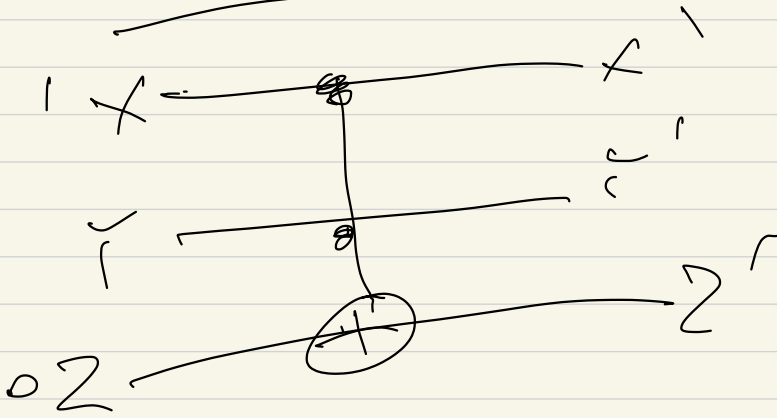
ϕ_1 HAS BEEN MIXED TO $\begin{pmatrix} 1 \\ 1 \end{pmatrix}$

OUTPUT $\left(\begin{array}{c} -1 \\ 0 \\ 0 \\ -1 \end{array} \right) \left| \left(\begin{array}{c} 00 \\ 01 \\ 10 \\ 11 \end{array} \right) \right.$



CANNOT SEPARATE THAT
2 QBIT STATE INTO A
PRODUCT OF 2 QBIT
STATES.

TOFFOLI



FIX $x=1, z=0$

$$y=0 \rightarrow z'=0 \quad z'=y$$

$$y=1 \rightarrow z'=1$$

QUICKSORT

COMMON VERSION

WORST TIME $T = N^2$

"AVERAGE" TIME $N \lg N$

OVER ALL $N!$ INPUT PERMUTATIONS.

3 1 4 59 26
12 4 59 6

PICK PIVOT RANDOMLY
EACH RUNNING TAKES
DIFFERENT TIME
FOR ANY INPUT, AVERAGE TIME
 $T = N \log N$
LAS VEGAS RANDOM.