```
e.g if classical state of X=0, men (do nothing) if classical state of X=1, thip bit with P=\frac{1}{2}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                unlike stochastic matrices, these ops rep- by unitary matrices
     e-g if X is bib, S = 20,13 (binary)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  unitary mats U are
                                                                                                                                                                                                                                                                                                                                       like deterministic ops, nowe matrix rap. called stochastic man, but does not have a sole 1 in sean cole . Procubers at 5) in sean cole . Other thanks of the sean of the sean
                             X is a die, S= $1,...,63
X is for setting, S= fort tout, thigh?
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  • square (inverse a conj. transpose : U'= U+) - "invertible"
     tracte 3 needs to be non-zero 1 22 to be weful
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                • has complex entries • satisfies utu=1=uut = automatically
                                                                                                                                                                                                                                                                                                                                                                                                                            supports supports (standing when x = b + 2) of an enthrer of the a = b + 2 of an enthrer of a = b + 2 of an enthrer of a = b + 2 of an enthrer of a = b + 2 of 
   # in processing information, there is a P
associated with each classical state
(probabilish)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  · not changing euclidean norm when multiplied to any ?
     probability vector
     Probability CP(X=0) * & P(X=1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          * if v is a quantum state vector, ov is also one
                                                                                                                                                                                                                                                                                                                                            can also re-express in linear combination way of random choices on top of deterministic ops:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        [U] is closed
     dirac rotation (Part ): Describing vectors
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  qubit unitary operations
                                                                                                                                                                                                                                                                                                                                             e.g S = \begin{bmatrix} 1 & \frac{1}{2} \\ 0 & \frac{1}{2} \end{bmatrix} = \frac{1}{2} \begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix} + \frac{1}{4} \begin{bmatrix} 0 & 1 \\ 0 & 1 \end{bmatrix} probabilistic operation in substance such as 0 = 0.
   denote 1a) column vector or "ket" with 1 in entry = a 6 & and 0 otherwise
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1. Pauli operations
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 represented by Pauli matrices which are unitar and equal to own conj. trans. (hermitian matrice
      eig if Z= £0,13,
                         10>=(0) and 11>=(0)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 eg 1=(0) 6x=(00) 6y=(00) 6z=(00)
      AKA standard bosis vectors.
                                                                                                                                                                                                                                                                                                                                                 composing probabilistic operations performing one after another
        v can be linear combinations of them
      eg \left(\frac{\frac{q}{q}}{\frac{q}{q}}\right) = \frac{\frac{q}{q}}{q} \left(0 > + \frac{1}{q}\right)  for re-expresses probabilishes stocks
                                                                                                                                                                                                                                                                                                                                                      rmbr matmux is associative -schoesn't matter where "()" are
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          dx10>=11> d=10>=10>
dx11>=10> d=10=-11>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             # but ordering of terms impt
since it not commutative!
                                                                                                                                                                                                                                                                                                                                                         e-9 Mn ... M,
 measuring probabilities
                                                                                                                                                                                                                                                                                                                                                                              for n=2,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              2. Hadamard operation
                                                                                                                                                                                                                                                                                                                                                                              Ma (Miv) = (ma mi) v -> k always will get S always
     ar see classical state closen at rando
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          represented by mis matrix
     suppose we "see" a EE, we change the
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              H = ( 1/2 - 1/2 )
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            since {s} is closed.
                                                                                                                                                                                                                                                                                                                                                                                                                                            compose
es single
     probabilistic nature of a having been observed.
      ∴ P(X=a)=1 → la> after observation ← "measurement"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Checking for unitariness:  \begin{pmatrix} \frac{1}{2} & \frac{1}{2} & \frac{1}{2} \\ \frac{1}{4} & \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} = \begin{pmatrix} \frac{1}{4} & \frac{1}{
                                                                                                                                  after measurement
     deterministic operations (Part 1): for kets
                                                                                                                                                                                                                                                                                                                                            simpler: states represented by states operations by unitary operato
     in classical information, these are functions, f: E \rightarrow E s.t. f: (a \rightarrow E)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              3. Phase operations
                                                                                                                                                                                                                                                                                                                                            general: state by density making
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          rep. by any mat in the form :
                  given any function, matrix rep. after operation
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Po= ( o eio), where o is any R complex no on unit circle it is not hermitian to its invent fittelf
                  given any functions, solars rep: live specific solars and early file before the file of th
                                                                                                                                                                                                                                                                                                                                            definition of quantum states denoted by col- vector. with indices corr. to classical states
                                                                                                                                                                                                                                                                                                                                                 e entries are complex no. + amplitudes siruitar but # P
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            important operations include:
                                                                                                                                                                                                                                                                                                                                                   It this oleth is physically relevant/"works? for quantum mechanical system euclidean norm of v \rightarrow "length"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              · S= Para = (10) + S gate in circuits
                                                                                                                                                                                                                                                                                                                                       Advantage above the confidence of the property of the confidence 
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              · T = PR/9 = ( ' iii ) ← T gave in circuits
           this is useful since we can do matrix-rector
             mult to get state P_1 \rightarrow P_2 of system e.g v transformed Mv
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              outcome of operations:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               \frac{1}{100} = \left(\frac{1}{10}, \frac{1}{10}\right) \begin{pmatrix} 1 \\ 0 \end{pmatrix} = \left(\frac{1}{10}\right) = 1 + 2 + 112 = \left(\frac{1}{10}, \frac{1}{10}\right) \begin{pmatrix} 1 \\ 0 \end{pmatrix} = \left(\frac{1}{10}\right) = 1 + 2 + 112 = \left(\frac{1}{10}, \frac{1}{10}\right) \begin{pmatrix} 1 \\ 0 \end{pmatrix} = \left(\frac{1}{10}\right) = 1 + 2 + 112 = \left(\frac{1}{10}, \frac{1}{10}\right) \begin{pmatrix} 1 \\ 0 \end{pmatrix} = \frac{1}{10} + \frac{1}{10} \begin{pmatrix} 1 \\ 0 \end{pmatrix} = \frac{1}{10} 
                                                                                                                                                                                                                                                                                                                                                         (euclidean norm = 1, square root doesn't change value)
                                          given &= {0,1} l 4 separate f: & + &
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               HI+>= (音音)(音)=(6)=10> HI->=(文章)(点)=(0)=11>
                                                                                                                                                                                                                                                                                                                                                                           Standard leafs: |0> and |1> \leftarrow imaginary part =0

plus/minus: |+> = \frac{1}{\sqrt{2}} |0> + \frac{1}{\sqrt{2}} |1> | 0.5

|-> = \frac{1}{\sqrt{2}} |0> - \frac{1}{\sqrt{2}} |1> | 0.5

|-> = \frac{1}{\sqrt{2}} |0> - \frac{1}{\sqrt{2}} |1> | 0.5
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 holice it transforms the I+> 2 1-> into 10> 2 14>
                      E helps detect the diff states in uniform rondom bits
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   which has equal chances for both states
                                                                                                                                                                                                                                                                                                                                                                  Candom: \frac{1+2i}{3} 10> -\frac{2}{3} 11>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               J noisel
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        be you have to perform Hadamond first then, measure
                  = M= [0] M2= [0] M3= [0] M4= [0]
                                                 applying above to diror notation Mlex:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   : Lalamoxa
                                                 * H ( 1+2i 10> - 2 117)
                                                                                                                                                                                                                                                                                                                                               dirac rotation (Parts): Describing arbitrary of
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           =(辛辛)(号)=(號)
                                                                                                                                                                                                                                                                                                                                               denote arbitrary ? using 4 (psi) or anything really
                                                                                                                                                                                                                                                                                                                                             must follow a rule locations (1112), for any bet, its bra it the conjugate transport e.g <+1 = 14>5 or means you thip it 8 men complex conjugate or via varea.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          = -1+2i 10>+ 3+2i 11>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     * TID>=10> and TID= 141 117
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               T |+> = T \left( \frac{1}{4\pi} |+ |+| + \frac{1}{4\pi} |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + | + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+| + |+
                                                                                                                                                                                                                                                                                                                                                                     \{45 = \frac{142i}{3}\{05 - \frac{2}{3}\}\}\}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     = \frac{1}{\sqrt{2}} |0\rangle + \frac{1+i}{2} |1\rangle sub in the ve
           dirac rotation Part 2 : Describing operations
                                                                                                                                                                                                                                                                                                                                                                     (4)= 트를 4이-를 시
          denote (a) now vector or "bra" with 1 in entry - a 62 and 0 otherwise
                                                                                                                                                                                                                                                                                                                                               definition of measurements
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     • HT|+>= H\left(\frac{1}{62}10> + \frac{|4|}{2}11>\right)
= \frac{1}{45}H10>+ \frac{|4|}{2}H11>
                                                                                                                                                                                                                                                                                                                                               extract classical information & types differentiated by generality
                                                                                                                                                                                                                                                                                                                                                 standard basis measurements are simplest
                                10>= (10) and 11>= (01)
             recall now x col= scalar + [ ][] = CO]
                                                                                                                                                                                                                                                                                                                                                 e possible outcome are classical states
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               = 1 1+> + 1+i 1-> e sub in these
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            = \left(\frac{1}{48}(0) + \frac{1}{2}(1)\right) + \left(\frac{141}{248}(0) - \frac{141}{248}(1)\right) \xrightarrow{1 \to 1} \frac{3ub in (1+2)onnhbes}{4anhhbes}
               eig (alb)=callb)= { o asb talo called inner product
                                                                                                                                                                                                                                                                                                                                                 · IP(outrome) = 1 al 2 where a is corr. quantum state entry
                                                                                                                                                                                                                                                                                                                                               e.g suppose qubit in 1+y = \frac{1}{\sqrt{2}}(10) + \frac{1}{\sqrt{2}}(1)

measuring yields: (P(outcome = 2)) = |\frac{1}{\sqrt{2}}|^2 = \frac{1}{2}

IP (outcome = 2) = |\frac{1}{\sqrt{2}}|^2 = \frac{1}{2}
               recall col & row = mahix + [][] = []
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          = \left(\frac{1}{12} + \frac{14i}{2(2)}\right) 107 + \left(\frac{1}{2} - \frac{14i}{2(2)}\right) 117 just regarding to common terms
                  e-9 given 2 = {0,13
                                         10>401 = [6](10] = [80]
                                                                                                                                                                                                                                                                                                                                                                       but if qubit in 1->= 1 10>-1 11>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              1+>, get ron
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            composing unitary operations
                                       (B) (B) = [1] [1017 = [0]] A notice the position of the continuous of the continuous
                                                                                                                                                                                                                                                                                                                                                                       measuring yields: (P(outcome = 0) = |\frac{1}{\sqrt{n}}|^2 = \frac{1}{2}

(P(outcome = 1) = |\frac{1}{\sqrt{n}}|^2 = \frac{1}{2}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               rep. by matmux (similar to 1P operations)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               as always, order matters & are closed
                                                                                                                                                                                                                                                                                                                                                                           in another case:
                                   low wol
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               interesting e.g : square root of NOT
                                                                                                                                                                                                                                                                                                                                                                           initial: 1+21 10>- 2 11>
           deterministic operations (Part 2): for bras
                                                                                                                                                                                                                                                                                                                                                                           yields: IP (outcome = 0) = \left|\frac{1+2i}{3}\right|^2 = \frac{5}{9}

IP (outcome = 1) = \left|-\frac{1}{3}\right|^2 = \frac{9}{9}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 steps: 1) apply H -> 2) apply 5 -> 3) apply H
           HSH= ( 교수 (0:)( 두수)= (보고 다) ~ unimmy!
                                                                                                                                                                                                                                                                                                                                                                            to notice how there's a chance for system to be in new state the act of measurement changes quantum state
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 HSH^2 = 001 = \left(\frac{141}{3} \frac{1+1}{3}\right)^2 = \left(\frac{1}{10}\right) = 6x/X
               "pvoof";
                 Mla> = (2 | f(b) > (b) | la> makix mult is linear & associative
                                                                                                                                                                                                                                                                                                                                                                                             e.g 1+21 10> - 2 11>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      "collapse of
                                            = & If(b)>Cb11a>
                         sum transform inner
                                                                                                                                                             2 rmbr, this is out fixed a
                                                                                                                                                                       me are only concerned about bera (contributosum)
                                                                                                                                                                                                                                                                                                                                                                                                      this is he same for classical
                                                                                                                                                                       2 sum over our possible states of b aka linear combi → are to re-express f(a)
                                          = 1 f (a) > ja
# ree if have connection to
IA>= Zaili> ← all kels can be re-exp as sums.
```

probabilistic operations

introduce own randomness & uncertainty so if you think abot it, deterministic ones are special cases

definition of operations

quantum state & classical information

unitary operations is the ret of allowable operations on

IBM ass tecture 1.1 : Single Systems

consider system storing into called X assumption; finite S of classical states