

04

AUGUST
FRIDAY

2017

WK 31 • 21st

05.) Calculate

$$\sum_{i=0}^1 \sum_{j=0}^1 |i\rangle\langle j|$$

$$|0\rangle\langle 0| + |0\rangle\langle 1| + |1\rangle\langle 0| + |1\rangle\langle 1|$$

 $|0\rangle$ and $|1\rangle$ are orthogonal state

we know

$$|0\rangle\langle 0| = \begin{pmatrix} 1 & 0 \\ 0 & 0 \end{pmatrix} \begin{pmatrix} 1 & 0 \\ 0 & 0 \end{pmatrix} = \begin{pmatrix} 1 & 0 \\ 0 & 0 \end{pmatrix}$$

$$|0\rangle\langle 1| = \begin{pmatrix} 0 & 1 \\ 0 & 0 \end{pmatrix}$$

$$|1\rangle\langle 1| = \begin{pmatrix} 0 & 0 \\ 0 & 1 \end{pmatrix}$$

$$|1\rangle\langle 0| = \begin{pmatrix} 0 & 0 \\ 1 & 0 \end{pmatrix}$$

$$\sum_{i=0}^1 \sum_{j=0}^1 |i\rangle\langle j| = \begin{pmatrix} 1 & 1 \\ 1 & 1 \end{pmatrix}$$

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	7	14	21	28
1	8	15	22	29
2	9	16	23	30
3	10	17	24	31
4	11	18	25	
5	12	19	26	
6	13	20	27	

Notes