Assignment-6. (1) Given 147 = x107+ BID \$ (4*) = B 107- 0 12) Prove that they are onthogonal of find a unincome matrin B such that it transform 47 to 107 of 14 to 27 $\Rightarrow |14\rangle = \begin{pmatrix} B \\ A \end{pmatrix} \neq |4\rangle \Rightarrow \begin{pmatrix} -A \\ B \end{pmatrix}$ Then, (414*) = (4* pt) (px) = gran - BAX* 3) for from one onthogonal. first of all we find want to find a mornin A, which satisfiely, Amountains -A(107) = 147 & A(117) = 141) So, basically, $A = \begin{pmatrix} \alpha & + \beta^* \\ \beta & -\alpha^* \end{pmatrix}$ $\begin{cases} \alpha, & \alpha & \alpha \\ \beta & -\alpha^* \end{cases}$

A is an unitary matrix of so,
$$A^{+}$$
 is also
$$A^{-} = A^{+} = (A^{*})^{T} = \begin{pmatrix} \alpha^{*} & \beta \\ \beta^{*} - \alpha \end{pmatrix}$$

$$= \begin{pmatrix} \alpha^{*} & \beta^{*} \\ \beta - \alpha \end{pmatrix}.$$

FAT (147) = 107 & A'(147) = 11)...