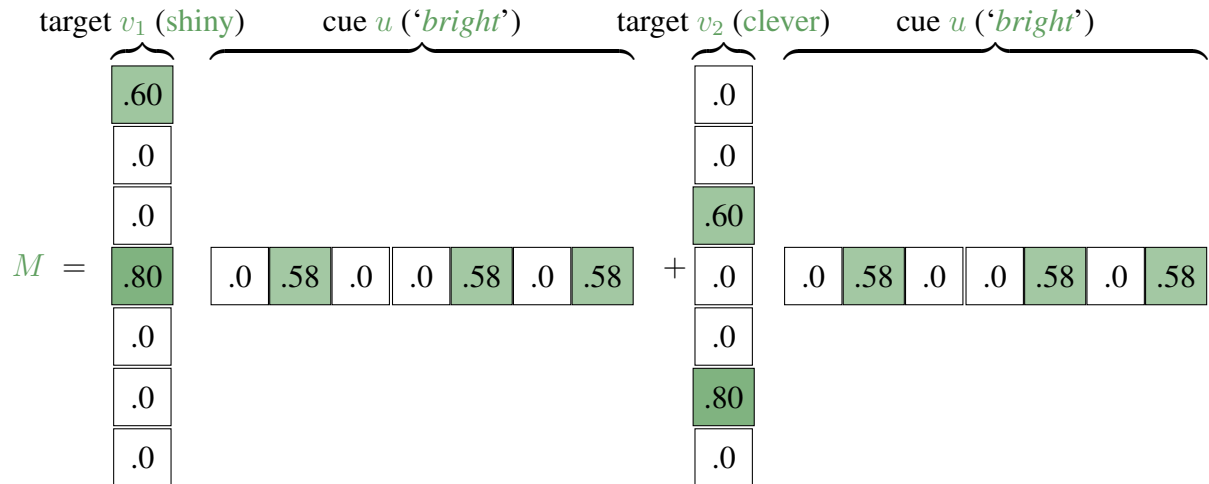


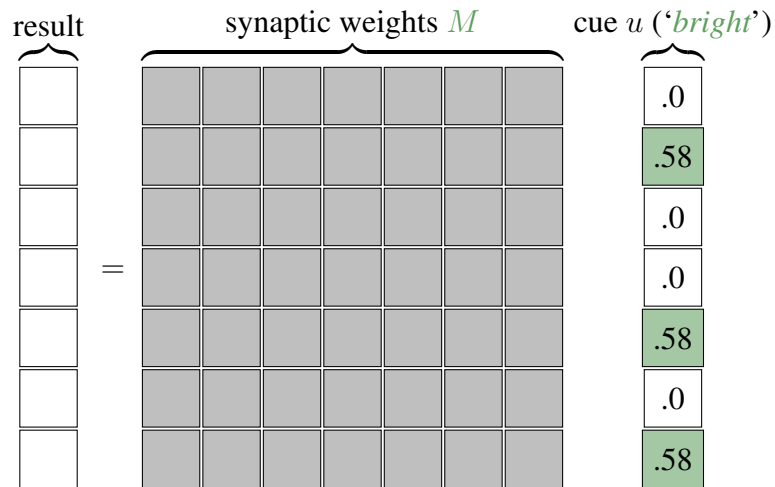
# LING5702: Problem Set 3

Due via Carmen dropbox at 11:59 PM 2/22.

1. (a) [7 pts.] If associative memory  $M$  is made from one cue  $u$  and two targets  $v_1$  and  $v_2$ :

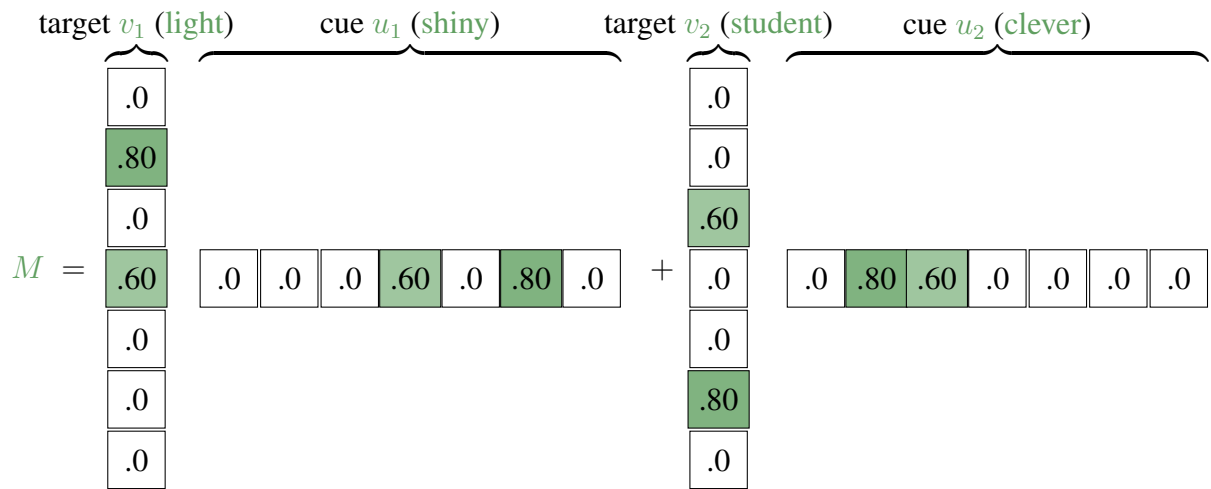


what is the result of cueing  $M$  with  $u$ ? (HINT: You don't need to calculate the matrix!)

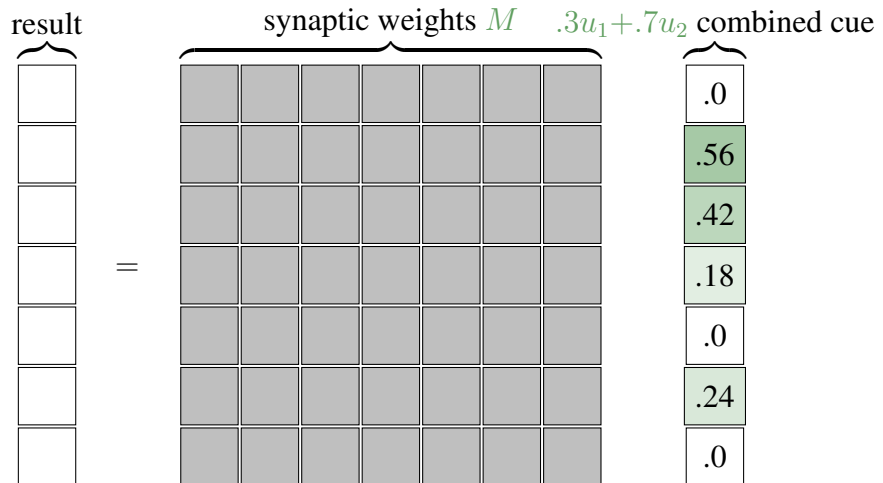


- (b) [3 pts.] Describe the result in a sentence in terms of  $v_1$  and  $v_2$ .

2. (a) [7 pts.] If associative memory  $M$  is made from cues  $u_1$  and  $u_2$  and targets  $v_1$  and  $v_2$ :



what results from cueing  $M$  with a mixture of  $.3u_1 + .7u_2$ ? (You needn't calculate the matrix!)



(b) [3 pts.] Describe the result in a sentence in terms of  $v_1$  and  $v_2$ .

3. (a) [7 pts.] If a filter  $F$  is made from auto-associated vectors  $v_1$  and  $v_3$  (NOTE variable names!):

$$F = \begin{matrix} \overbrace{\begin{matrix} .60 \\ .0 \\ .80 \\ .0 \\ .0 \\ .0 \\ .0 \end{matrix}}^{v_1 \text{ (light)}} & \overbrace{\begin{matrix} .60 & .0 & .80 & .0 & .0 & .0 & .0 \end{matrix}}^{v_1 \text{ (light)}} & + & \overbrace{\begin{matrix} .0 \\ .58 \\ .0 \\ .0 \\ .58 \\ .58 \\ .0 \end{matrix}}^{v_3 \text{ (flight)}} & \overbrace{\begin{matrix} .0 & .58 & .0 & .0 & .58 & .58 & .0 \end{matrix}}^{v_3 \text{ (flight)}} \end{matrix}$$

what is the result of cueing  $F$  with a mixture of  $.2v_1 + .8v_2$ ? (You needn't calculate the matrix!)

$$\begin{matrix} \overbrace{\begin{matrix} \phantom{.0} \\ \phantom{.0} \\ \phantom{.0} \\ \phantom{.0} \\ \phantom{.0} \\ \phantom{.0} \\ \phantom{.0} \end{matrix}}^{\text{result}} & = & \overbrace{\begin{matrix} \phantom{.0} & \phantom{.0} & \phantom{.0} & \phantom{.0} & \phantom{.0} & \phantom{.0} & \phantom{.0} \\ \phantom{.0} & \phantom{.0} & \phantom{.0} & \phantom{.0} & \phantom{.0} & \phantom{.0} & \phantom{.0} \\ \phantom{.0} & \phantom{.0} & \phantom{.0} & \phantom{.0} & \phantom{.0} & \phantom{.0} & \phantom{.0} \\ \phantom{.0} & \phantom{.0} & \phantom{.0} & \phantom{.0} & \phantom{.0} & \phantom{.0} & \phantom{.0} \\ \phantom{.0} & \phantom{.0} & \phantom{.0} & \phantom{.0} & \phantom{.0} & \phantom{.0} & \phantom{.0} \\ \phantom{.0} & \phantom{.0} & \phantom{.0} & \phantom{.0} & \phantom{.0} & \phantom{.0} & \phantom{.0} \\ \phantom{.0} & \phantom{.0} & \phantom{.0} & \phantom{.0} & \phantom{.0} & \phantom{.0} & \phantom{.0} \end{matrix}}^{\text{filter } F} & \overbrace{\begin{matrix} .12 \\ .0 \\ .16 \\ .64 \\ .0 \\ .0 \\ .48 \end{matrix}}^{.2v_1 + .8v_2 \text{ combined cue}} \end{matrix}$$

- (b) [3 pts.] Describe the result in a sentence in terms of  $v_1$ ,  $v_2$  and  $v_3$ .