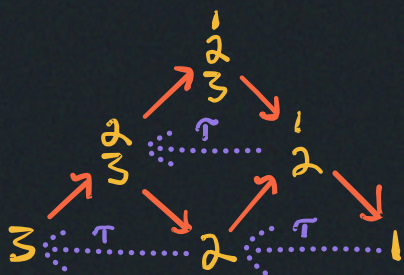


Exercise Hints

(1b) See what happens when you mutate!
Follow the non-doubled version in the notes for mutation inspiration.

(2a) The mutation at 1 looks like $(M_1, P(2) \oplus P(3))$.
To find M_1 , look at the AR quiver and manually check τ -rigidity for each module.
Remember that τ takes you to the left along the diamonds!



(3a) Your answer for (2) should give a guess!

To prove it, think about the condition

$$\text{Hom}(P, M) = 0$$

which is necessary for τ -rigidity of (M, P)

(3b)
$$\chi(\text{Gr}_e(S(k))) = \begin{cases} 1 & e = (0, \dots, 0) \text{ or } e = (0, \dots, 1, \dots, 0) \\ 0 & \text{else} \end{cases}$$

↑ 1 in k^{th} place
0 elsewhere

Injective resolution of $S(k)$:

$$0 \hookrightarrow S(k) \hookrightarrow I(k) \hookrightarrow \bigoplus_{\alpha: j \rightarrow k} I(j)$$

↑ injective representation at k

Now calculate!