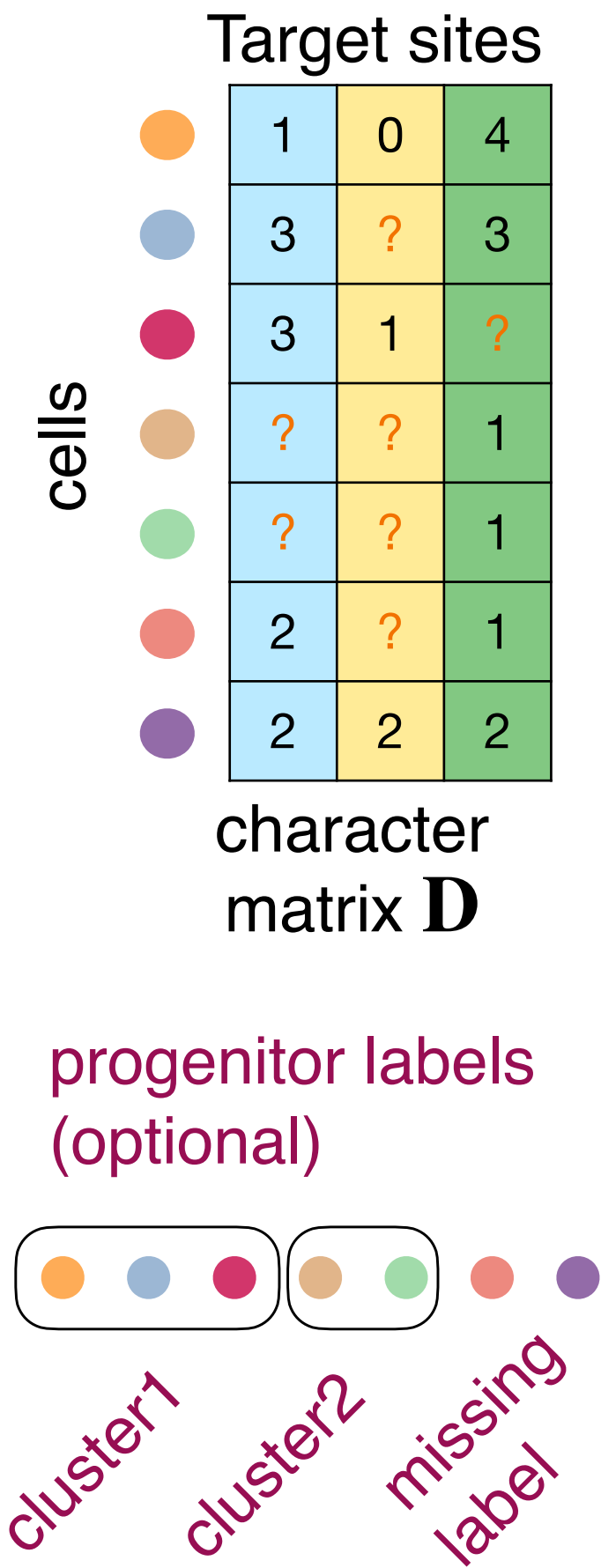
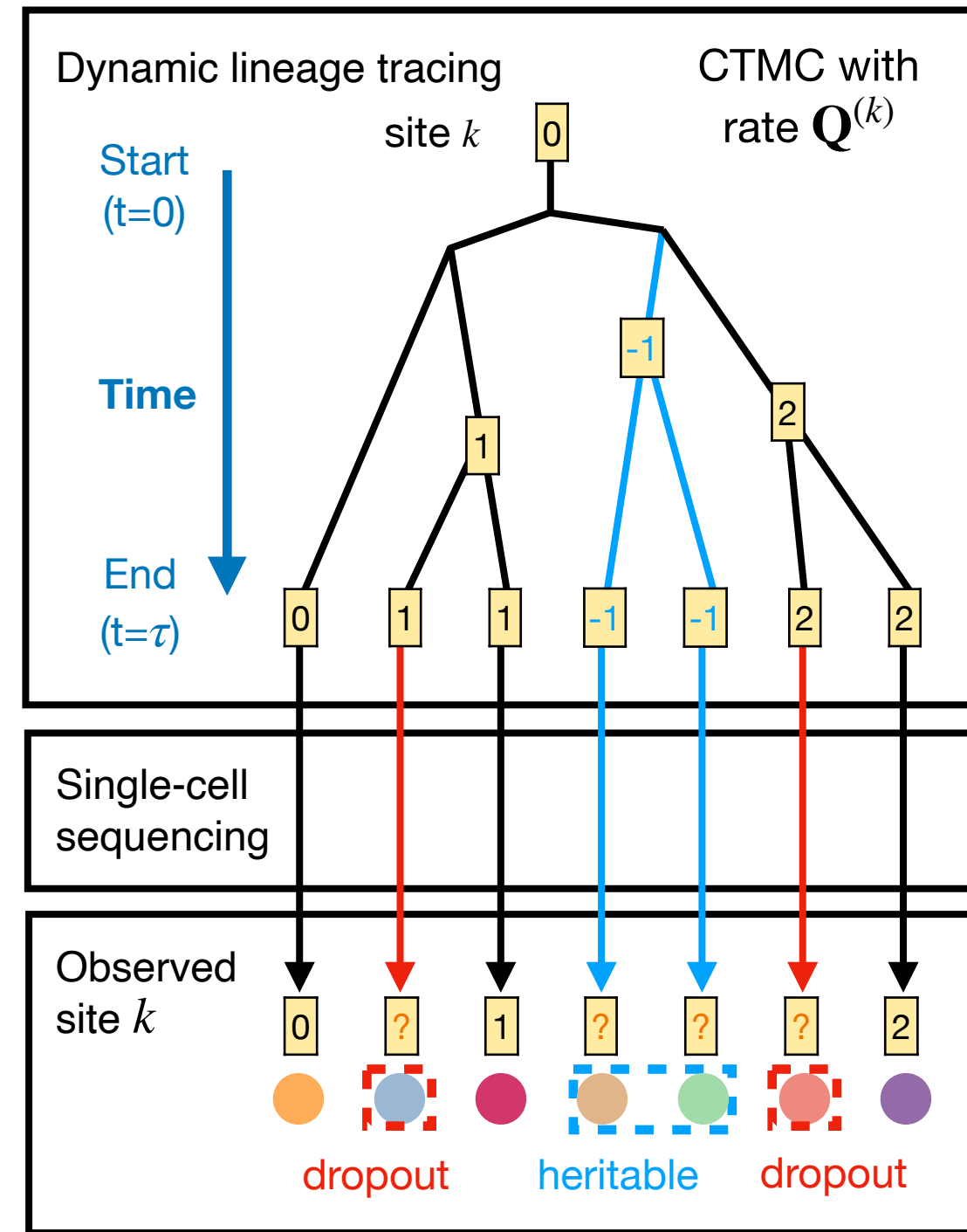


Input

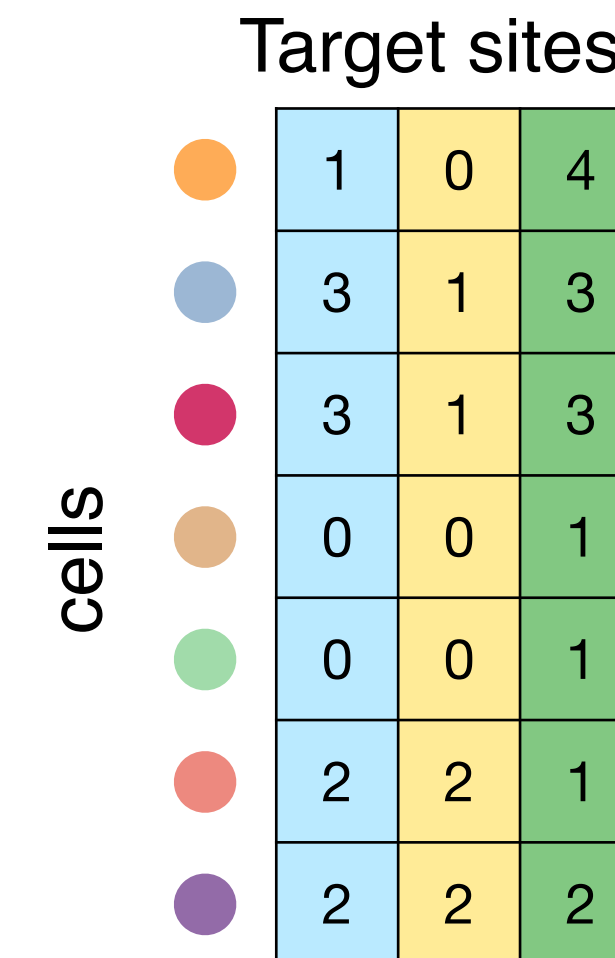


maximum likelihood tree inference
 $\max_{T, \Theta} \log L(T, \Theta; \mathbf{D})$
 calculate $L(T, \Theta; \mathbf{D})$ under the PMM

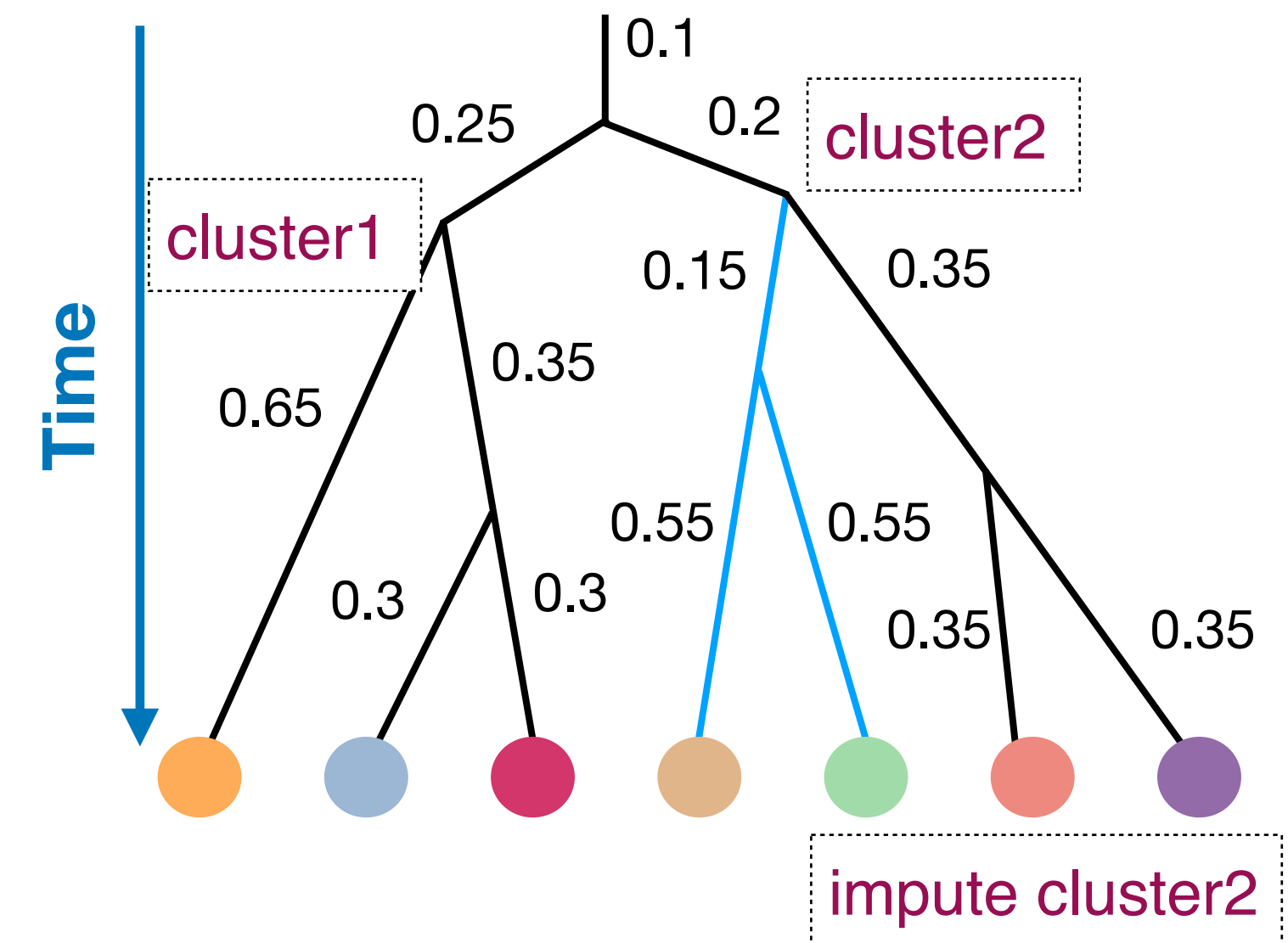


Output

(1) Imputed character matrix



(2) Time-resolved lineage tree



(3) Mutation rate, heritable missing rate, and dropout rate