top-1 node | region-1 | top-2 node | region-2 | top-3 node | region-3

a.original graph structure
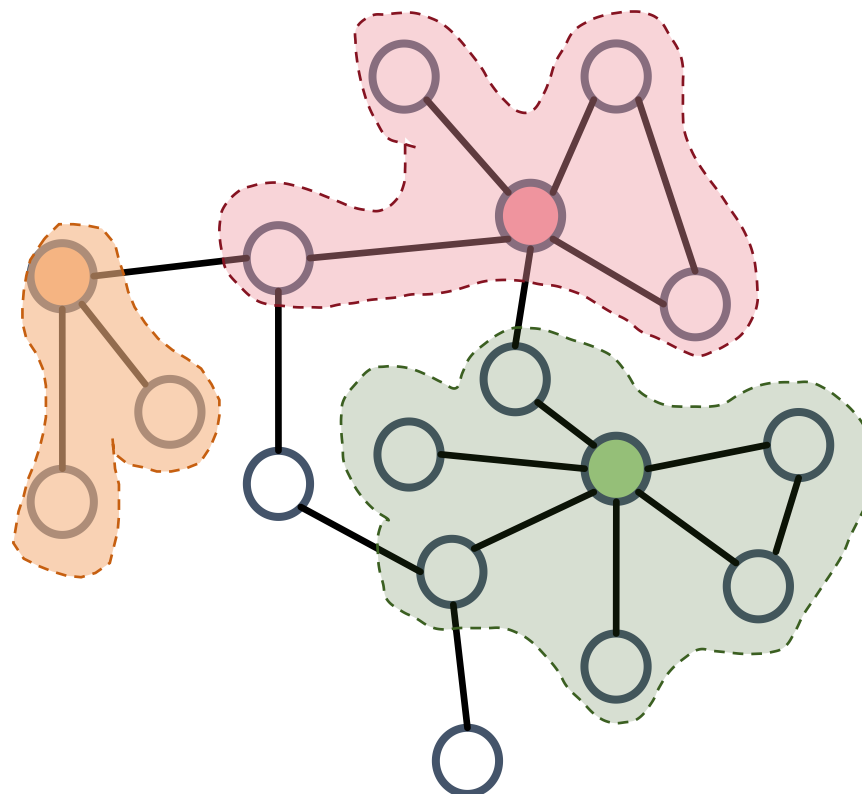
b.regional graph representation
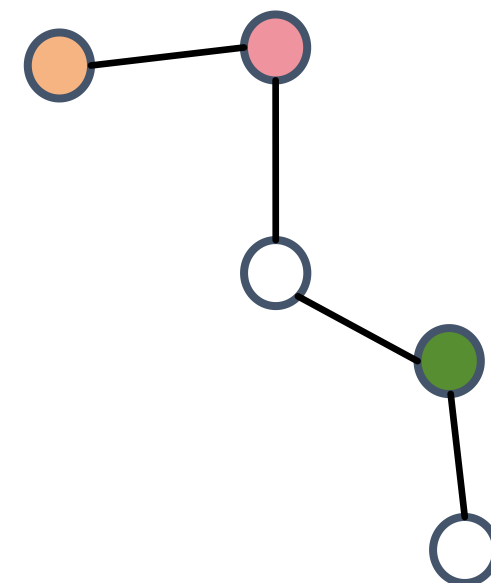
c.regional graph structure

message pass

1 hop

2 hop

reconstruction

region node output

reshape
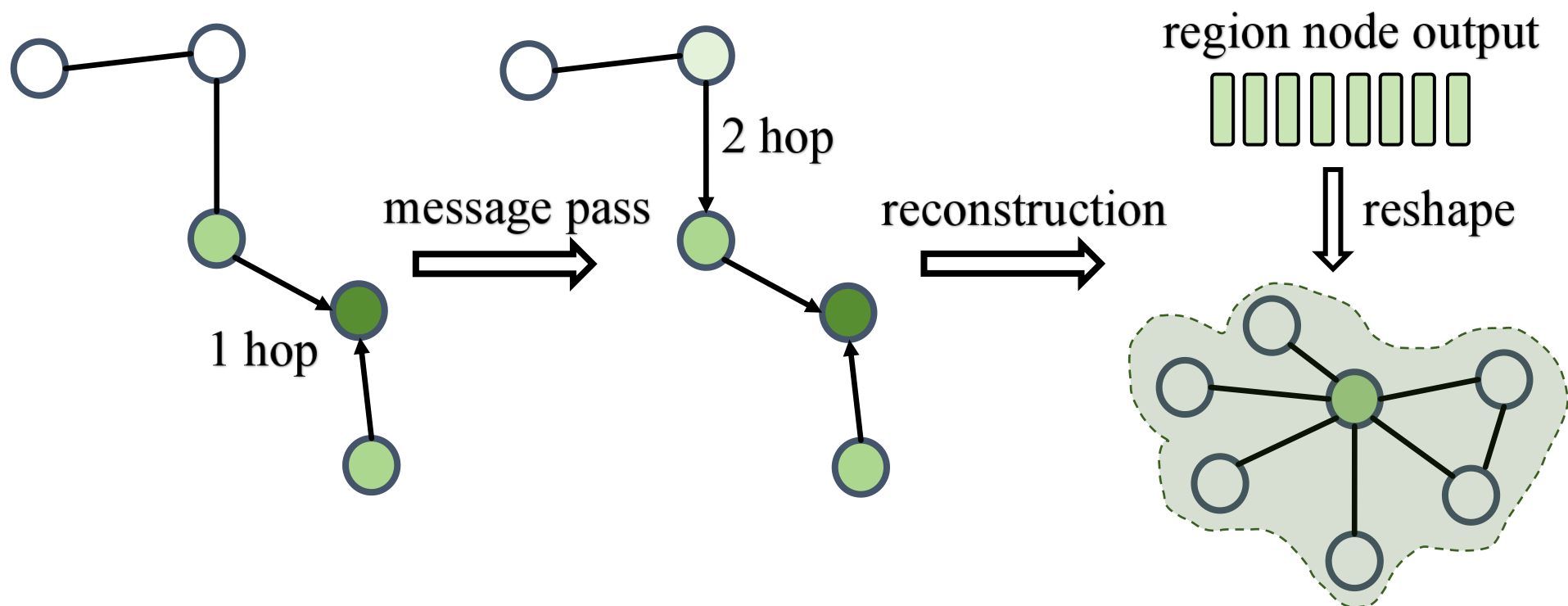
d.fine-grained reconstruction and message passing