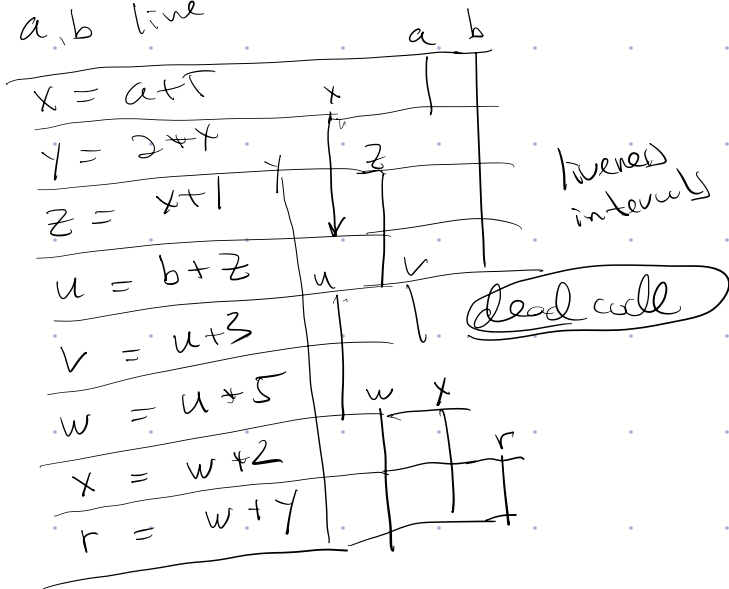
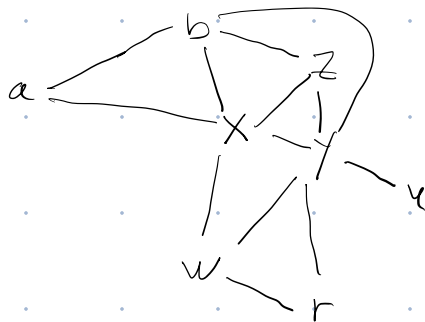


a, b live

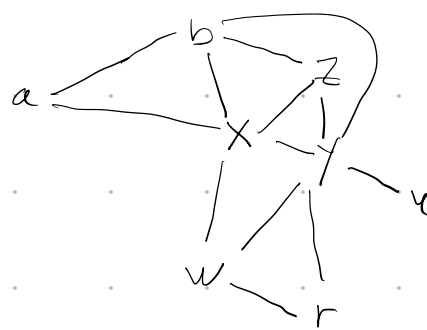


r, x live



Algorithm to color with  $k=3$  colors

- SIMPLIFY**
- remove each node with  $< k$  neighbours and push on a stack if we color the remaining graph then we can color that node
- For  $u, a, u, r$  have  $< 3$  neighbours.

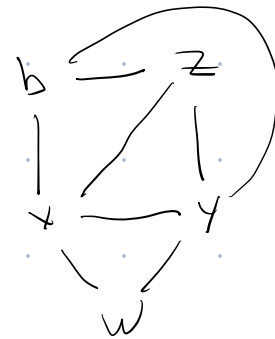


interference graph

Assume we have 3 registers. Can we "color" the nodes of the graph with 3 colors  $R1, R2, R3$

So no edge connects nodes of the same color?

Stack  $a, u, r$



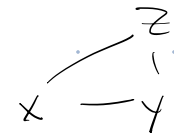
Now  $w$  has  $< 3$  edges so push on stack

Stack  $a, u, r, w$



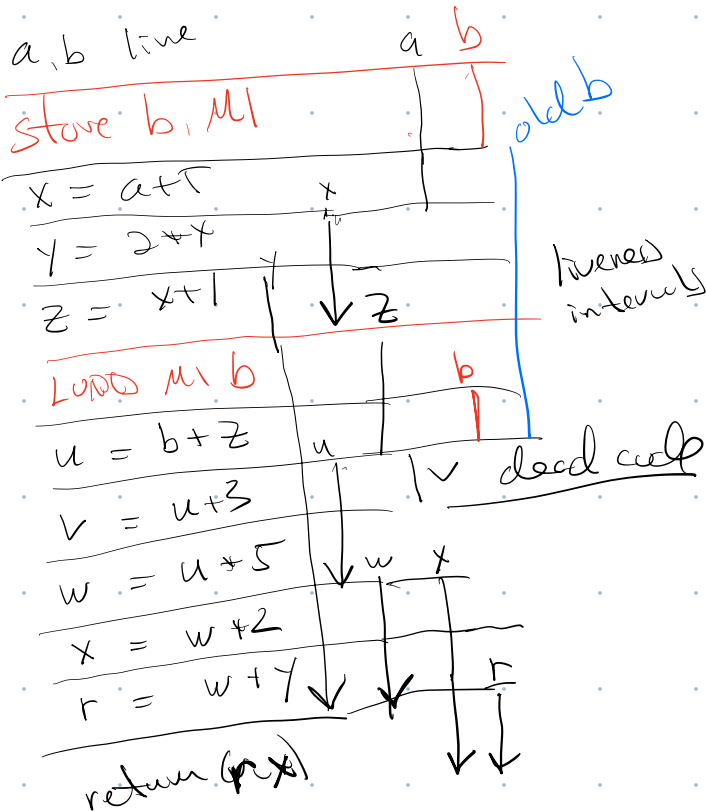
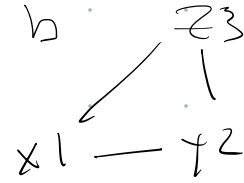
(2) Spill each node has  $\geq k$  edges  
 So push one to put in memory  
 say b

Memory b  
 stack a u v e, (b)

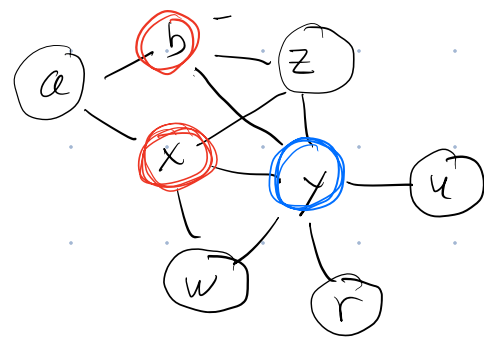
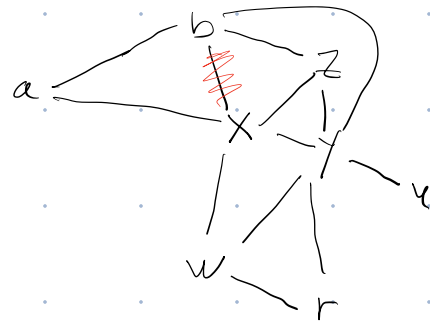


(3) Select Colors  
 b has no register

So rewrite code to  
 b stored in memory  
 and Start Over



interference graph  
 ↓



Stack  
 simplify a, b, w, r, u, y, z

Rebuild graph from stack and

Select colors

R1 black  
 R2 blue  
 R3 red

# Rewrite code with registers

a in R1

b in R3

Store R3, M1

R3 = R1 + 5

R2 = 2 \* R3

R1 = R3 + 1

Load M1, R3

R1 = R3 + R1

dead code, delete

R1 = R1 \* 5

R3 = R1 \* 2

R1 = R1 + R2

return (r, x)

a, b live

store b, M1

x = a + 5

y = 2 \* x

z = x + 1

Load M1, b

u = b + z

v = u + 3

w = u + 5

x = w + 2

r = w + y

a b

old b

liveness intervals

