23-S1-Q1

(a) R Y G B

1 2 3 4

R > B

(1, 2) : 1 <=> 2

(2, 3) : 2 <=> 3

(2, 4) : 2 <=> 4

(i) state space graph

(ii) RBYG -> GYRB

best-first search.

$f(n) = g(n) + h(n)$

$g(n)$ = cost : start -> current
num of operations

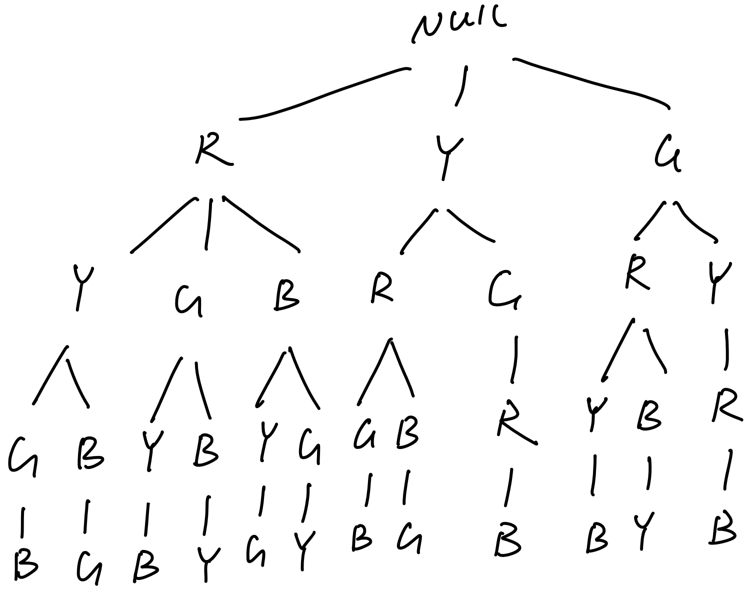
$h(n) = \frac{\text{incorrect}}{2}$ position

draw tree, $f(n)$

(b) FP-growth, a single branch

why we can enumerate frequent pattern

Solution (a)(i) ① limit R>B , total R Y G B



② List $6+3+3=12$

R Y G B

R Y B G

R G Y B

R G B Y

R B Y G

R B G Y

Y R G B

Y R B G

Y G R B

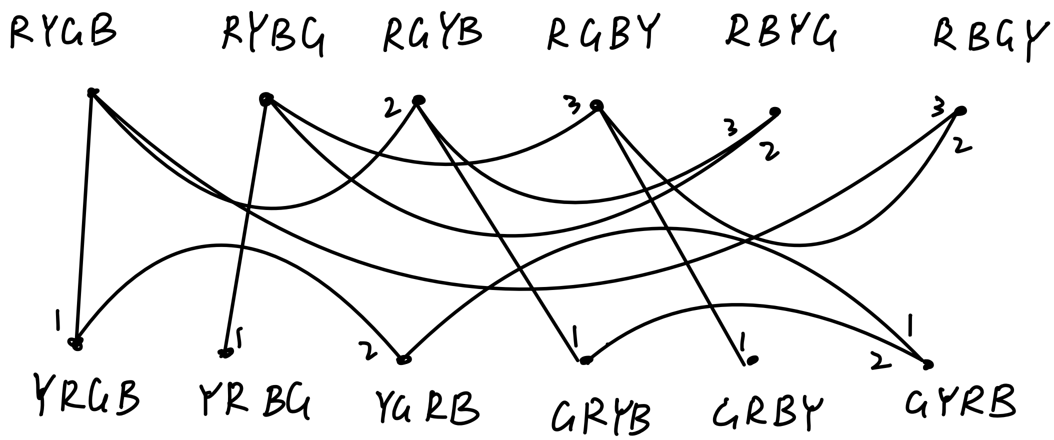
G R Y B

G R B Y

G Y R B

③ complete state space graph

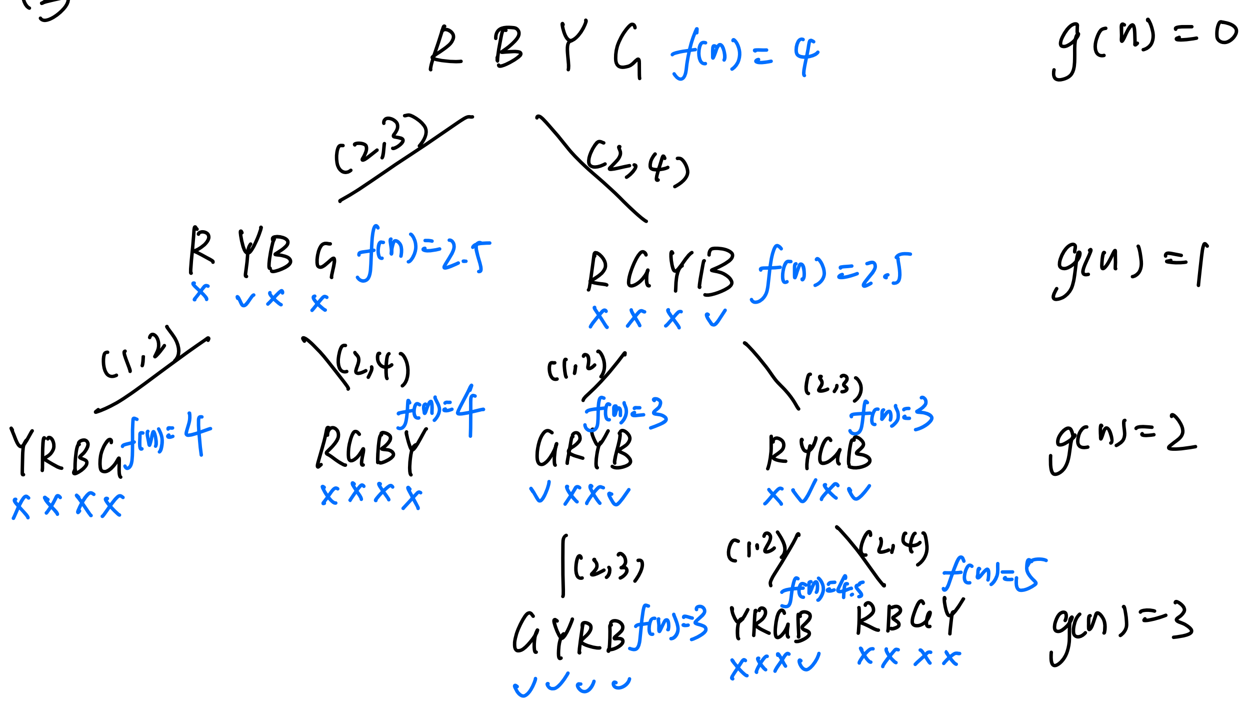
1: (1,2) 2: (2,3) 3: (2,4) R > B all line denote ⟷



(ii) ① RBYG $\longrightarrow$ GYRB $\qquad f(n) = g(n) + h(n)$

(1,2) $\quad$ (2,3) $\quad$ (2,4) $\qquad R > B$

②



③ So the best-first search is

RBYG $\xrightarrow{(2,4)}$ RGYB $\xrightarrow{(1,2)}$ GRYB $\xrightarrow{(2,3)}$ GYRB

$$f(n) = g(n) + h(n) = 3 + \frac{0}{2} = 3$$

(b) ① If a conditional FP-Tree has only a single branch, every subset of the items along that path must appear in exactly the same trasactions that support the entire path.

② all combinations of the items in that single path are guaranteed to be frequent.

③ So we can directly enumerate all subsets