23-S1-Q1

(a) R Y G B   R > B

1 2 3 4   (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

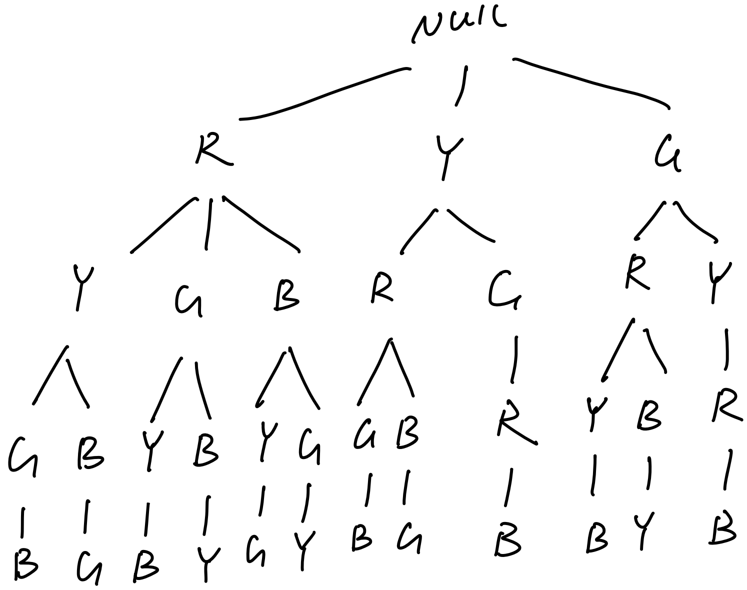
$h(n) = \frac{\text{incorrect}}{2}$ position

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

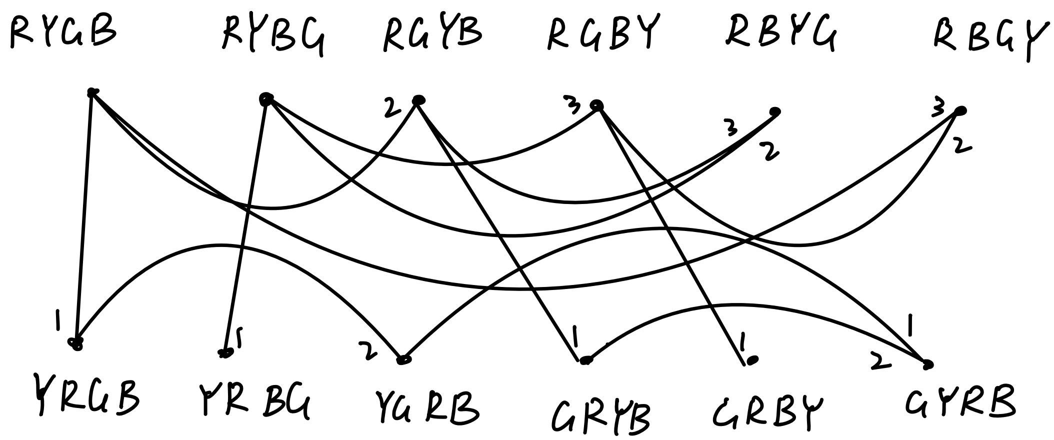
G R Y B

G R B Y

G Y R B

3 complete state space graph

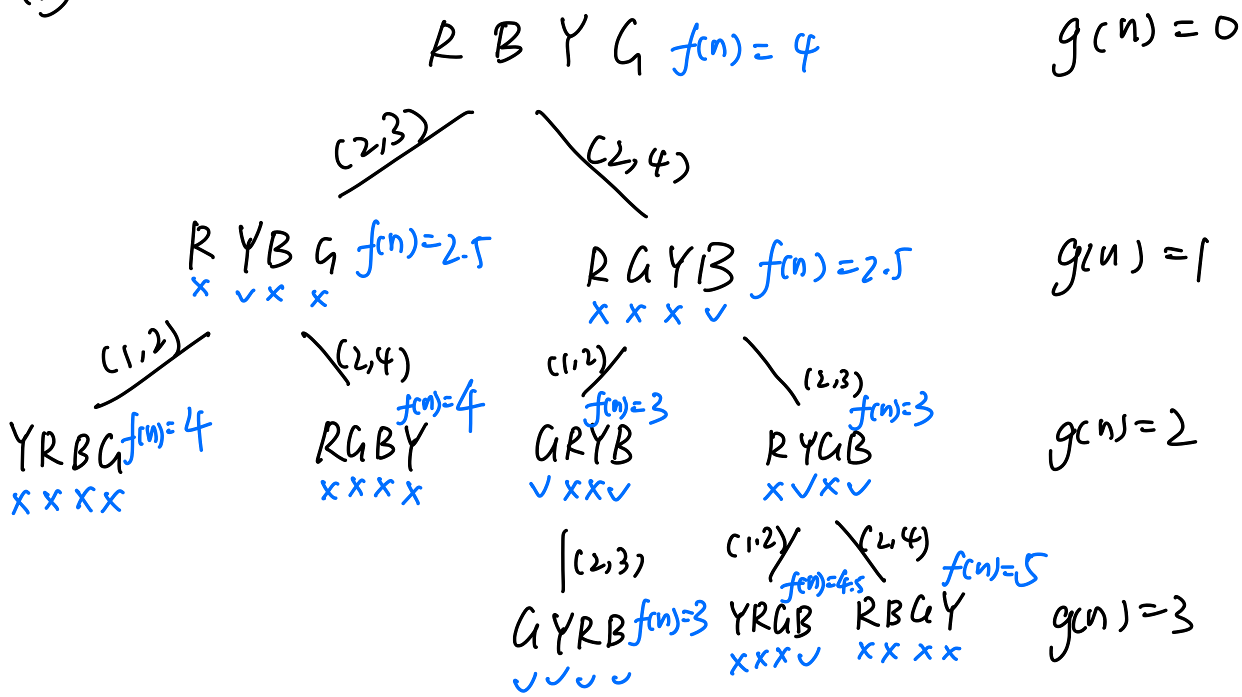
1: (1,2) 2: (2,3) 3: (2,4) R > B all line denote $\leftrightarrow$



(ii) ① RBYG → GYRB $f(n) = g(n) + h(n)$

(1,2) (2,3) (2,4) R > B

②



③ So the best-first search is

Initialize : open = [RBYG 4] closed = [ ]

evaluate	open	closed
RBYG 4	RYBG 2.5 RGYB 2.5	RBYG 4
RYBG 2.5	RGYB 2.5 YRBG 4 RGBY 4	RYBG 2.5 RBYG 4
RGYB 2.5	GRYB 3 RYGB 3 YRBG 4 RGBY 4	RGYB 2.5 RYBG 2.5 RBYG 4
GRYB 3	GYRB 3 RYGB 3 YRBG 4 RGBY 4	GRYB 3 RGYB 2.5 RYBG 2.5 RBYG 4

evaluate GYRB 3 : the solution is found!

(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