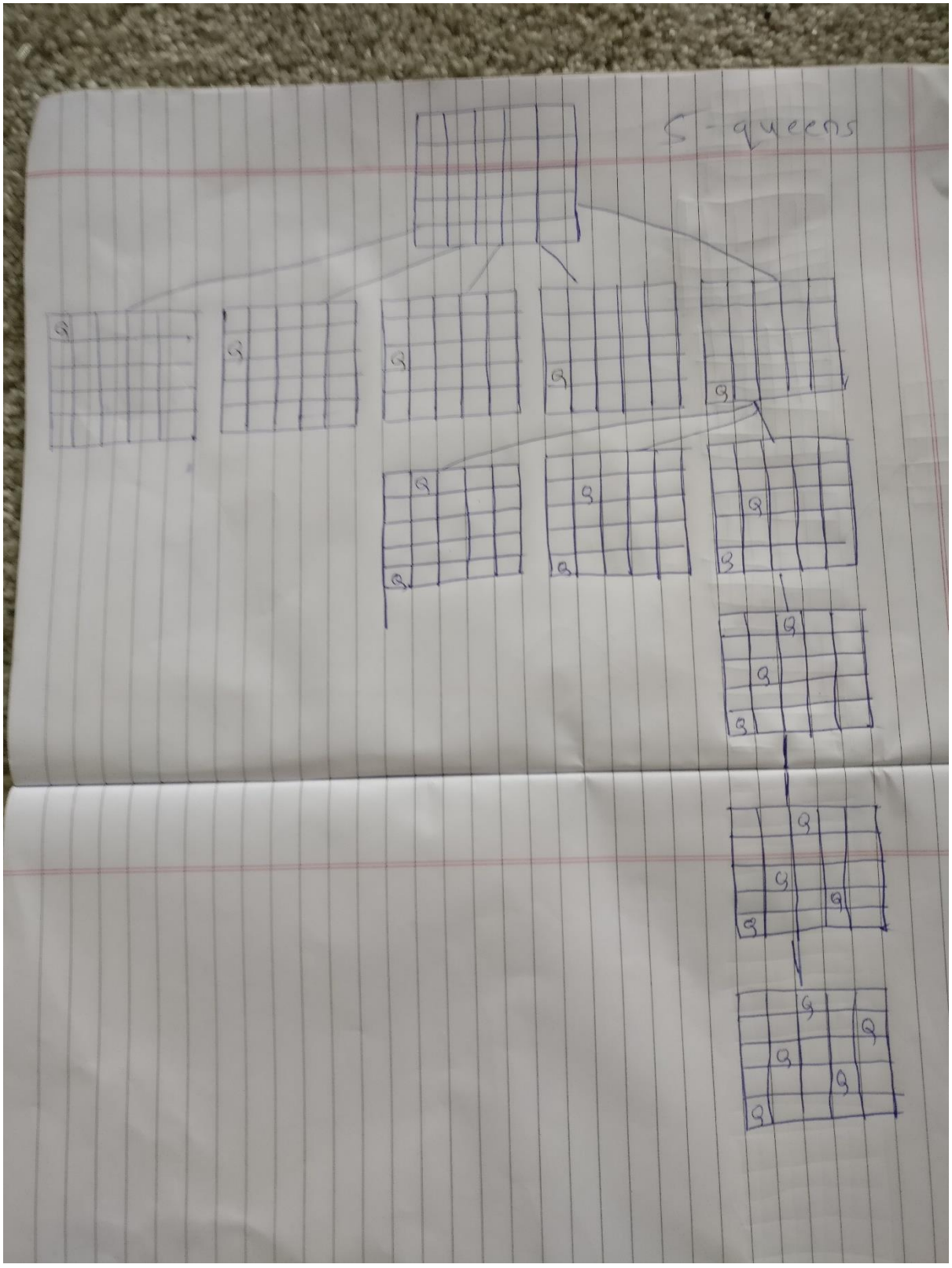
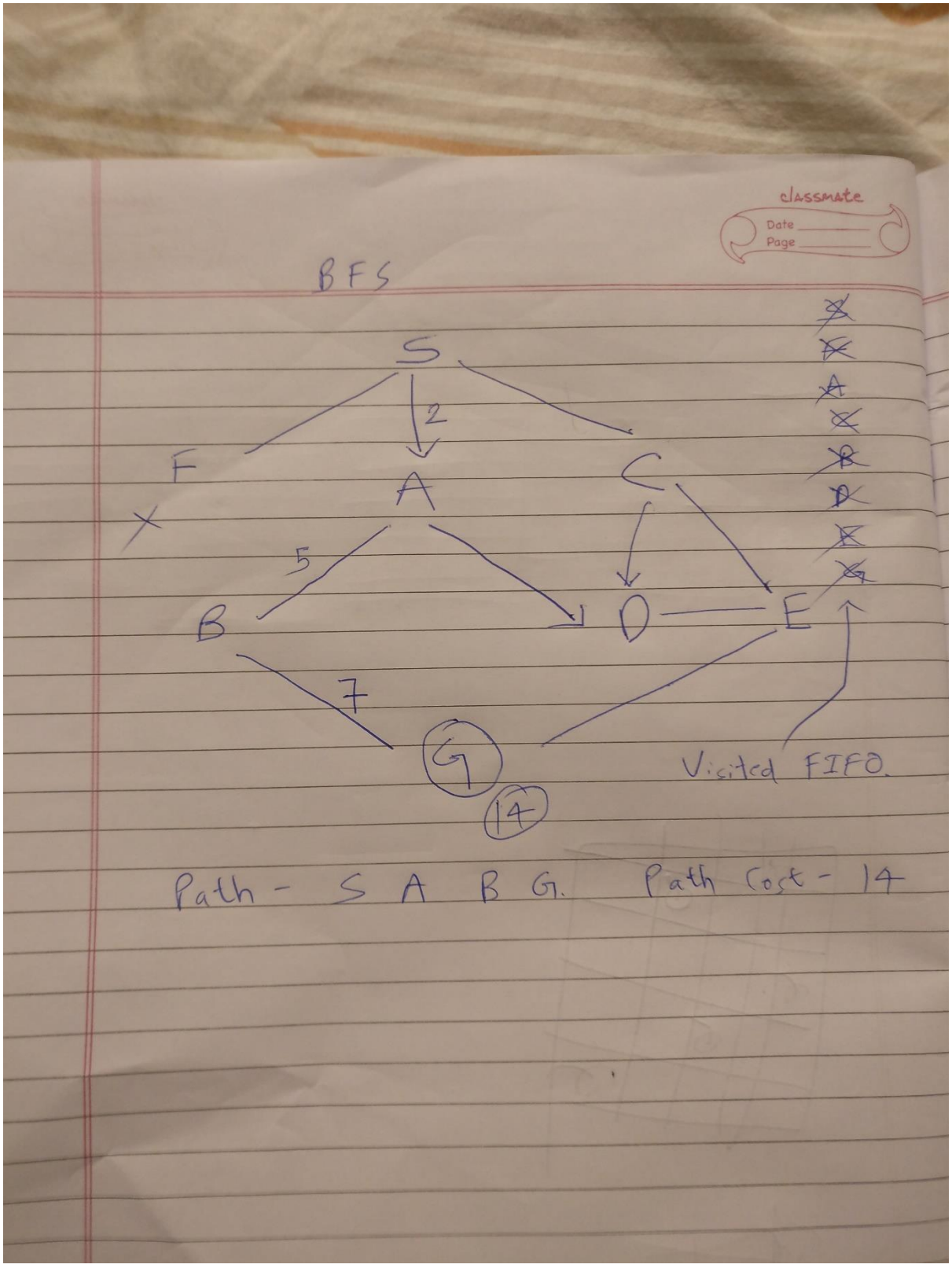
Homework Assignment 1

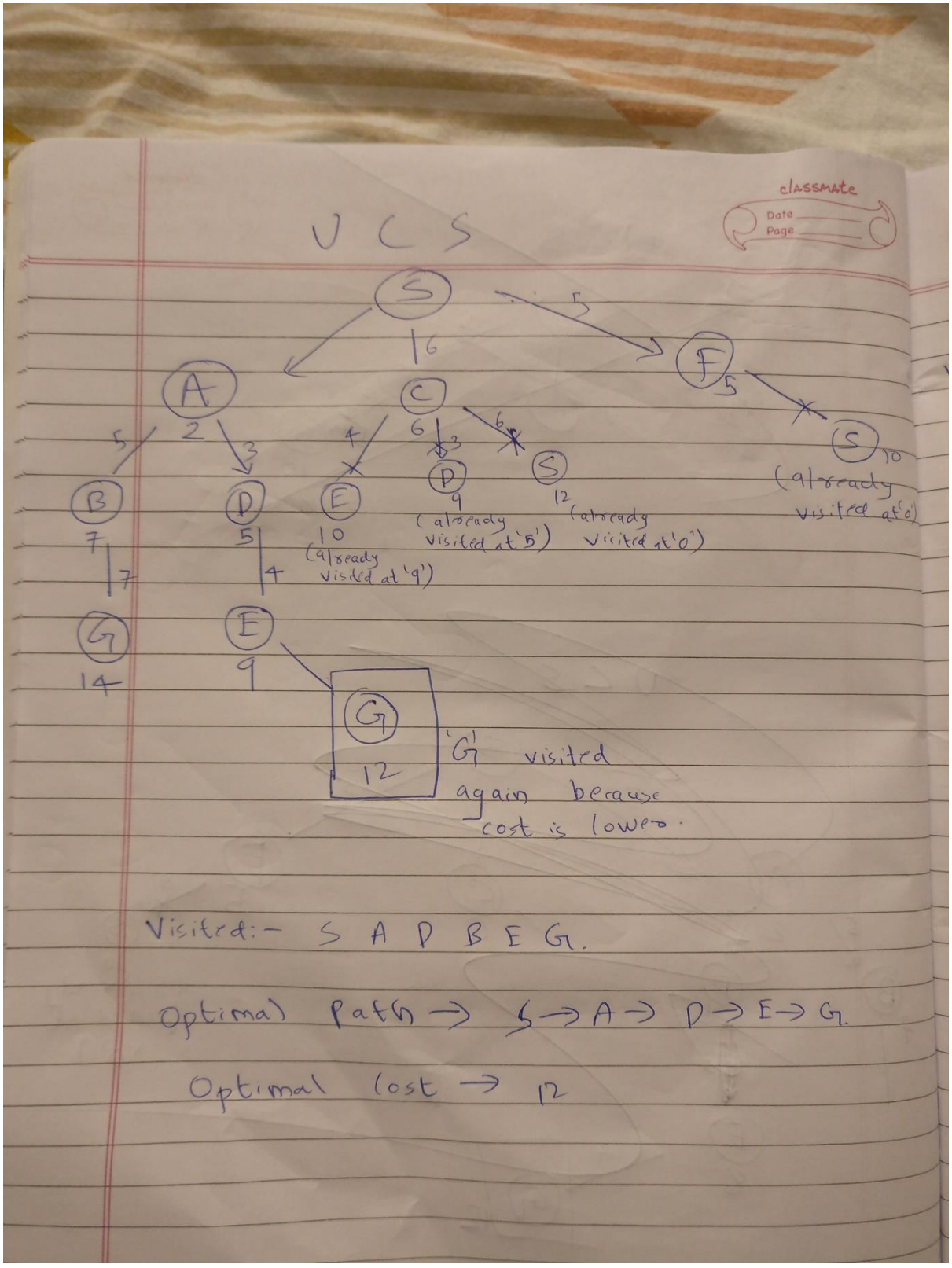
Q1: 5 queens DFS



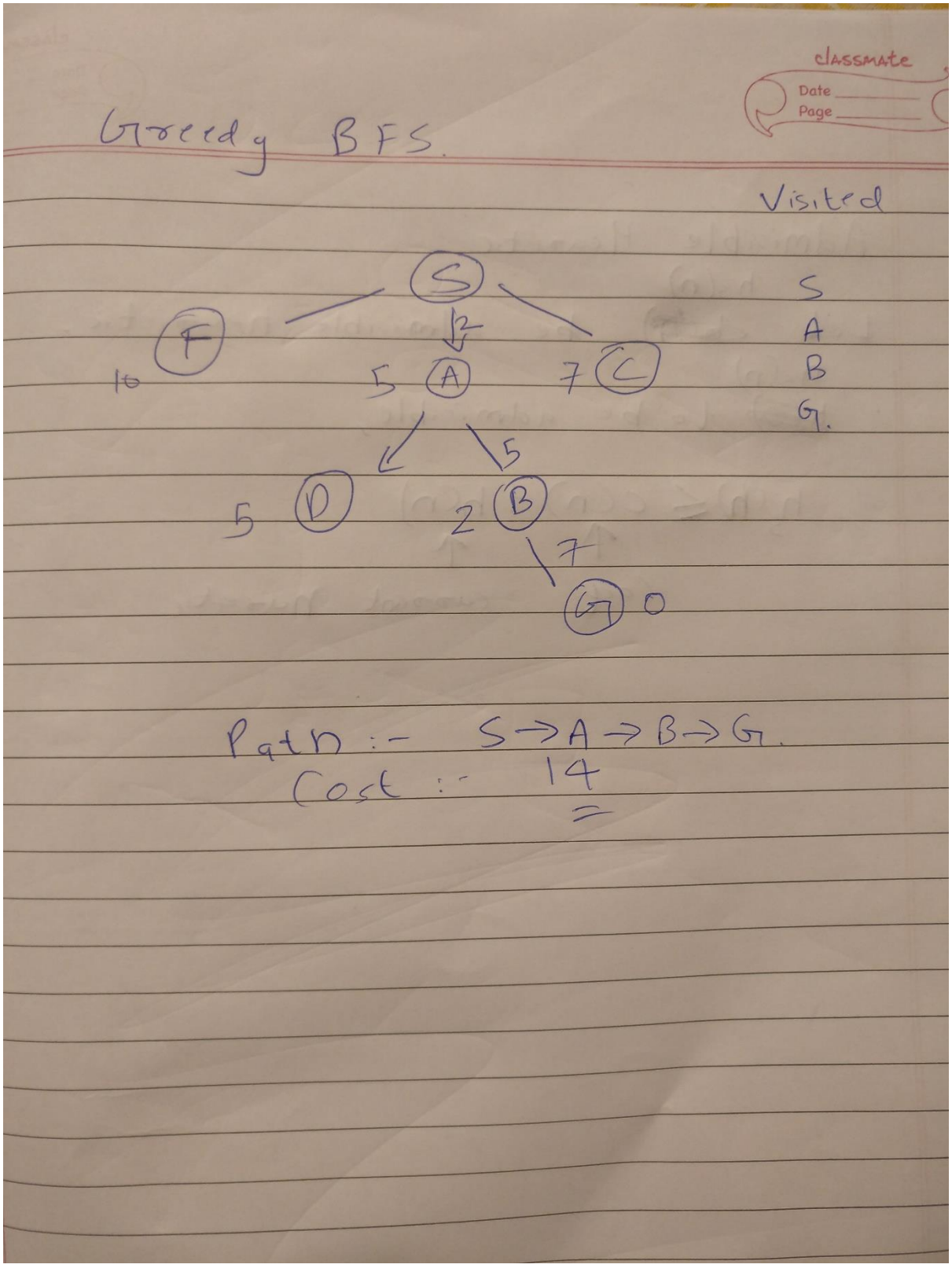
Q2: Breadth First Search



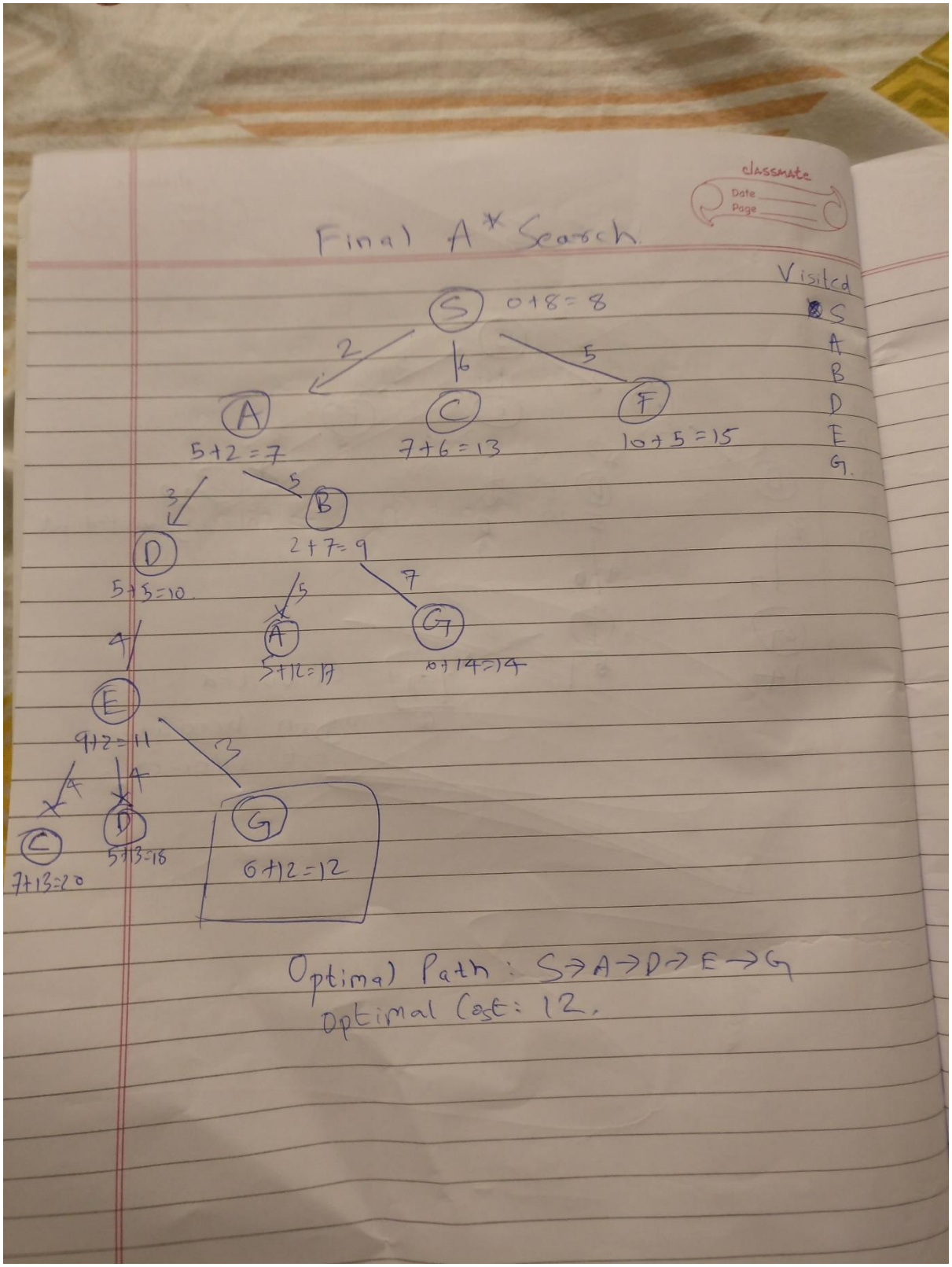
3. Uniform Cost Search



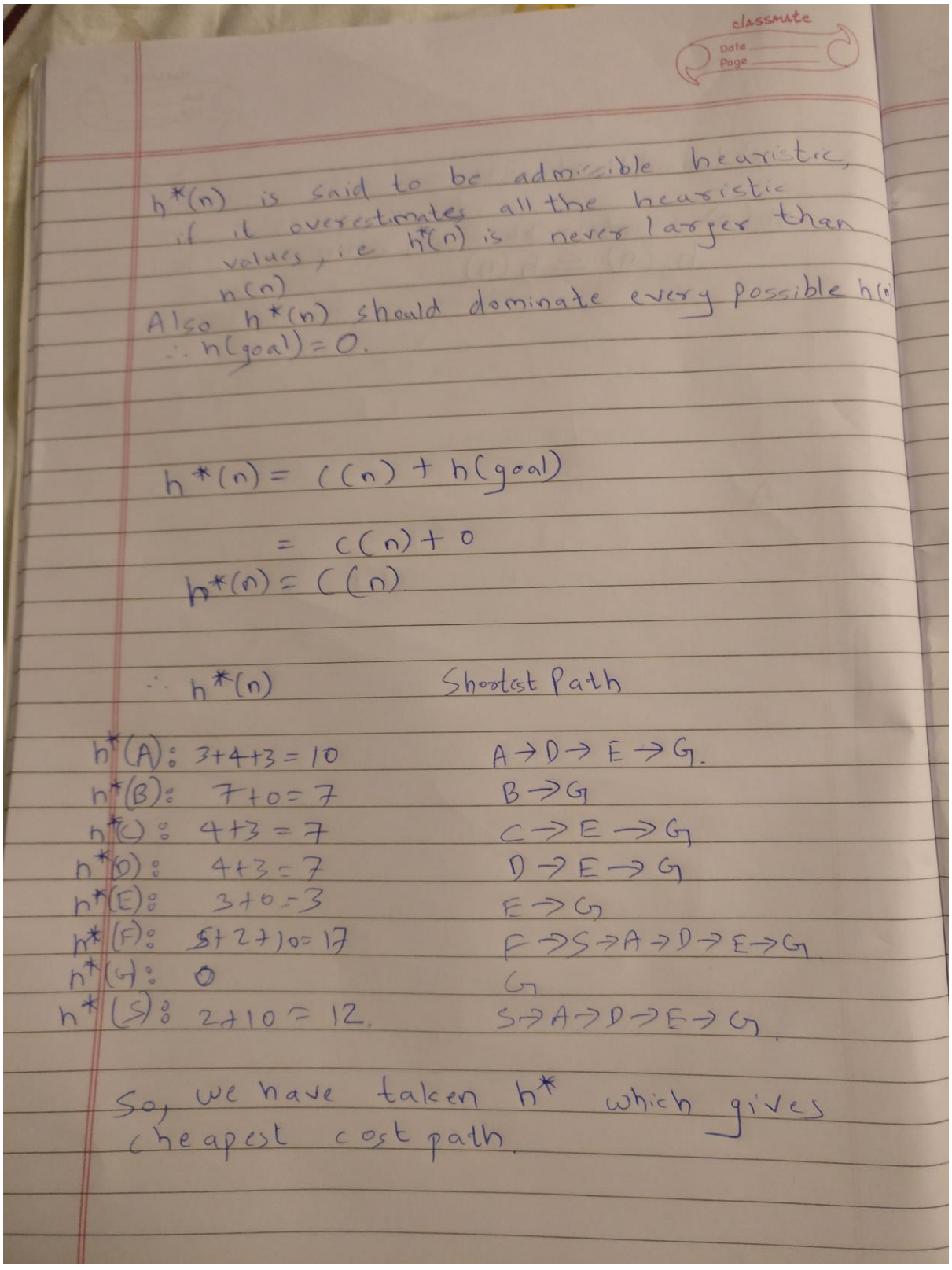
4: Greedy Best First Search



5: A* Search


Final A* Search
Visited
S
A
B
D
E
G.
S
0+8=8
A
5+2=7
C
7+6=13
F
10+5=15
B
2+7=9
D
5+5=10
A
5+11=17
G
0+14=14
E
9+2=11
C
7+13=20
D
5+13=18
G
6+12=12
Optimal Path: S→A→D→E→G
Optimal Cost: 12.

6: Admissible Heuristic



$h^*(n)$ is said to be admissible heuristic, if it overestimates all the heuristic values, i.e $h^*(n)$ is never larger than $h(n)$

Also $h^*(n)$ should dominate every possible $h(n)$

$\therefore h(goal) = 0.$

$h^*(n) = c(n) + h(goal)$

$= c(n) + 0$

$h^*(n) = c(n)$

$\therefore h^*(n)$	Shortest Path
$h^*(A)$: $3+4+3 = 10$	$A \to D \to E \to G.$
$h^*(B)$: $7+0 = 7$	$B \to G$
$h^*(C)$: $4+3 = 7$	$C \to E \to G$
$h^*(D)$: $4+3 = 7$	$D \to E \to G$
$h^*(E)$: $3+0 = 3$	$E \to G$
$h^*(F)$: $5+2+10 = 17$	$F \to S \to A \to D \to E \to G$
$h^*(G)$: 0	G
$h^*(S)$: $2+10 = 12.$	$S \to A \to D \to E \to G.$

So, we have taken h^* which gives cheapest cost path.