ALGORITHMS

Assignment 5 Report

Group: 6

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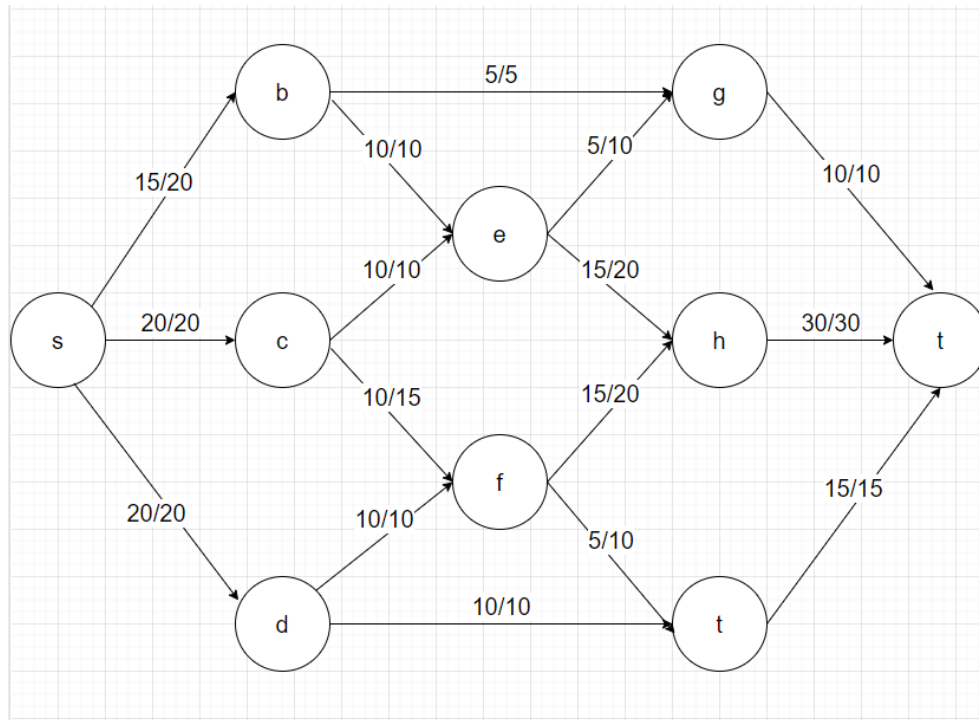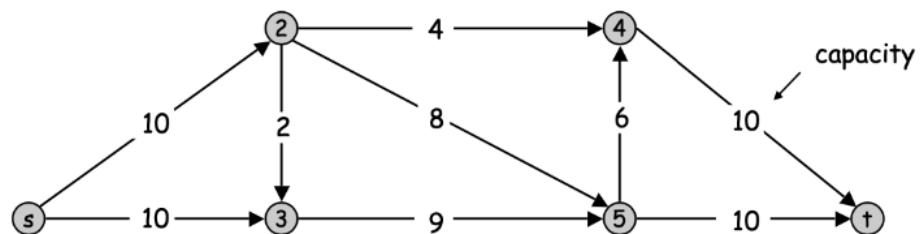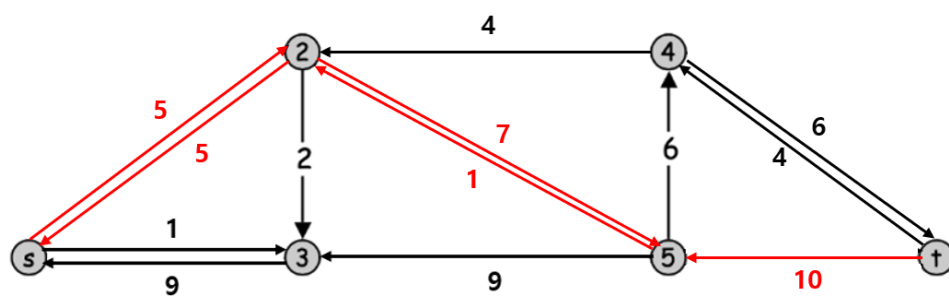Student ID: 201921166   name: 정의철
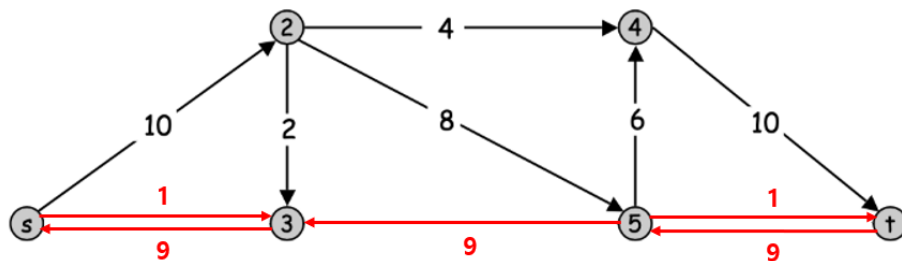
May 28, 2021

1 Exercise 1
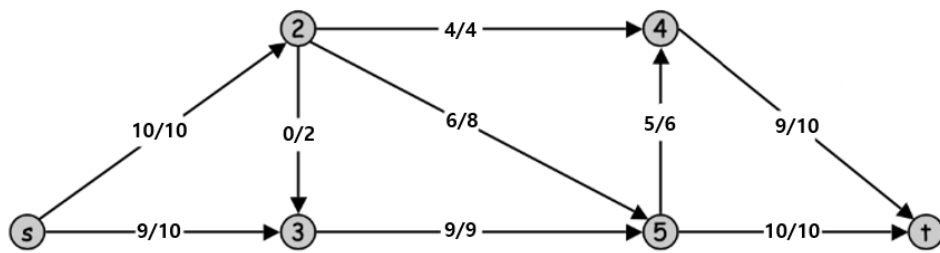
1.1

1.2

S = $\{s, b, c, d, e\}$, T = $\{f, g, h, i, t\}$

2 Exercise 2

2.1 Ford-Fulkerson Algorithm (Total 15 point)

Top diagram:

2 — 4 — 4

10 2 8 6 10

s — **1** — 3 — **9** — 5 — **1** — t
9   **9**   **9**

Middle diagram:

4

2 — **4** — 4

6 **4** 2 8 6 **6** **4**

s — 1 — 3 — 9 — 5 — 1 — t
9   9   9

Bottom diagram:

4

2 — 4

5 **5** 2 **7** **1** 6 6 4

s — 1 — 3 — 9 — 5 — **10** — t
9
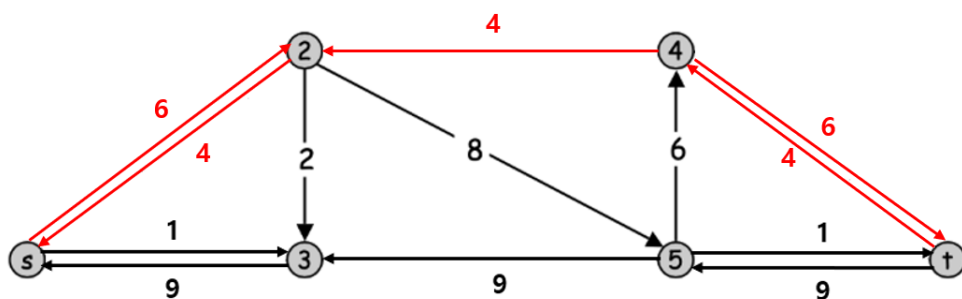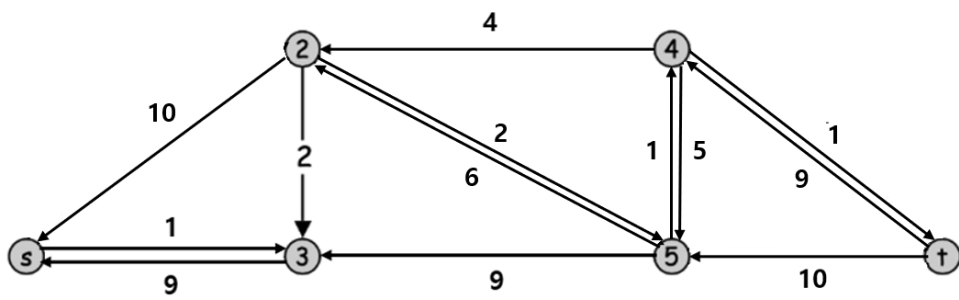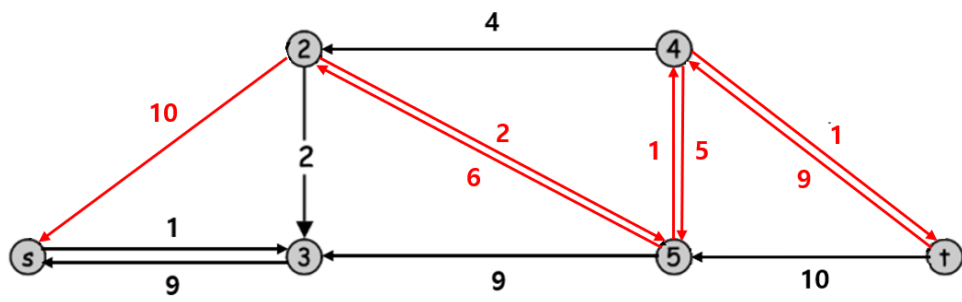
Value of flow = 19

Maximum flow = 19

3 Exercise 3

3.1

문서 상에서 정보가 잘 표시되지 않아, 아래의 링크로 이미지 첨부해드립니다. https://drive.google.com/file/d/1cp6DiL01rb9r1U_OdtLQHuorETtQSUM_/view?usp=sharing
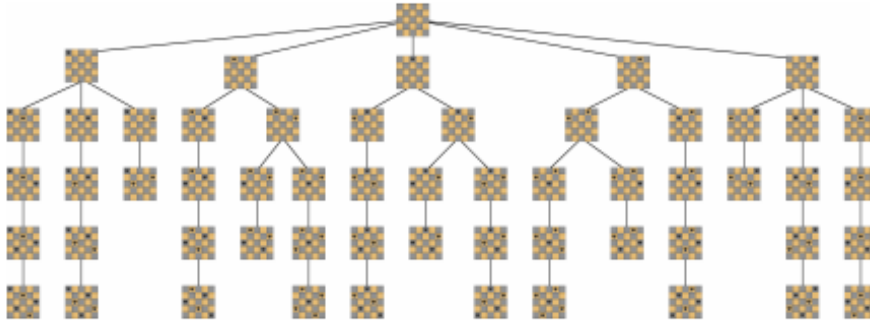
3.2

```python
solution = list()

def N_Queens_new(row, n, N, board):
    if n == 0:
        return True

    for j in range(1, N+1):
        if not is_attack(row, j, board, N):
            board[row][j] = 1
            solution.append((row, j))
            if N_Queens_new(row+1, n-1, N, board):
                if n == N:
                    return solution
                else:
                    return True

            board[row][j] = 0
            solution.remove((row, j))

    return False

def is_attack(i, j, board, N):
```

```
for k in range(1, i):
    if board[k][j]==1:
        return True
k = i−1
l = j−1
while k >= 1 and l >= 1:
    if board[k][l]==1:
        return True
    k = k−1
    l = l−1
k = i−1
l = j+1
while k >= 1 and l <= N:
    if board[k][l]==1:
        return True
    k = k−1
    l = l+1

return False
```