3.4.5 · 3.4 A* Find Path

Example: BestFirst/A* to Find a Path from *Arad* to *Bucharest*

f(n) : estimated total cost of path through *n* to goal (Whole Life)

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

$h(n)$ = straight-line distance from *n* to **Bucharest** (admissible *h*)

$g(n)$ = distance from **Arad** to *n*   via the given route/branch

SLD from *a* to *b*

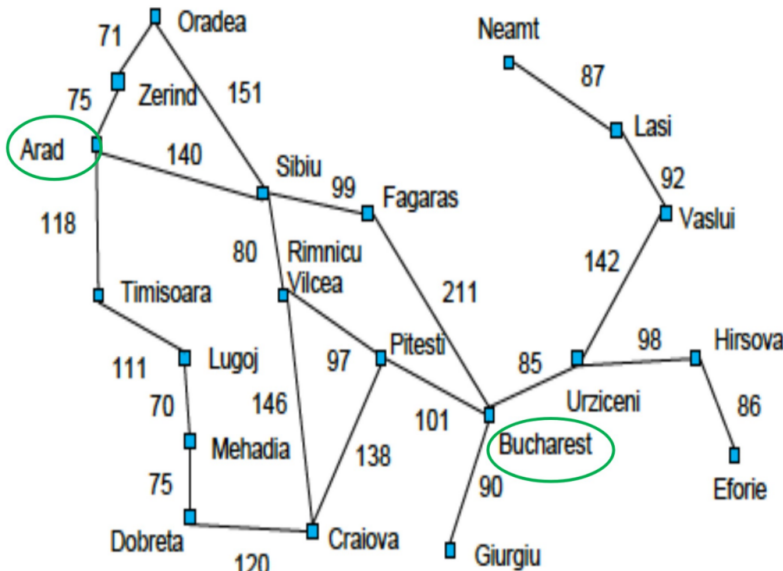| Straight–line distance to Bucharest	
Arad	366
Bucharest	0
Craiova	160
Dobreta	242
Eforie	161
Fagaras	176
Giurgiu	77
Hirsova	151
Iasi	226
Lugoj	244
Mehadia	241
Neamt	234
Oradea	380
Pitesti	100
Rimnicu Vilcea	193
Sibiu	253
Timisoara	329
Urziceni	80
Vaslui	199
Zerind	374

Fig.3.2 A Simplified road map of part of Romania
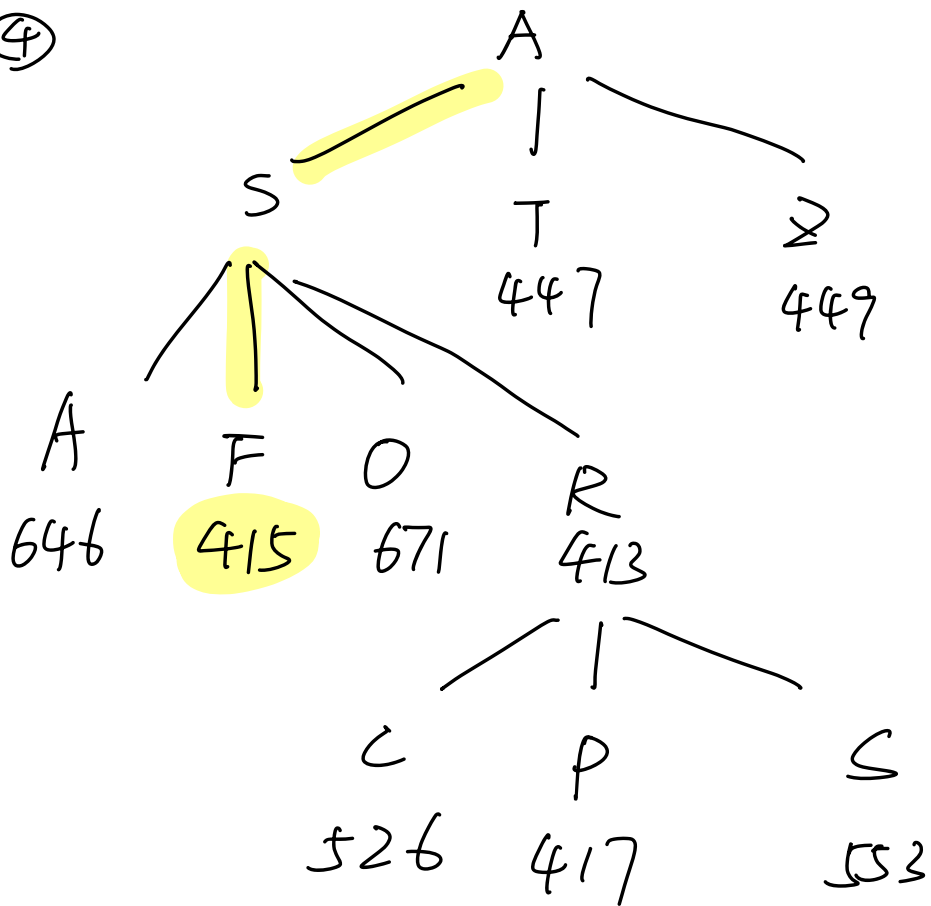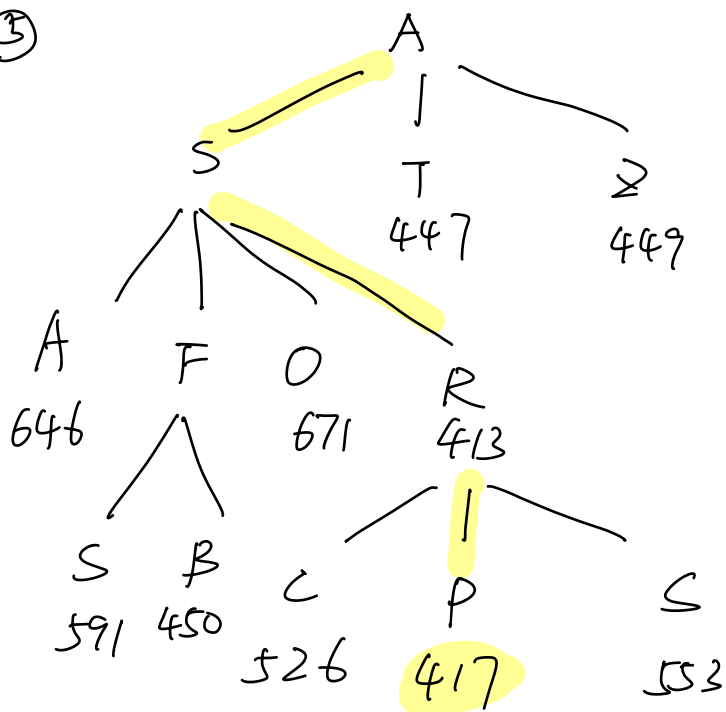
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Solution

①   A
0+366=366

②   A

S   T   Z   75+374=449

140+253=393   118+329=447

③

A

S   J

T   Z
447   449

A   F   O   R
646   415   671   413

④

A

S   J

T   Z
447   449

A   F   O   R
646   415   671   413

C   P   S
526   417   553

⑤

A
├─ S
│ ├─ A 646
│ ├─ F
│ │ ├─ S 591
│ │ └─ B 450
│ ├─ O 671
│ └─ R 413
│   ├─ C 526
│   ├─ I
│   │ └─ P (417)
│   └─ S 553
├─ T 447
└─ Z 449

⑥

A
├─ S
│ ├─ A 646
│ ├─ F
│ │ ├─ S 591
│ │ └─ B 450
│ ├─ O 671
│ └─ R 413
│   ├─ C 526
│   ├─ I
│   │ └─ P
│   │   ├─ B (418)
│   │   ├─ C 615
│   │   └─ R 607
│   └─ S 553
├─ T 447
└─ Z 449
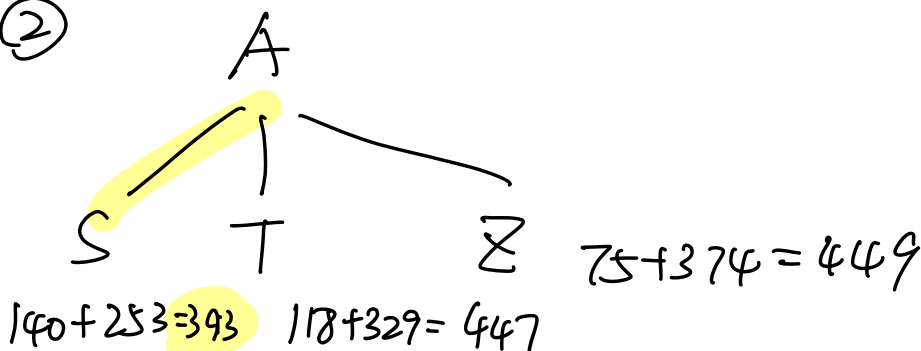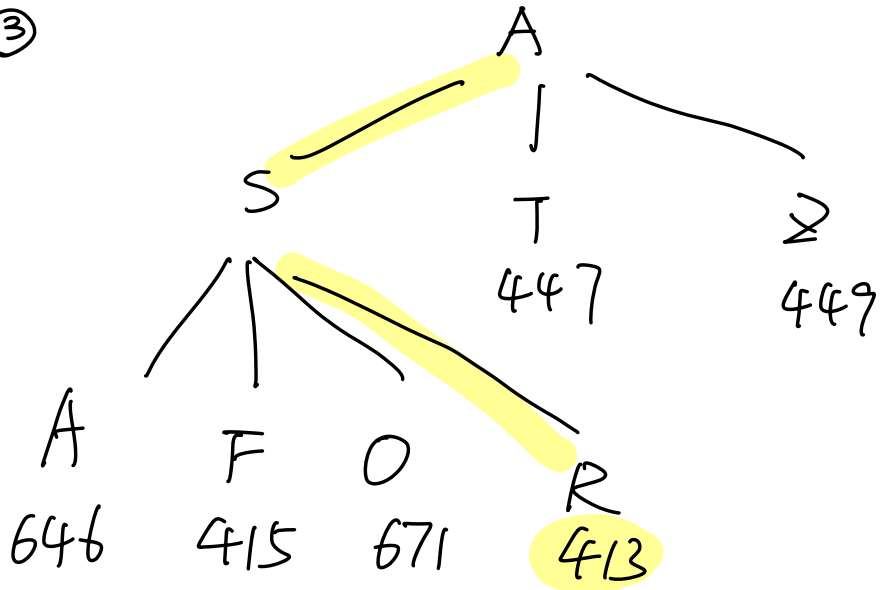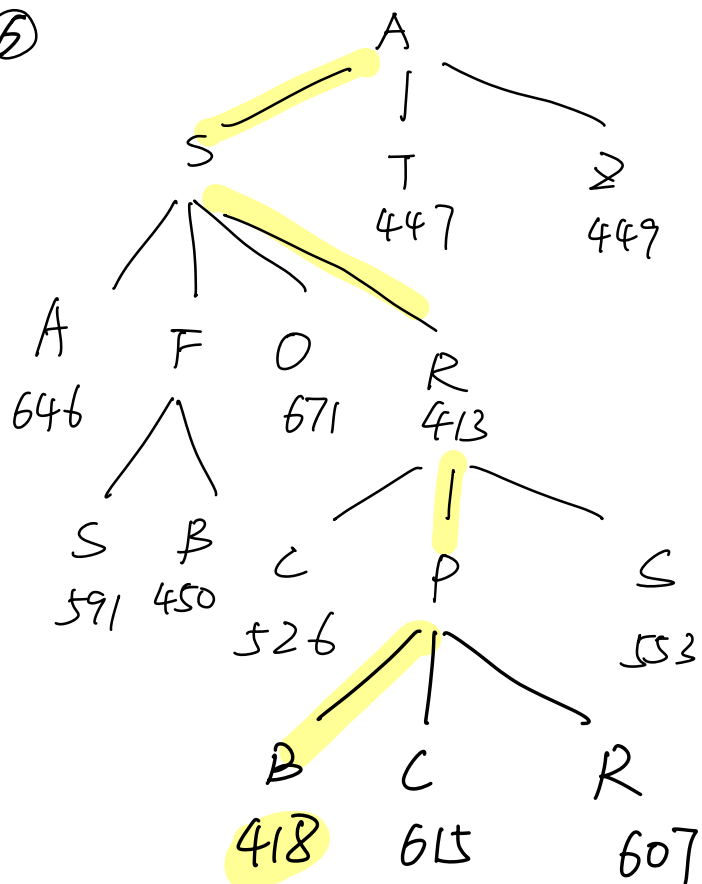
⑦ Total   A → S → R → P → B

= 140 + 80 + 97 + 101

= 418

Greedy BF = 450

So A* is better Answer