Foundation for Advancement of Science & Technology

Assignment 1
Artificial Intelligence

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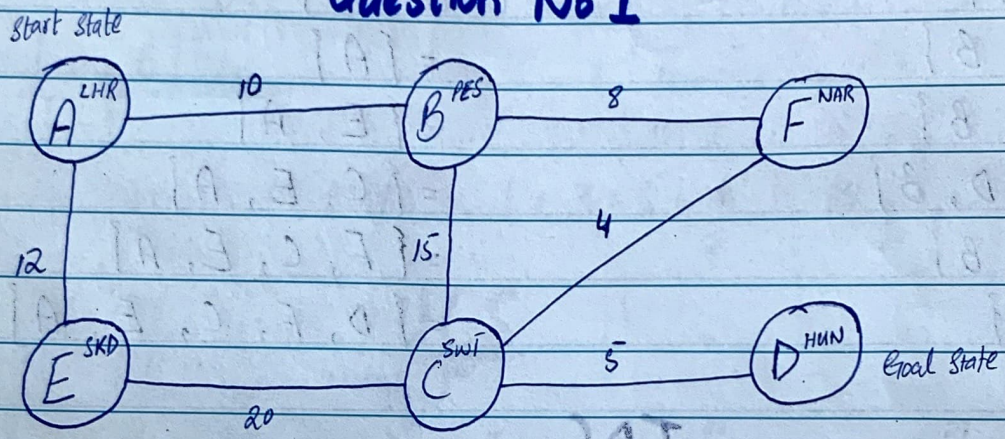
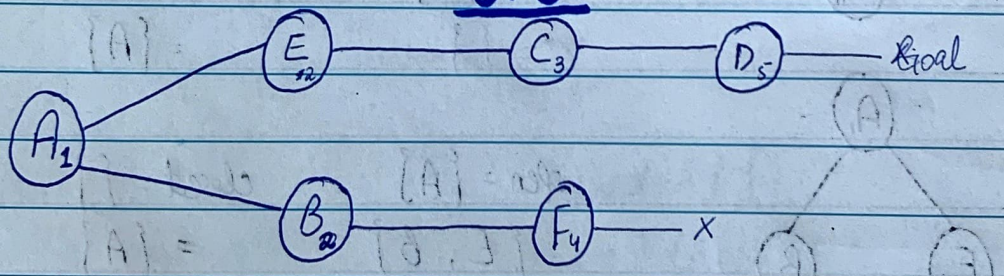
Section : 6H **Batch :** 21 (CS)

Question No 1



BFS



open = {A}
= {E, B}
= {B, C}
= {C, F}
= {F, D}
= {D}
= { }

closed = { }
= {A}
= {E, A}
= {B, E, A}
= {C, B, E, A}
= {F, C, B, E, A}
= {D, F, C, B, E, A}

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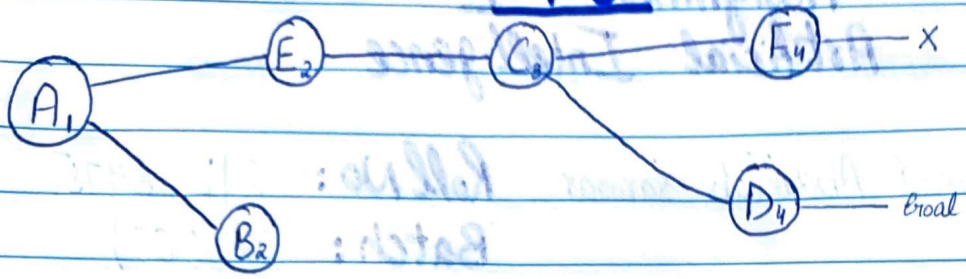
DFS



open = { A }
= { E, B }
= { C, B }
= { F, D, B }
= { D, B }
= { B }

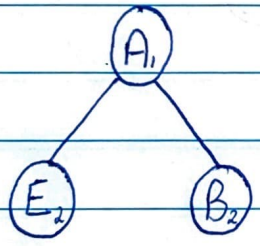
closed = { }
= { A }
= { E, A }
= { C, E, A }
= { F, C, E, A }
= { D, F, C, E, A }

IDS

Level 0: 

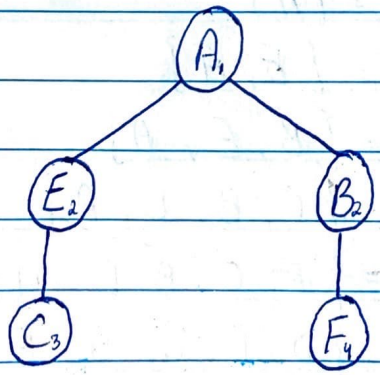
open = { A }
= { }

closed = { }
= { A }

Level 1: 

open = { A }
= { E, B }
= { B }
= { }

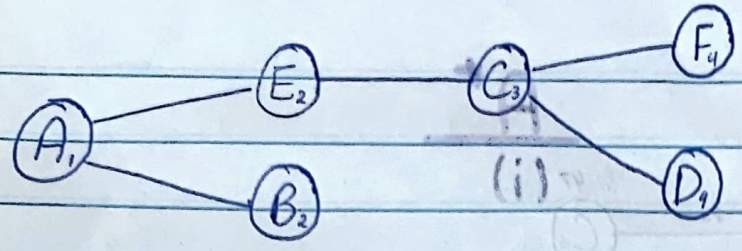
closed = { }
= { A }
= { E, A }
= { B, E, A }

Level 2: 

open = { A }
= { E, B }
= { C, B }
= { B }
= { F }
= { }

closed = { }
= { A }
= { E, A }
= { C, E, A }
= { B, C, E, A }
= { F, B, C, E, A }

Level 3:

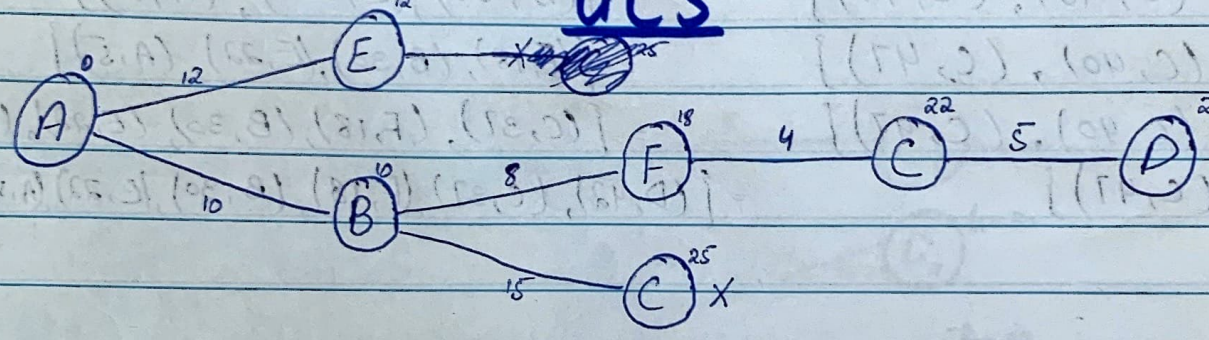


open = {A}
= {E, B}
= {C, B}
= {F, D, B}
= {D, B}
= {B}

closed = { }
= {A}
= {E, A}
= {C, E, A}
= {F, C, E, A}
= {D, F, C, E, A}

Total Visited Nodes = 1 + 3 + 5 + 5 = ~~15~~ 14

UCS



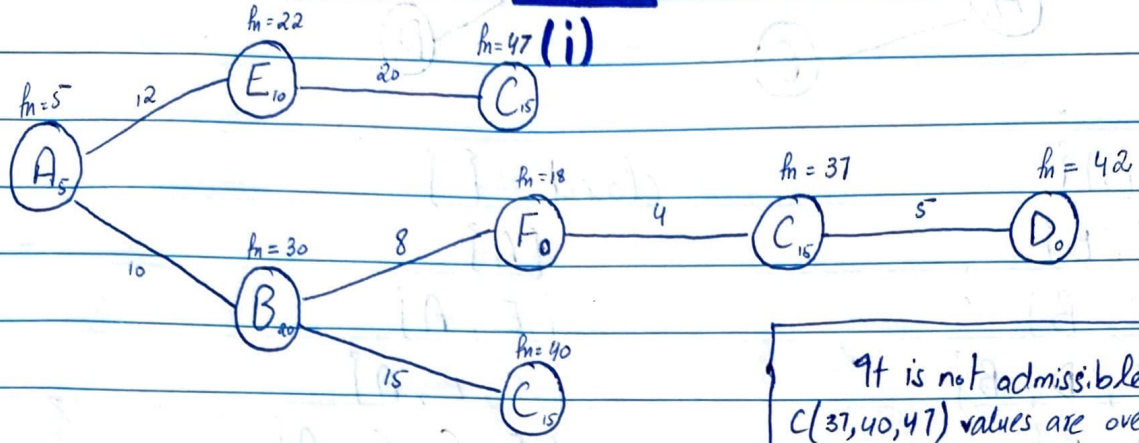
open = {A, 0}
= {(B, 10), (E, 12)}
= {(E, 12), (F, 18), (C, 25)}
= {(F, 18), (C, 25)}
= {(C, 22)}
= {(D, 27)}
= { }

(ii)

closed = { }
= {(A, 0)}
= {(B, 10), (A, 0)}
= {(E, 12), (B, 10), (A, 0)}
= {(F, 18), (E, 12), (B, 10), (A, 0)}
= {(C, 22), (F, 18), (E, 12), (B, 10), (A, 0)}
= {(D, 27), (C, 22), (F, 18), (E, 12), (B, 10), (A, 0)}

A*

(i)

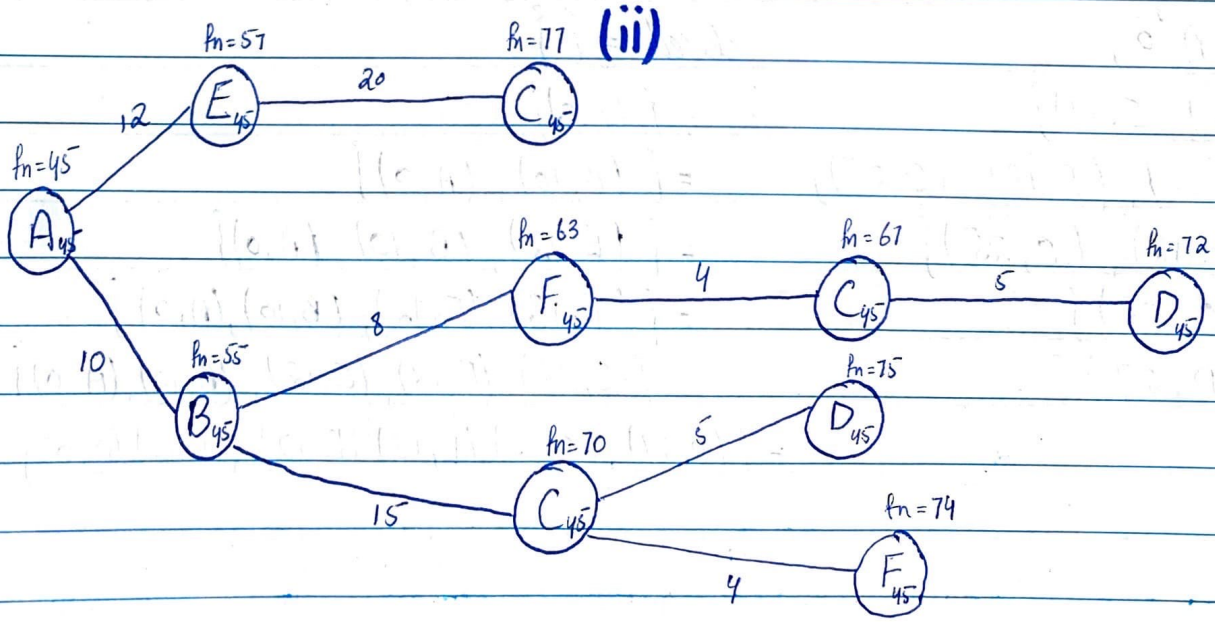


It is not admissible as for C(37,40,47) values are overestimating, it ~~should be ≤ to optimal~~.

open = { A }
= { (E, 22), (B, 30) }
= { (B, 30), (C, 47) }
= { (F, 18), (C, 40), (C, 47) }
= { (C, 37), (C, 40), (C, 47) }
= { (D, 42), (C, 40), (C, 47) }
= { (C, 40), (C, 47) }

closed = { }
= { (A, 5) }
= { (E, 22), (A, 5) }
= { (B, 30), (E, 22), (A, 5) }
= { (F, 18), (B, 30), (E, 22), (A, 5) }
= { (C, 37), (F, 18), (B, 30), (E, 22), (A, 5) }
= { (D, 42), (C, 37), (F, 18), (B, 30), (E, 22), (A, 5) }

(ii)



open = {(A,45)} closed = {}

= {(B,55), (E,57)} = {(A,45)}

= {(E,57), (F,63), (C,70)} = {(B,55), (A,45)}

= {(F,63), (C,70), (C,77)} = {(E,57), (B,55), (A,45)}

= {(C,67), (C,70), (C,77)} = {(F,63), (E,57), (B,55), (A,45)}

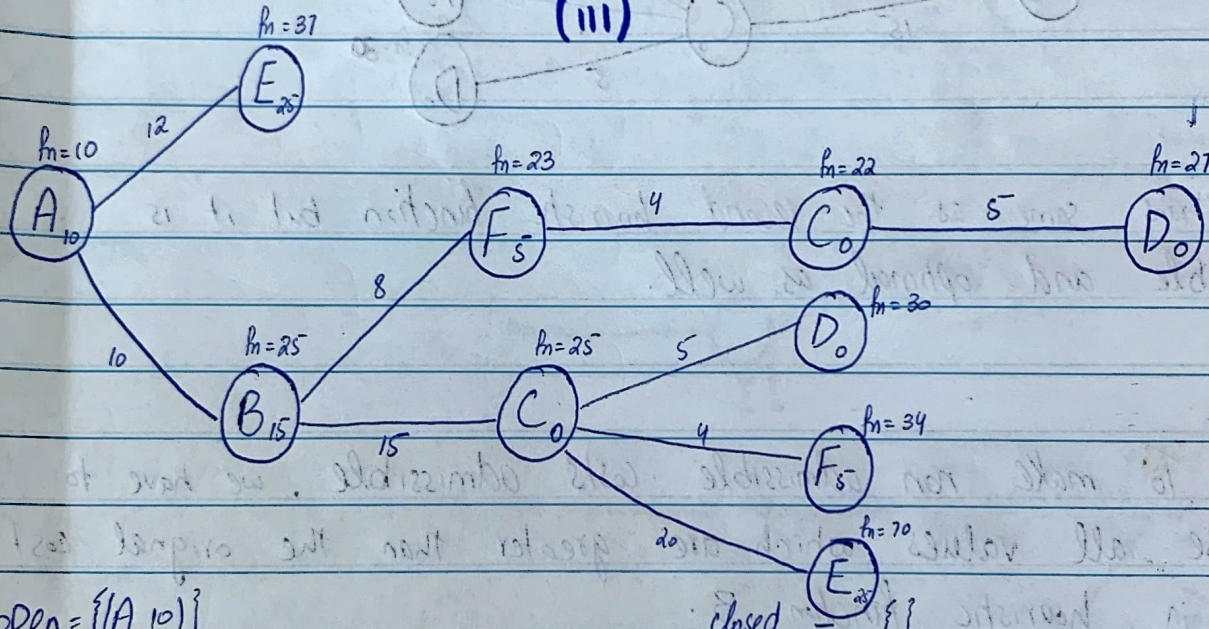
= {(C,70), (D,72), (C,77)} = {(C,67), (F,63), (E,57), (B,55), (A,45)}

= {(D,72), (F,74), (D,75), (C,77)} = {(C,70) (C,67), (F,63), (E,57), (B,55) (A,45)}

= {(F,74), (D,75), (C,77)} = {(D,72), (C,70), (C,67), (F,63), (E,57), (B,55), (A,45)}

* is not admissible as it voilate the condition (estimation ≤ actual)

(iii)



open = {(A,10)} closed = {}

= {(B,15), (E,37)} = {(A,10)}

= {(F,23), (C,25), (E,37)} = {(B,15), (A,10)}

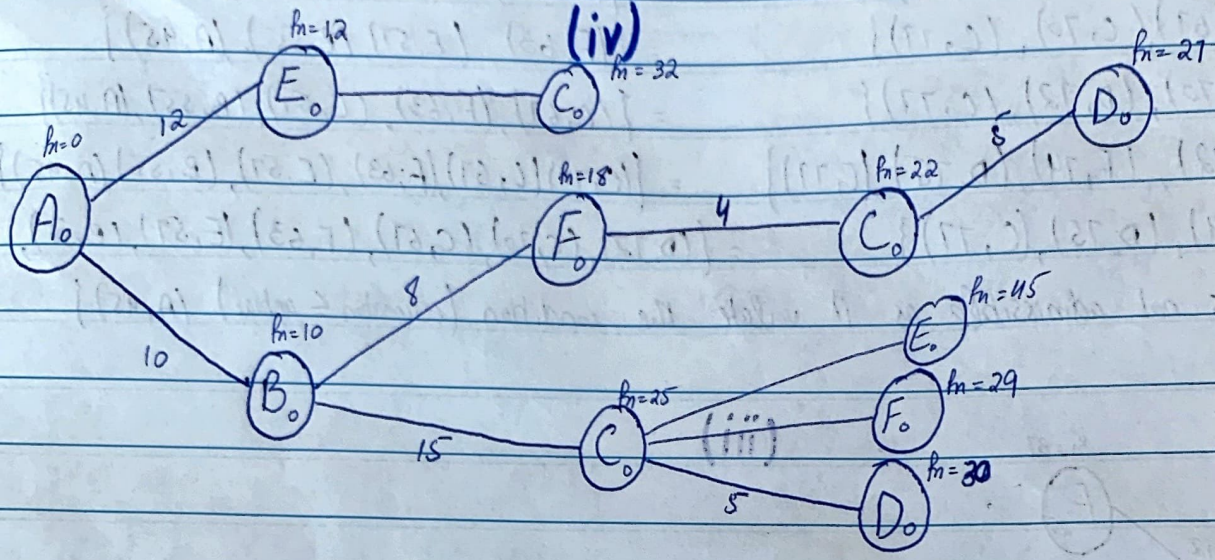
= {(C,22), (C,25), (E,37)} = {(F,23), (B,15), (A,10)}

= {(C,25), (D,27), (E,37)} = {(C,22), (F,23), (B,15), (A,10)}

= {(D,27), (D,30), (F,34), (E,70)} = {(C,25), (F,23), (B,15), (A,10)}

(D,27) "

It is admissible as all the values of h(n) is ≤ orignal path cost.



It runs same as the second houristic function but it is admissible and optimal as well.

note: To make non admissible costs admissible, we have to decrease all values which are greater than the orignal cost as in houristic function 3.

Question 2

Initializing
$\alpha = -\infty$
$\beta = \infty$

Max → α Min → β
If ($\alpha \geq \beta$) → Prune Branch