Uniform Cost Search Overview

- Paths in the State Space ordered by cost

Path	Cost
<S>	0
<S, a>	1.0
<S,b>	1.0
<S,a,c>	1.5
<S,d>	2.0
…	…

Note cost is non-decreasing

Uniform Cost Search Overview

- Uniform Cost Search expands paths in non-decreasing order of cost. So it only goes down this list.
  LEMMA 1

- It does not miss any paths on this list. LEMMA 2

Path	Cost
<S>	0
<S, a>	1.0
<S,a,b>	1.0
<S,a,b,c>	3.0
<S,a,b,d,e>	4.0
…	…

Uniform Cost Search Overview

It does not miss any paths on this list. LEMMA 2

Path	Cost
<S>	0
<S, a>	1.0
<S,a,b>	1.0
<S,a,b,c>	3.0
<S,a,b,d,e>	4.0
…	…

- If <S,a,b,d,e> is expanded next, <S,a,b,c> must already been expanded. If not it or <S,a,b,c> or <S,a,b> or <S,a> or <S> must be available for expansion (on OPEN) and would be expanded next as they all have lower cost than <S,a,b,d,e>

Uniform Cost Search Overview

Thus working its way down such a list of paths in this order the first path achieving the goal that Uniform cost search finds will be the cheapest way of achieving the goal.