If we use Best First search with \( f(n) = g(n) + h(n) \),
where
- \( g(n) \) is the cost from the start to \( n \), and
- \( h(n) \) is an estimated cost to get from \( n \) to goal

we call it "Algorithm A".

We will look at four different sets of estimation of \( h(n) \).

- a) Optimistic, but not monotone
- b) Not optimistic (and therefore not monotone)
- c) All estimates equal to zero (monotone, and therefore optimistic)
- d) All estimates are perfect (monotone, and therefore optimistic)

We will use the following problem graph

The distances in the picture are the real distances between the nodes.
a) Optimistic, but not monotone

The estimated remaining distances to the goal, G are:

From A 16 (Irrelevant)  From D 2
From B 4  From E 1
From C 16  From F 4

The estimations are optimistic, so we know that the found path is the best.
The heuristic function, h, is not monotone, however.  h(C) = 16, h(B) = 4, and cost(C,B) = 4, so |h(C) - h(B)| > cost(C,B). Therefore we had the first occurrence of node B, which was later replaced by a better B.
b) Not optimistic (and therefore not monotone)

If we replace the estimated distance from F to G with 8 we get:

From A 16 (Irrelevant) From D 2
From B 4 From E 1
From C 16 From F 8

Now we have G24 as the current state, so we stop the search. We have found a solution according to method A, but this is not the best one. The big estimate of F hid the best solution.
c) All estimates equal to zero (monotone, and therefore optimistic)

This is a kind of breadth first search. We will find the best path, but it might take time. When we find a node, it is via the best path.
d) All estimates are perfect (monotone, and therefore optimistic)

The real distances are:

- From A: 22 (Irrelevant)
- From B: 14
- From C: 18
- From D: 8
- From E: 14
- From F: 4

Now we have G22 as the current state, so we stop the search. We have found the best path in shortest possible time. All nodes we visit have the same f-value.

All h-values are greater than the corresponding h-value in c) (which are all zero), so d) is more informed than c).