Question 3
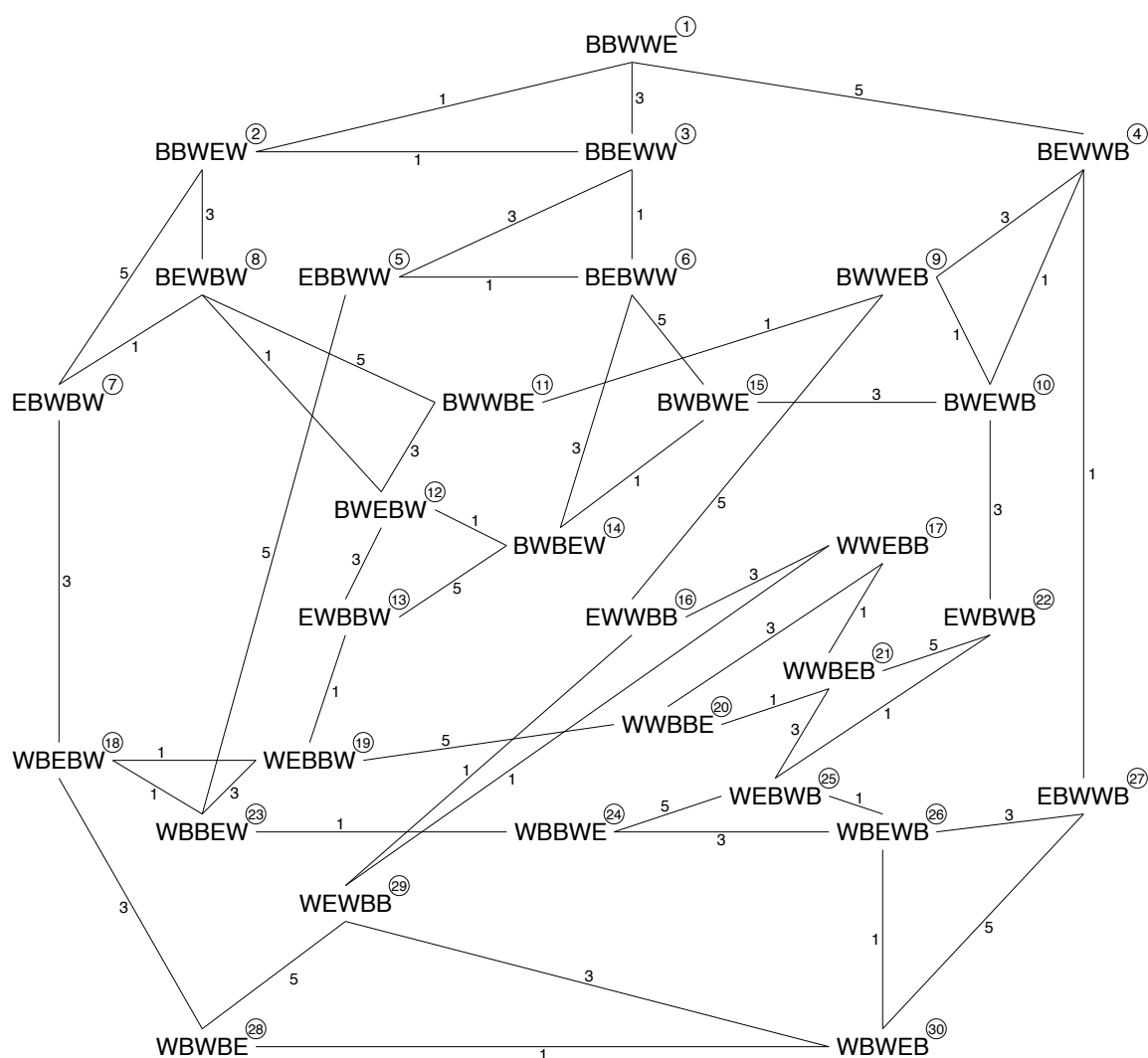
Consider a puzzle whose complete move graph (each node represents a configuration of the puzzle, each edge represents a move) is given in the diagram on the following page. The initial configuration is **Node 20** (WWBBE). **Note that this node is near the centre of the graph.**

The puzzle has a cost associated with each move (1, 3, or 5) and these costs are indicated on the edges. The goal of the puzzle is to reach one of **Nodes 4, 9, 10, 11, or 27**.

Give the search tree produced by an A* search which uses multipath pruning. Since this tree grows dynamically, you should annotate the tree with f-values used and any other comments such as indicating the order that nodes are taken from the priority queue and the reason for pruning.

BBWWE ①

BBWEW ②   BBEWW ③   BEWWB ④

BEWBW ⑧   EBBWW ⑤   BEBWW ⑥   BWWEB ⑨   BWEWB ⑩

EBWBW ⑦   BWWBE ⑪   BWBWE ⑮

BWEBW ⑫

BWBEW ⑭

EWBBW ⑬   EWWBB ⑯   WWEBB ⑰   EWBWB ㉒

WWBEB ㉑

WWBBE ⑳

WBEBW ⑱   WEBBW ⑲   WEBWB ㉕   EBWWB ㉗

WBBEW ㉓   WBBWE ㉔   WBEWB ㉖

WEWBB ㉙

WBWBE ㉘   WBWEB ㉚

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The h-values for each node are given in the following table.

Node	h	Node	h	Node	h
1	5	11	0	21	5
2	5	12	3	22	3
3	5	13	5	23	5
4	0	14	3	24	5
5	5	15	3	25	3
6	5	16	5	26	3
7	3	17	5	27	0
8	3	18	5	28	3
9	0	19	5	29	5
10	0	20	5	30	3