#3 Assignment - CMPT 405

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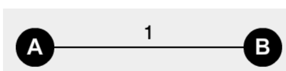
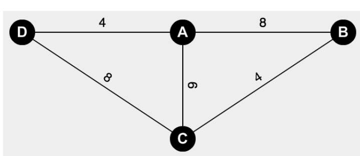
#1a)
Let G_1 be a graph with two vertices A and B and an edge (A, B) with weight 1. For every shortest path tree T_v, $v \in V$, T_v is also a MST (it is easy to see, as there is only one tree). See the image below:



#1b)
Let G_2 be a graph with vertices A, B, C and D and edges $(A, B), (A, D), (A, C), (B, C)$ and (C, D), with weights $8, 4, 6, 4$ and 8, respectively. Then, no shortest path tree T_v given by Dijkstra's algorithm is a MST.



MST $= (A, C), (A, D), (B, C)$
$T_a = (A, B), (A, C), (A, D)$
$T_b = (A, B), (A, D), (B, C)$
$T_c = (A, C), (B, C), (C, D)$
$T_d = (A, B), (A, D), (C, D)$

References