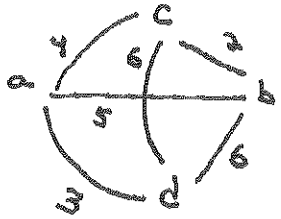
Graph G is

1) undirected
2) weighted
3) complete
4) satisfies the triangle inequality $\forall_{u,v,w}\ c(u,w) \leq c(u,v) + c(v,w)$



TSP solved by trying all permutations

$a\ ^{5}\ b\ ^{2}\ c\ ^{6}\ d\ ^{3}\ a$ 16

$a\ ^{4}\ c\ ^{2}\ b\ ^{6}\ d\ ^{3}\ a$ 15

⋮

$|V-1|! = 3! = 6$

MST (Prim)

Pre order walk

$a\ ^{4}\ c\ ^{2}\ b\ ^{6}\ d\ ^{3}\ a$ 15

$a\ ^{3}\ d\ ^{6}\ c\ ^{2}\ b\ ^{5}\ a$ 16

Cost of Pre order walk no more than twice cost of optimal tour.

Let $c(T)$ be the cost of an MST and $c(H^*)$ be the cost of an optimal tour.

$c(T) \leq c(H^*)$

A full walk lists vertices when first ~~and when subtree~~ visited and then again when recursion unwinds.

$W = a\ ^{4}\ c\ ^{2}\ b\ ^{2}\ c\ ^{4}\ a\ ^{3}\ d\ ^{3}\ a$ $\quad c(W) = 2c(T)$

$18 = 2 \cdot 9$

$c(W) = 2c(T) \leq 2c(H^*)$

W is not a tour.

By the triangle inequality, remove all but first visit.

$H = a\ c\ b\ d$

$c(H) \leq 2c(H^*)$