Exercise Sheet 10
## COMP6741: Parameterized and Exact Computation

2016, Semester 2

1. Show that the algorithm solving COMP-FVS from the lecture notes has running time $O^*(4^k)$.

2. A *cluster graph* is a graph where every connected component is a complete graph.

<div>

CLUSTER VERTEX DELETION

Input:	Graph $G = (V, E)$, integer k
Parameter:	k
Question:	Is there a set of vertices $S \subseteq V$ with $|S| \leq k$ such that $G - S$ is a cluster graph?

</div>
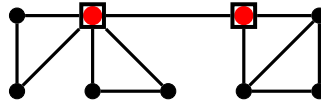
Recall that G is a cluster graph iff G contains no induced P_3.

- Design an $O^*(2^k)$ time algorithm for CLUSTER VERTEX DELETION.

Hints
(1) Show that the disjoint version of the problem can be solved in polynomial time: given $(G = (V, E), S, k)$ such that $|S| = k + 1$ and $G - S$ is a cluster graph, find a $S^* \subseteq V \setminus S$ with $|S^*| \leq k$ such that $G - S^*$ is a cluster graph.
(2) Simplification rule for $v \in V \setminus S$ inducing a P_3 with 2 vertices in S. Reduce to maximum weight matching.