

Solutions to AS. 1

cs141, Fall 2000

Part I. :

From textbook: Intro to Algorithms, Cormen, Rivest et al.

1. Ex. 5.4-1

1 Method: Induction on the number of edges

~~Base~~ For a graph of n edges it holds: $\sum d(u) = 2|E|$

- 1. Base: For $n=0$, it holds trivially
- 2. Hypothesis: It holds for $n=k$: for $G_k(V_k, E_k)$.
- 3. Prove for: $n=k+1$ $G_{k+1}(V_{k+1}, E_{k+1})$.

Argument 1 edge will increase by one the degree of two nodes.

$$\sum_{G_{k+1}} d(u) = \sum_{G_k} d(u) + 2$$

$$E_{k+1} = k+1, \quad E_k = k.$$

2 Method: with just the argument that 1 edge \rightarrow is counted twice in the degree of the nodes.

DISCLAIMER:

This is provided for your convenience.
 Keep a critical mind, as some (hopefully minor) errors may exist.

ALSO, there are usually more than one way to solve these