

Subset Sum

instance: positive integers a_1, \dots, a_n, t

Question: is there some subset that sums to t ?

Partition

instance: positive integers a_1, \dots, a_n

Question: is there a subset which sums to half of total sum?

eg $\sum a_i = 100, t = 70.$



$(t > \frac{1}{2} \text{ sum})$

$a_1, \dots, a_n, 40$ (add a number $r = 2t - \sum a_i$)

if $t < \frac{1}{2} \text{ sum}$, add $r = \sum a_i - 2t$.

(padding)

Hamiltonian Circuit

instance undirected graph $G = (V, E)$

Question Does G have a hamiltonian circuit (i.e. an ordering v_0, v_1, \dots, v_{n-1} s.t. $\forall i \in \{0, \dots, n-1\}, (v_i, v_{(i+1) \bmod n}) \in E$.

HC is NP-complete: $VC \in_P HC$. and $HC \in NP$ obviously

PF $G = (V, E), k$ \Rightarrow
is there a VC of size k ?