Chapter 14

14.1 How many solutions are possible for a 4-Queen problem?

***Solution*:**

There are 4! possibilities. But when constraints are imposed, the possibilities are reduced.

One possible solution is

		Q	
Q			
			Q
	Q		

14.2 Find the sum of subsets for the following set of integers

[5 10 25 50 100] for $w = 75$.

***Solution*:**

Some of the possible solutions are

[25 50]

14.3 Find the sum of subsets for the following set of integers.

[1 2 3 5 6 7 8 9 10] for $w = 8$.

***Solution*:**

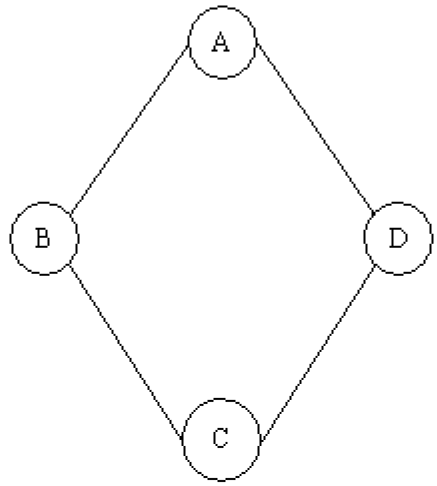
Some of the possible solutions are

[3 5]

[6 2]

[7 1]

14.4 Colour the following graph.

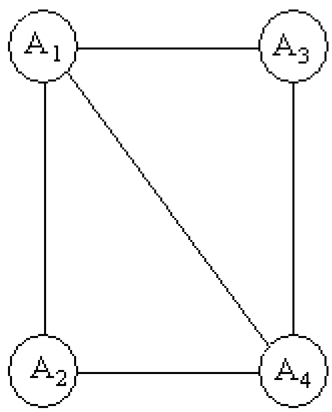


***Solution*:**

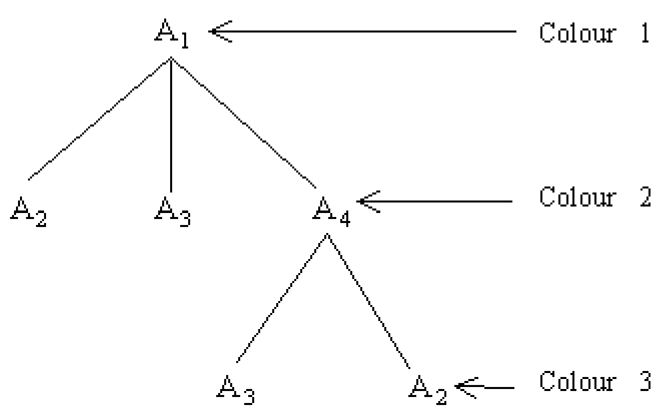
All nodes can be coloured uniquely. In that case, four coloured are required.

The optimal colours would be 2.

14.5 Colour the following graph using vertex colouring algorithm. What is the minimum colours required.



***Solution*:**



∴ Minimum three colours are required.

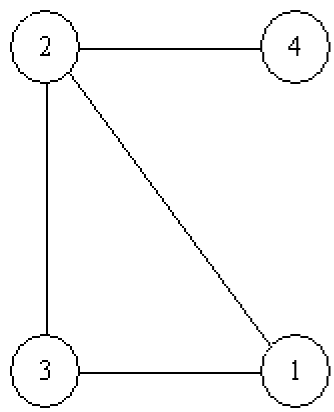
14.6 What is the minimum numbers of coloured required to colour this bipartite graph. Justify the answer.

***Solution*:**

The graph involved is bipartite graph. So two colours are required.

Any bipartite graph can be coloured with only two colours.

14.7 Show that the following graph, assuming that the initial vertex is 1, has no Hamiltonian cycle but only Hamiltonian path.



Solution:

The Hamiltonian path is 1 — 3 — 2 — 4. There is no cycle as node ‘2’ is repeated twice. Therefore, there is no Hamiltonian cycle.

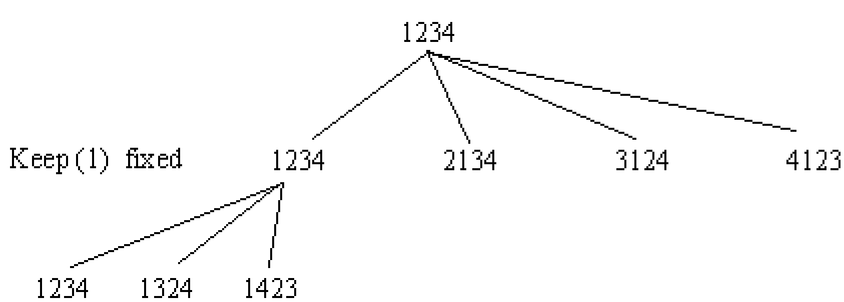
14.8 Does the following graph have a Hamiltonian Cycle. Justify the answer.

Solution:

The graph is a complete graph. Therefore, the Hamiltonian cycle exists.

14.9 Generate a permutation tree for the following sequence.

a) 1234



Generating like this, one get permutation as

1234	2134	3124	4123
1243	2143	3142	4132
1324	2413	3214	4312
1432	2431	3241	4321
1423	2314	3412	4231
1342	2341	3421	4213

There would be $4! = 4\times3\times2\times1$

$= 24$

b) ABCD

By replacing 1 with A, 2 with B, 3 with C, 4 with D, one can get 24 combinations

Again there would be 4! = 24 Combinations.