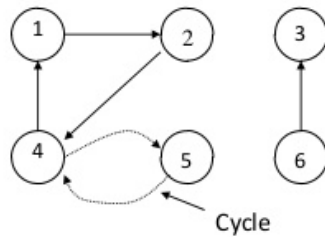


Cycle

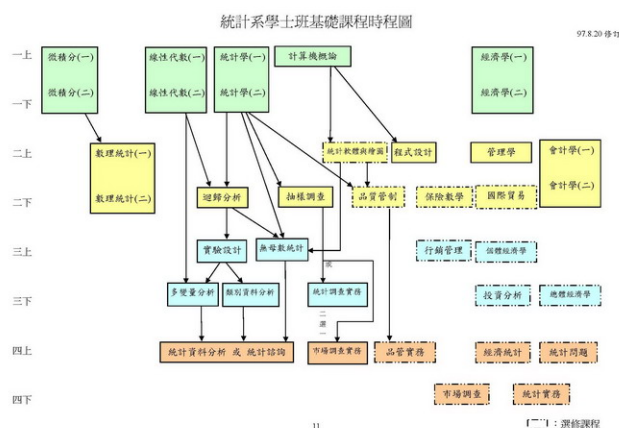
- A path from a vertex to itself is called a **cycle**.
- A graph is called **cyclic** if it contains a cycle;
– otherwise it is called **acyclic**



1. Directed Acyclic Cycle :

example : 大學課程地圖，修完一門課程後往接續的課程邁進，但修過的課程不會被再次修到。

measure technique : 可以在不同系網站得到



2. Cyclic directed network :

example : 中醫五行圖

empirical technique : 經由病人五行的狀況得到資料，利用資料去維持五行的平衡



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3. A tree

example : 生物演化圖

empirical technique : 生命科學實驗室透過基因資料判斷演化圖與分支依據

4. A planar network

example : 北京環狀都市規劃圖

empirical technique : measure everyday flows of commuters in the city of 北京 and find out how different cities connect.

5. A bipartite network

example : shopping items and stores

you may want to get a loaf of bread, milk, a T-shirt, a music album, and a chocolate bar. Bread , milk , and chocolate bar may be found in 7-11. All of the items may be found in Target. Music album itself may be found in a music store. T-shirt are sold in a shop...etc.

empirical technique: from data collected by Walmart and Target ... , we can look through the data and manage the placement of the items in the store.

6. A temporal network

example : a network of real life friendship

empirical technique : We can observe the interaction of different groups of students regularly.

①

A	1	2	3	4	5
1	0	0	0	0	1
2	1	0	1	1	0
3	0	0	0	0	0
4	0	1	1	0	1
5	0	0	0	1	0

②

A

1 → {5}

2 → {1, 3, 4}

3 → { }

4 → {2, 3, 5}

5 → {4}

③

A	1	2	3	4	5
1	0	1	1	0	0
2	1	0	1	0	0
3	1	1	0	1	0
4	0	0	1	0	1
5	0	0	0	1	0

B	1	2	3	4	5	6
1	0	1	1	1	0	0
2	1	0	0	0	0	0
3	1	0	0	1	1	1
4	1	0	1	0	0	0
5	0	0	1	0	0	1
6	0	0	1	0	1	0

④

	1	2	3	4	5	6	a	b
a	1	1	1	0	0	0	0	1
b	0	1	1	1	1	1	1	0

$A = [1, 1, 1, 0, 0, 0, 0, 0]$

$B = [0, 1, 1, 1, 1, 1, 0, 0]$

$\frac{a \cdot b}{\|a\| \|b\|} = \frac{2}{\sqrt{20}} = 0.4471 = \text{cosine similarity of } a \text{ and } b$

Collabs: 池富湧 & 2 TAs