Games and Models

遊戲與模型

Games (玩物喪志? 玩物養智!)

- Games are structured, voluntary activities undertaken for **entertainment**, **learning**, or **competition**, characterized by **goals, rules, and player interactions**.
- They range from **physical sports** and **board games** to **digital video games**, often requiring **problem-solving** and **decision-making (解題與決策)**.
- Games serve as unique forms of **communication** and **interaction (溝通與互動)**.

Mathematics

- Mathematics is about **Proof (證明)**
- 言 登 日 月
- **Different Proof Strategies**

- **Direct Method**
- **Proof by Contrapositive**
- **Proof by Contradiction**
- **Mathematical Induction**

Question: Let N be a positive integer. If N is even then 3N+1 is odd. [P => Q]

Direct Method

Question: Let N be a positive integer.
If N is even then 3N+1 is odd. [P => Q]

If N is a positive even integer then N=2M for some positive integer M.
We have 3N+1=3(2M)+1=6M+1.
Since 6M is a positive even integer,
3N+1=6M+1 must be a positive odd integer.

Proof by Contrapositive

Question: **Let N be a positive integer.**

If N is even then 3N+1 is odd.

[P => Q] is equivalent to [~Q => ~P]

If 3N+1 is even then 3N+1=2M for some positive integer M.

We have 3N=2M-1.

Since 2M-1 is odd and therefore 3N is odd.

Therefore, N must be odd.

Proof by Contradiction

Question: **Let N be a positive integer.**

If N is even then 3N+1 is odd. [P => Q]

We suppose Q is wrong and we hope to arrive at a contradiction.

If 3N+1 is even then 3N+1=2M for some positive integer M.

We have 3N=2M-1.

Since 2M-1 is odd and therefore 3N is odd.

Therefore, N is odd which contradicts to the fact that N is even. And 3N+1 cannot be even.

Mathematical Induction (M.I.)

Question: **Let N be a positive integer.**

If N is even then 3N+1 is odd. [P => Q]

When N=2, 3N+1=7 which is odd.

Assume: N is even, then (3N+1) is odd.

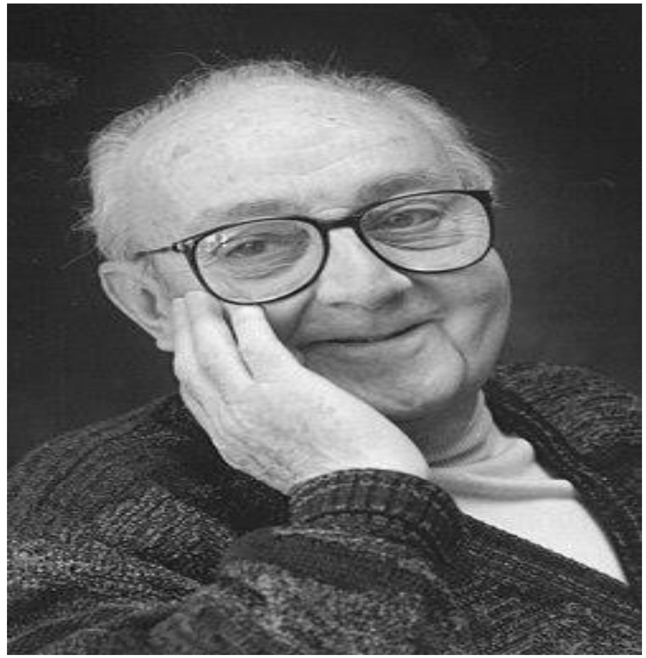
Consider the next even integer N+2, we have 3(N+2)+1=3N+7 = (3N+1) + 6 =odd number +6 which is odd.

Hence, by the principle of M.I., the statement is true for all positive even integer N.

Mathematical Models

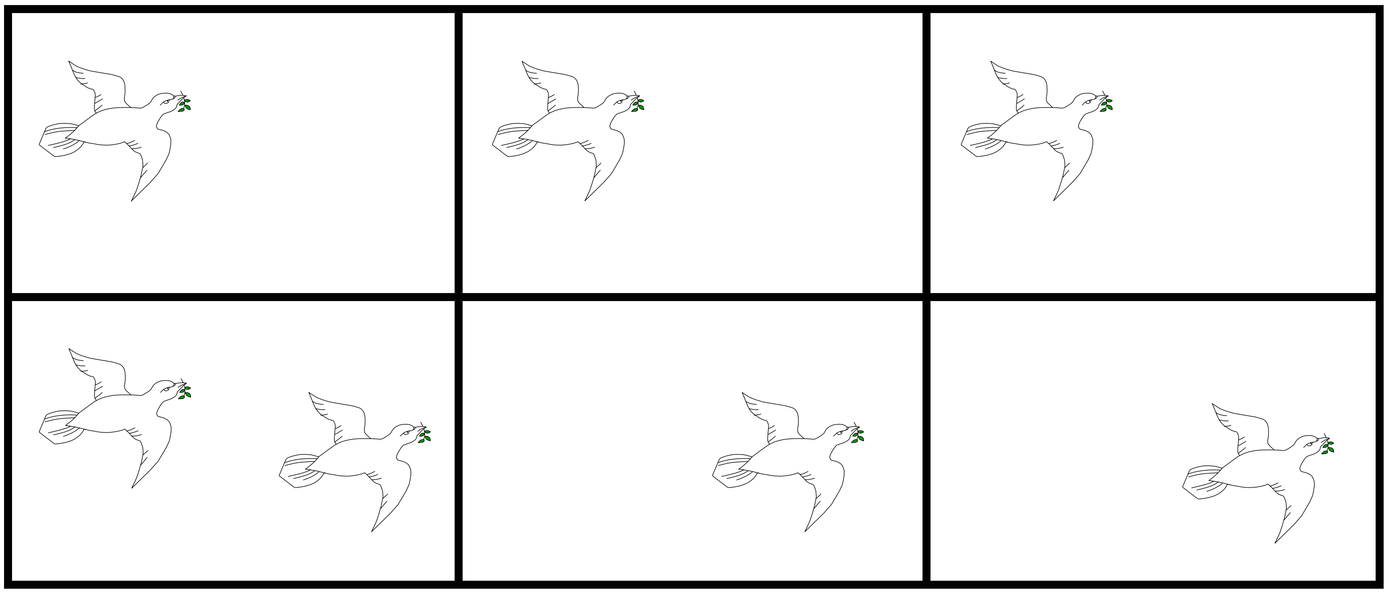
- Mathematical models are **simplified and rational representations** of real-world systems, processes, or scenarios created using **mathematical concepts** like **equations, graphs, and algorithms**, etc.
- They are used to analyze complex, messy, real-world problems such as weather forecasting, economic predictions, to **understand, explain,** and **predict** future behavior (eventually **planning** and **policy making**).

All Models are Wrong, but Some are Useful



George Box (18 October 1919 – 28 March 2013), a British Statistician.

1. Pigeonhole Principle (鴿巢原理)



Example: If 7 pigeons are to live in 6 boxes (holes), then there is at least one box containing two or more pigeons.

Matt 6:24 One man can't serve two masters.

Dirichlet (狄里克利)

The first statement of the Pigeonhole Principle is believed to have been made by the German Mathematician Dirichlet in 1834 under the name *Schubfachprinzip* (drawer principle).

Pigeonhole Principle (鴿巢原理)

If we put n+1 balls into n boxes, then at least one box must contain two or more balls. [Here n is an integer greater than 0.]

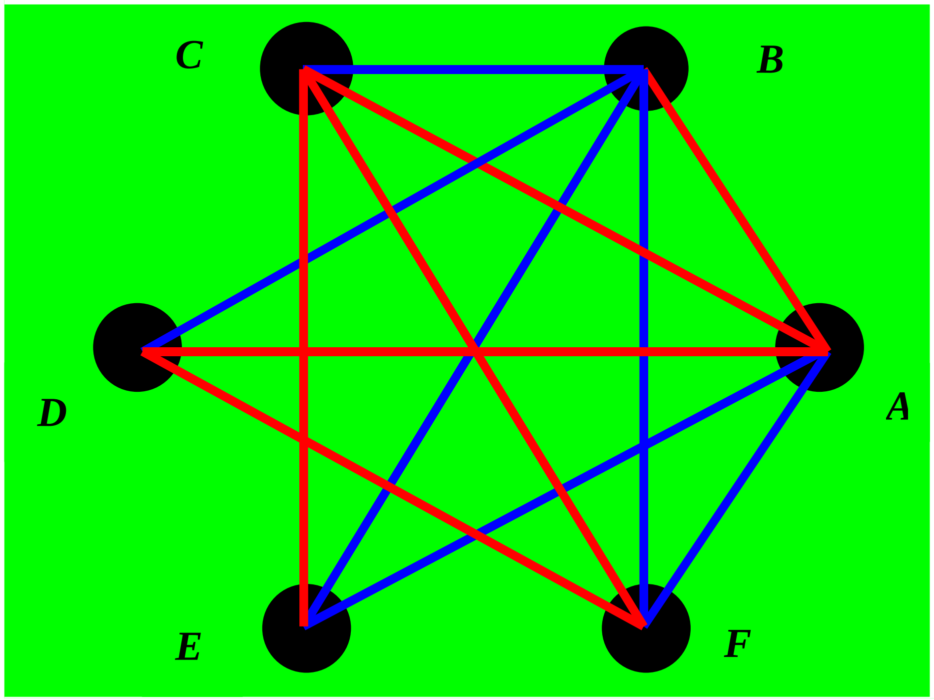
將 n+1 個球放入 n 個盒子內, 最小有一個盒子藏有2個或以上的球。

Proof of the Pigeonhole Principle

Proof by Contradiction:

Suppose the statement is **false**, i.e., when we put **all the balls** into the boxes, **all the boxes contain 1 or 0 ball**. Then, the total number of balls is **=< n < n+1**. This is a **contradiction**. Therefore, the statement must be **true**.

SIM



2. How to Play SIM (遊戲規則) ?

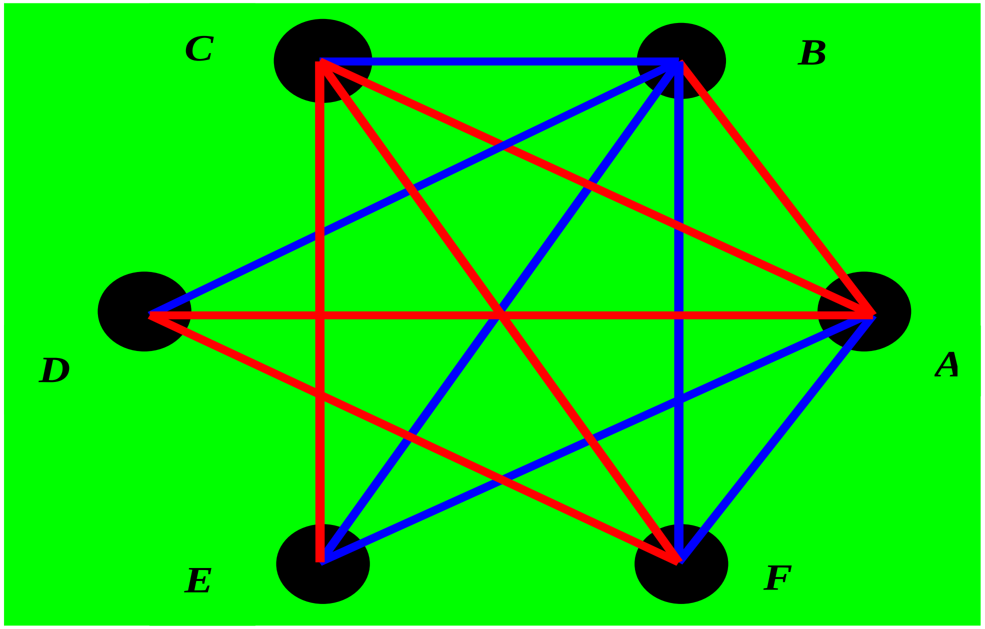
- The game board consists of **six points** in the form of a hexagon. The points are labelled as A, B, C, D, E, and F.
- **Two different coloured strings** are distributed to two players. The players take turns to join any two points with their own strings. [How many are there?]
- The aim of the game is to **avoid forming a triangle (避免三角關係) of your colour**. The points of the triangle must be three points of the hexagon A,B,C,D,E,F.

Gustavus J. Simmons

SIM is invented by well-known graph theorists and cryptographer **Gustavus J. Simmons**. Simmons described the game in his 1969 paper.

He is a "Senior Fellow for National Security Studies" at the Sandia National Laboratories, Albuquerque (NM), USA.

A Game in Progress (殘局)



In this game, both Peter (red lines) and John (blue lines) have made six moves. If Peter now chooses DE, then Paul is forced to choose either EF (and John loses by completing triangle BEF and triangle AEF) or CD (and John loses by completing triangle BCD).

A Question You May Ask

After playing this game several times, you may ask the following question.

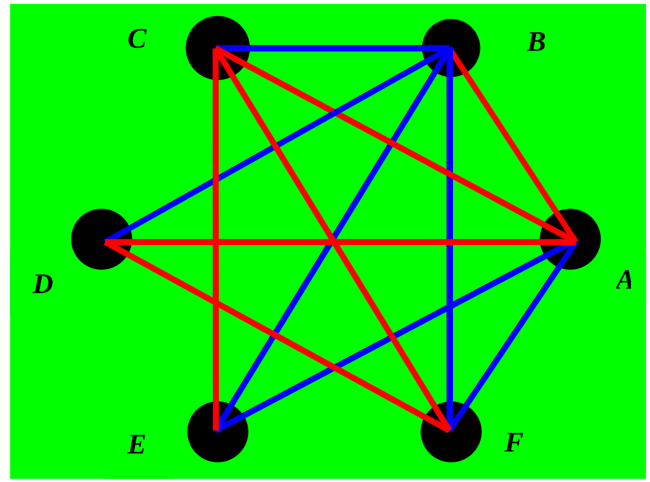
Is it possible to have a draw ? (可和否?)

The answer to this question is NO. But why?

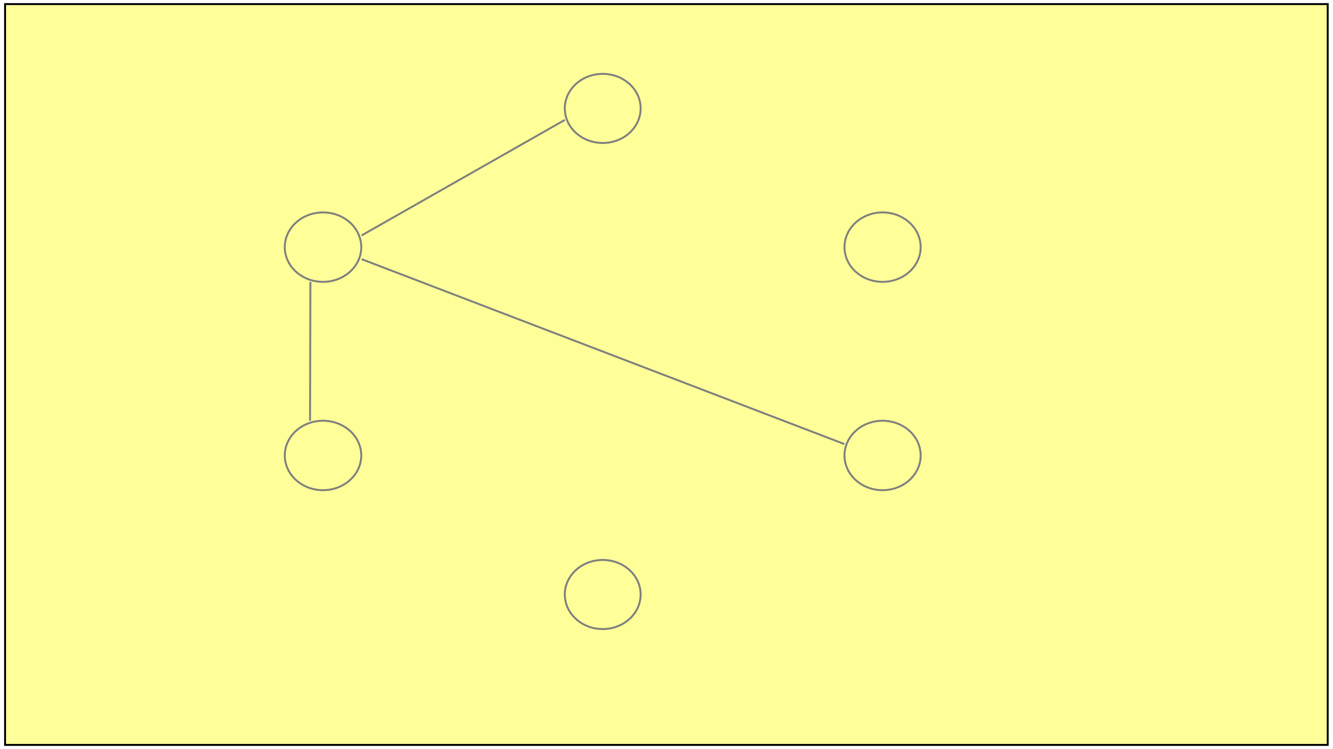
We will give a proof by using Pigeonhole Principle.

Proof

- We **assume a draw is possible** (**all lines are drawn**) and hope to arrive at a contradiction.
- We choose a point, say **A**. Then, there are five lines joining A to the other points. They are **AB, AC, AD, AE** and **AF**.
- Since we have two different colours, by the Pigeonhole Principle, **at least 3** lines must be in the same colour, say **AB**, **AC** and **AD**.
- We may assume these three lines are **blue**.



An Example



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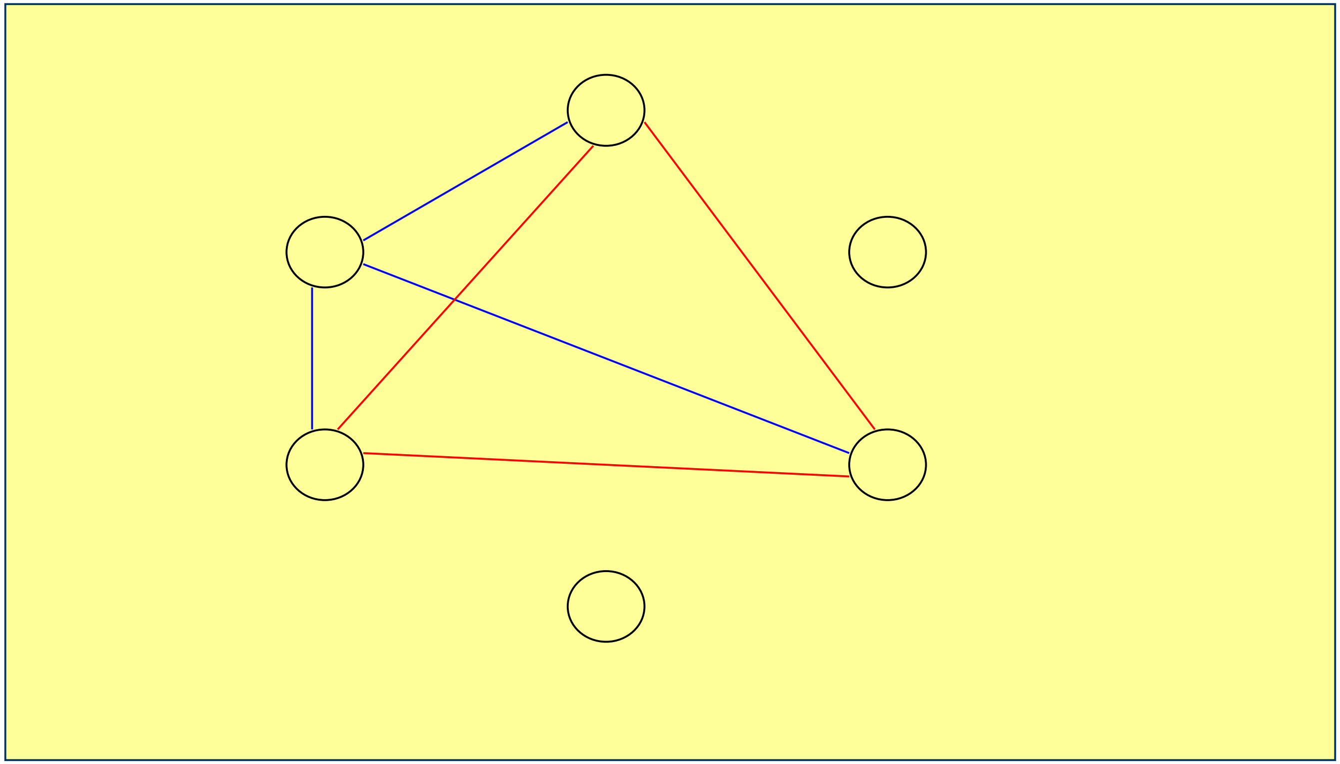
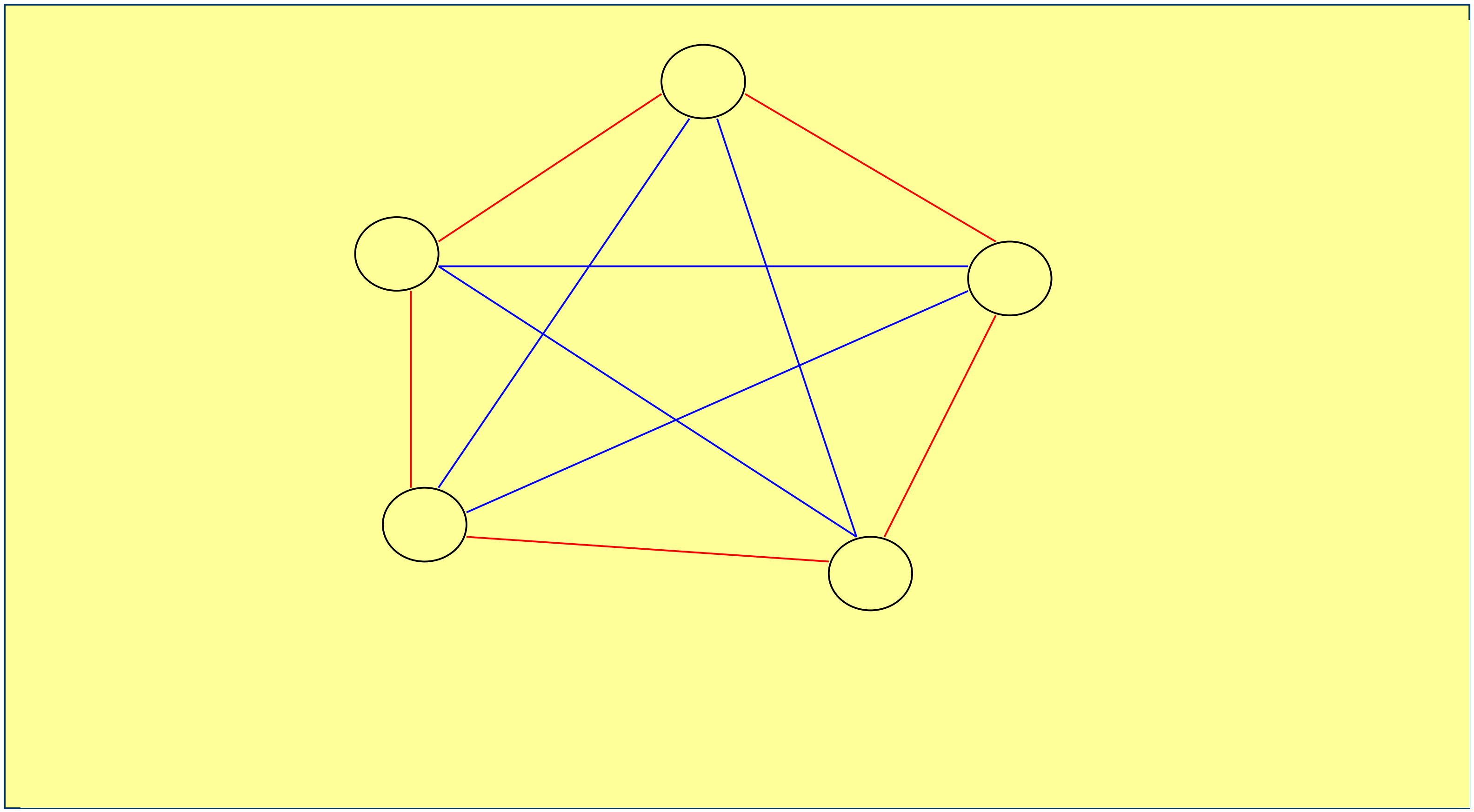


Do we have the same result for 5-vertex game board?

A Draw is Possible!



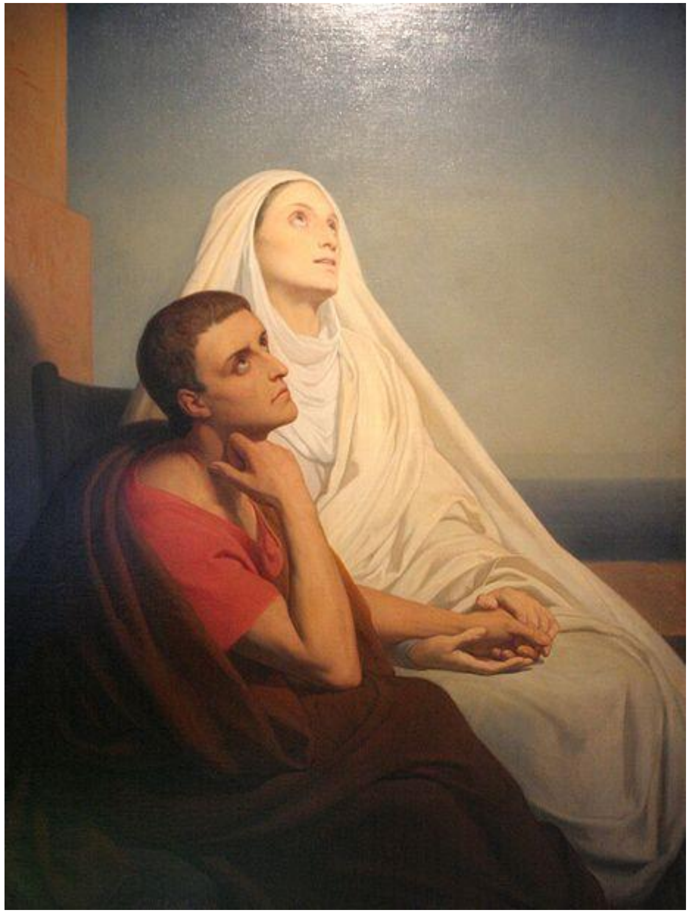
3.1 The Development of Probability

- With the advent of **Christianity**, the **concept of random events** developed by philosophers was rejected in the early time.
- 1. According to ***St. Augustine*** **(354-430)**, **nothing occurred by chance**, everything being minutely controlled by the will of God.

  2. If events **appear to occur at random**, then it is because of **our ignorance** and not in the nature of events.

  3. One should only seek for the will of God instead of looking at **patterns of behavior in aggregates of events**.

  (Taken from Poker faces: the life and work of professional card players by David M. Hayano, UCP Press, 1982.)



St Augustine and Monica by Ary Scheffer (1846). (维基百科全書)

The Game of Throwing Die

- The amazing contents and applications of probability theory owes its origin to **two questions on gambling** (game).
- The first question was raised by **Chevalier de Mere (雪佛萊·米爾)** (1607-1684) on his **problem of throwing a die**. He had a **title Chevalier (Knight)** and **educated at Mere**. The problem was solved by **Pascal (巴斯卡)**
- The second question was the **problem of points** solved by **Pascal-Fermat (巴斯卡-費瑪).**

Blaise Pascal
(1623-1662)

(Continue) The First Question

- De Mere made considerable money over the years in betting **double odds** on rolling at **least one '6' in 4 throws** of a fair die.
- He then thought that the same should occur for betting on at **least one double-six** in **24 throws of two fair dice** (**This is their ancient belief**). It turned out that it did not work well.
- In 1654, he challenged his friend Blaise Pascal (1623-1662) for the reasons.

Answers from Pascal

- The probability of getting no ‘6’in 4 **independent** throws: (5/6)*(5/6)*(5/6)*(5/6)=625/1296.
- Therefore the probability of having at least one ‘6’ in 4 throws will be equal to 1 - 625/1296 = 671/1296=0.5177 > 0.5000.
- This explained why de Mere got a good amount of money on double odds on his bet.

The Second Case Analysis

(1,1)	(1,2)	(1,3)	(1,4)	(1,5)	(1,6)
(2,1)	(2,2)	(2,3)	(2,4)	(2,5)	(2,6)
(3,1)	(3,2)	(3,3)	(3,4)	(3,5)	(3,6)
(4,1)	(4,2)	(4,3)	(4,4)	(4,5)	(4,6)
(5,1)	(5,2)	(5,3)	(5,4)	(5,5)	(5,6)
(6,1)	(6,2)	(6,3)	(6,4)	(6,5)	**(6,6)**

Continue

- The probability of getting no double'6'in the throw of two fair dice is 1-(1/6*1/6)=35/36.
- The probability of getting no double 6 in 24 independent throws is $(35/36)^{24}$. Therefore, the probability of having at least one double 6 in 24 throws is equal to $1 - (35/36)^{24} = 0.4914 < 0.5$.
- This explained why de Mere **did not** get a good amount of money on double odds on this bet.

The Second Question Asked by De Mere (not well-defined problem)

- Two Players A and B are playing a series of games which requires to score **5 points** (games) in order to win. In each game there is no draw.
- At the moment that Player A is leading **4 points** to **3 points**, the game was interrupted and cannot continue.

4.5 Continue

How should the players divide the stakes on the unfinished game?

	1	2	3	4	5	6	7
A	WIN	WIN	WIN	WIN	LOSE	LOSE	LOSE
B	LOSE	LOSE	LOSE	LOSE	WIN	WIN	WIN

The Response by Pascal-Fermat

- For the remaining two points, we may have

8th Point	9th Point	Final Winner
A Wins	A Wins	Player A
A Wins	B Wins	Player A
B Wins	A Wins	Player A
B Wins	B Wins	Player B

- Assume all the 4 outcomes are **equal likely** then the stake should be divided by the ratio 1:3 (B:A).

Another Response

- If P(A wins) = 4/7 and P(B wins)=3/7 according to their previous performance, we have

8th Point	**9th Point**	**Final Winner**	**Probability**
A Wins	A Wins	**Player A**	(4/7)*(4/7)
A Wins	B Wins	**Player A**	(4/7)*(3/7)
B Wins	A Wins	**Player A**	(3/7)*(4/7)
B Wins	B Wins	**Player B**	(3/7)*(3/7)

- Probability that Player B is the final winner is **9/49**.

  The stake should be divided in the ratio **9:40 (B:A).**

The Hidden Secrets of the Creative Mind
R. Keith Sawyer
(Creativity / Gift)

- Places where creative ideas suddenly emerged — the **Bathtub**, the **Bed** and the **Bus (3Bs)**.

1. **Take risk (承擔風險)**, and expect to make many **mistakes (容許犯錯).**
2. **Work hard (努力工作),** and take frequent breaks, but **stay with it over time (永不放棄) .**
3. **Do what you love (做你所愛),** because creative breakthroughs take years of hard work **(突破需時).**
4. **Develop a network of colleagues (同志網絡)** , and **schedule time for unstructured discussions (定期吹水).**

- Don’t forget **romantic myths** that creativity is all about being **gifted** (恩賜) and NOT about **hard work (功 德)** .

3.2 The Concept of Independent Event (獨立)

- Two events A and B are said to be ***independent*** if we have

$$P(A \text{ and } B) = P(A)P(B).$$

- Let A_1, A_2, A_3 … be independent events then the above result can be further extended to

$$P(A_1 \text{and } A_2 \text{ and } A_3 \text{ and } \ldots.) = P(A_1)P(A_2)P(A_3)\ldots.$$

A Question for Fun

- Two fair dice of six-face are thrown, the possible outcomes of total number of dots are:

  2,3,4,5,6,7,8,9,10,11,12.

- From above we notice that the number of elements in the set of even dots {2,4,6,8,10,12} is more than that in the set of odd dots {3,5,7,9,11}. Therefore, we conclude that

  P(Even dots) > P(Odd dots).

- Do you agree? Why?

Solution

- The probability of getting 2,3,….,11,12 are not equal. For example

  P(2 dots)=P({1,1})=1/6*1/6=1/36.

While probability

P(3 dots)=({(1,2),(2,1)})=2/36.

- In fact, it can be shown that

  P(Even dots) = P(Odd dots).

The Analysis

(1,1)	(1,2)	(1,3)	(1,4)	(1,5)	(1,6)
(2,1)	(2,2)	(2,3)	(2,4)	(2,5)	(2,6)
(3,1)	(3,2)	(3,3)	(3,4)	(3,5)	(3,6)
(4,1)	(4,2)	(4,3)	(4,4)	(4,5)	(4,6)
(5,1)	(5,2)	(5,3)	(5,4)	(5,5)	(5,6)
(6,1)	(6,2)	(6,3)	(6,4)	(6,5)	(6,6)

3.3 Mark Six

Mark Six is a popular lottery game in Hong Kong. Similar lottery game can be found all over the world. There are 49 balls (number 1 to 49) in the urn. Six balls are first drawn without replacement. The 7th ball is then drawn as the special number.

The following is some ten draws of the Mark Six Lottery in reverse order.

Date	Draw Number	Draw Results							
20/12/2002	02/110	13	18	23	24	26	33	+	15
17/12/2002	02/109	6	18	39	40	41	42	+	9
12/12/2002	02/108	7	15	16	23	31	35	+	8
10/12/2002	02/107	5	36	37	38	46	49	+	17
05/12/2002	02/106	11	21	27	31	37	44	+	1
03/12/2002	02/105	9	11	14	17	24	28	+	46
28/11/2002	02/104	17	19	26	31	37	43	+	38
26/11/2002	02/103	19	21	40	42	46	47	+	33
21/11/2002	02/102	4	16	18	25	29	41	+	21
19/11/2002	02/101	3	15	22	23	42	47	+	18

A Phenomenon for Explanation

- One observes that at **least 2** drawn numbers have the same '**first digit**' in all the cases.
- This can be explained by using **Pigeonhole Principle.**
- How about the 'last digit' ?
- Observe that in about **80%** of the draws, at **least 2** drawn numbers having the **same last digit**.
- Is the machine bias?

A Heuristic Explanation

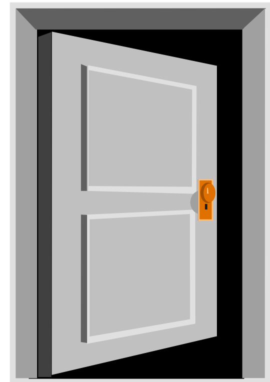
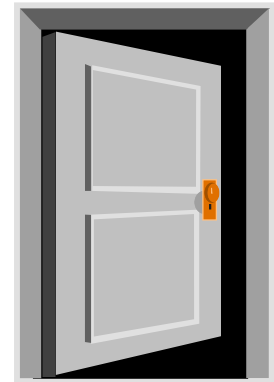
- We want to find p, the probability of having at **least 2 equal last digits**.
- Suffice to know q, the probability of having all the last digits being distinct (p=1-q).
- For **simplicity of calculation**, we assume that there are **50** balls and the probability of getting each ball is the same.

Continue

- **$q = (50/50)*(45/49)*(40/48)*(35/47)*(30/46)*(25/45) = 0.2064.$**
- Therefore, we have
  $p = 1 - 0.2064$
  $= 0.7935 \sim 80\%$.

01	11	21	31	41
02	12	22	32	42
03	13	23	33	43
04	14	24	34	44
05	15	25	35	45
06	16	26	36	46
07	17	27	37	47
08	18	28	38	48
09	19	29	39	49
10	20	30	40	50

3.4 Monty Hall Problem (Angel's Door)

- One of the three doors, there is **one** to heaven (prize). You are asked to open one of them and the Angel knows the correct door and can help you to **open one door** in the following two manners.
- (I)The Angel **opens an empty door** for you before you choose one.
- (II)You choose one door first **without** opening it, the Angel then **opens an empty door** from the remaining two doors. You are allowed to **change your choice**.
- Which one will you choose (I or II)? Why?

Solution

- It is clear that the probability of winning the car is 1/2 for Case 1.
- For Case 2, if the player doesn’t change his choice, then the probability of winning the car is 1/3.
- In Case 2, if the player changes his choice then his winning probability will be 2/3. Why? Because in this situation, the player wins if and only if he chose a wrong door at the very beginning (the chance is 2/3).

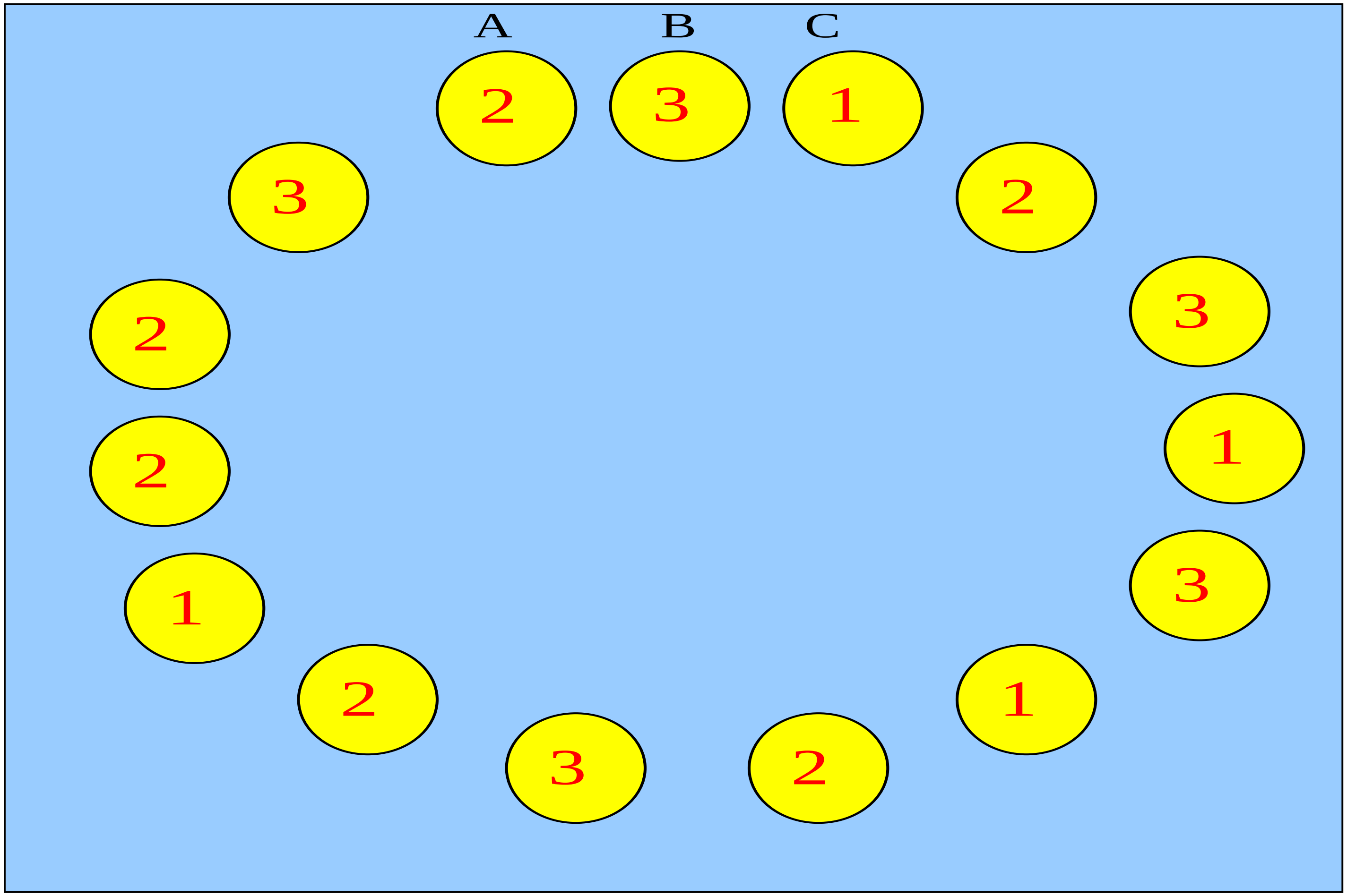
4. Random Walk (Predestination and Free Will)

- We play a game of 3N cards. Each card has a label of 1,2 or 3 and there are N cards of 1,2,3 respectively.
- We spread the cards randomly on a table and form a circle. Randomly choose 3 consecutive cards on the table and these 3 cards form a special ZONE. For the cards in this zone, we give them extra marks A,B and C.

Continue

- Choose randomly one of the cards in the zone and perform a walk (clockwise) with the step size equals to the number on the card. Continue the walk in this manner until you come back to the zone. Then record the mark (A,B,C) where you stop. Repeat the process again.

Continue



Continue

- The step size in each move is at most 3. Therefore it is useful to look at patterns of **3 consecutive** cards.
- The total number of possible patterns = $3^3=27$. Why?

- Among the **27** patterns, there are **12 'convergent patterns'** in blue. When the walker is in any one of the positions, **his future path will be converged**.

111	112	221	121	212	132	211	113	232
213	321	311	222	333	123	331	313	122
133	231	223	332	312	131	323	322	233

Convergent Probability

- We note that if the **3 walker paths** do not converge with each other then it implies that we **CANNOT** find **3 consecutive cards** taking a **blue pattern** in the 3N cards.
- This then implies that, cards 1 to 3, 4 to 6, 7 to 9, …., 3(N-1)+1 to 3N take no **blue patterns**.
- P(no convergent paths) < $(1-12/27)^N = (5/9)^N$.
- For N=5, the probability is less than 0.0529 ~5%.

5. Benford's Law

- In 1881, a Mathematician **Simon Newcomb** noticed that the pages of logarithm tables (四位對數表) with **small initial digits** were **dirtier** than those with **larger initial digits**, such that

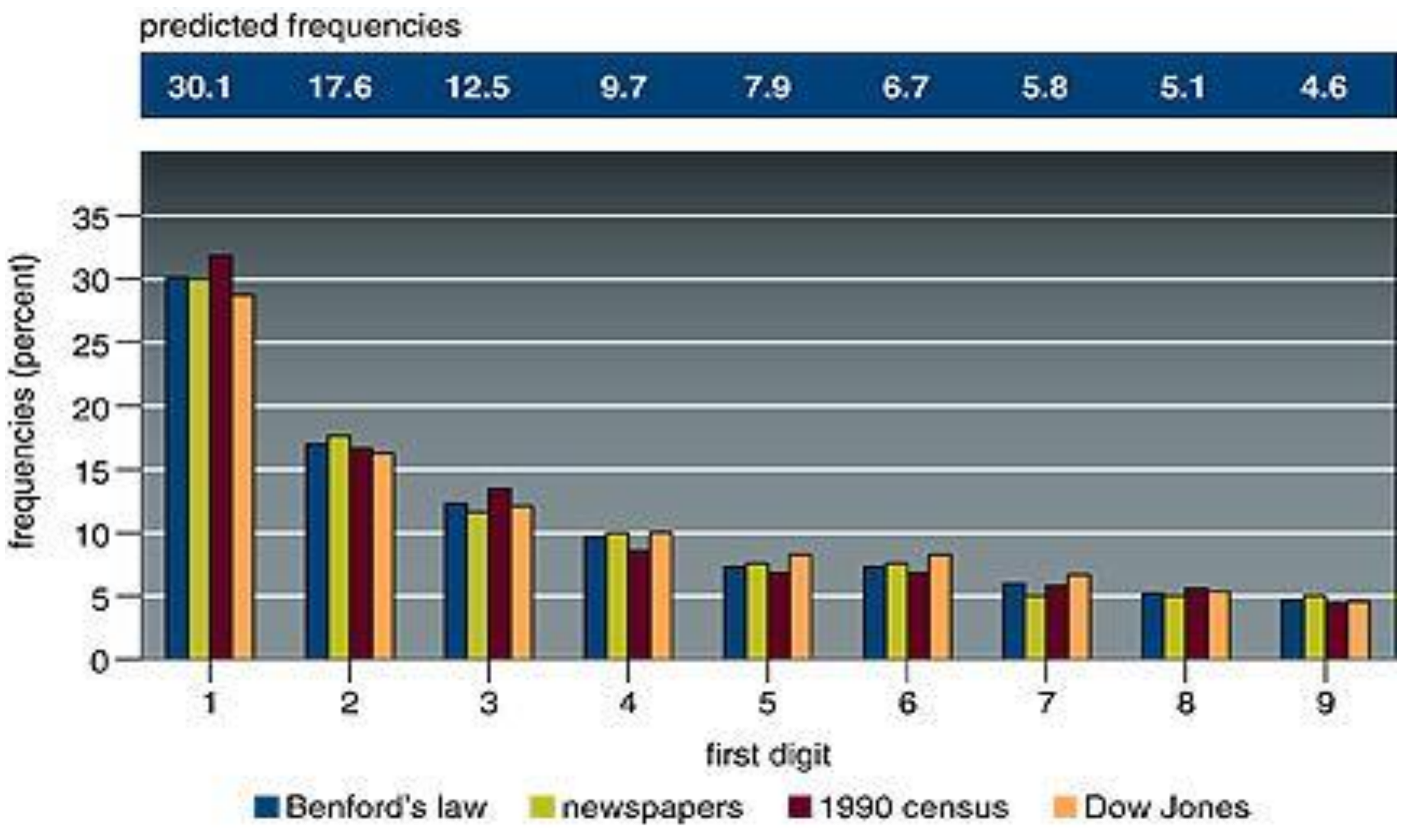
  $$1>2>3>4>5>6>7>8>9.$$

- In 1938, a Physicist, Frank Benford proposed the Benford's law based on the **empirical evident**:

  P(The first significant digit $= d) = \log_{10}(1+1/d)$

  for $d=1,2,3,4,5,6,7,8,9$.

Frequency of First Digits, From 1 to 9.

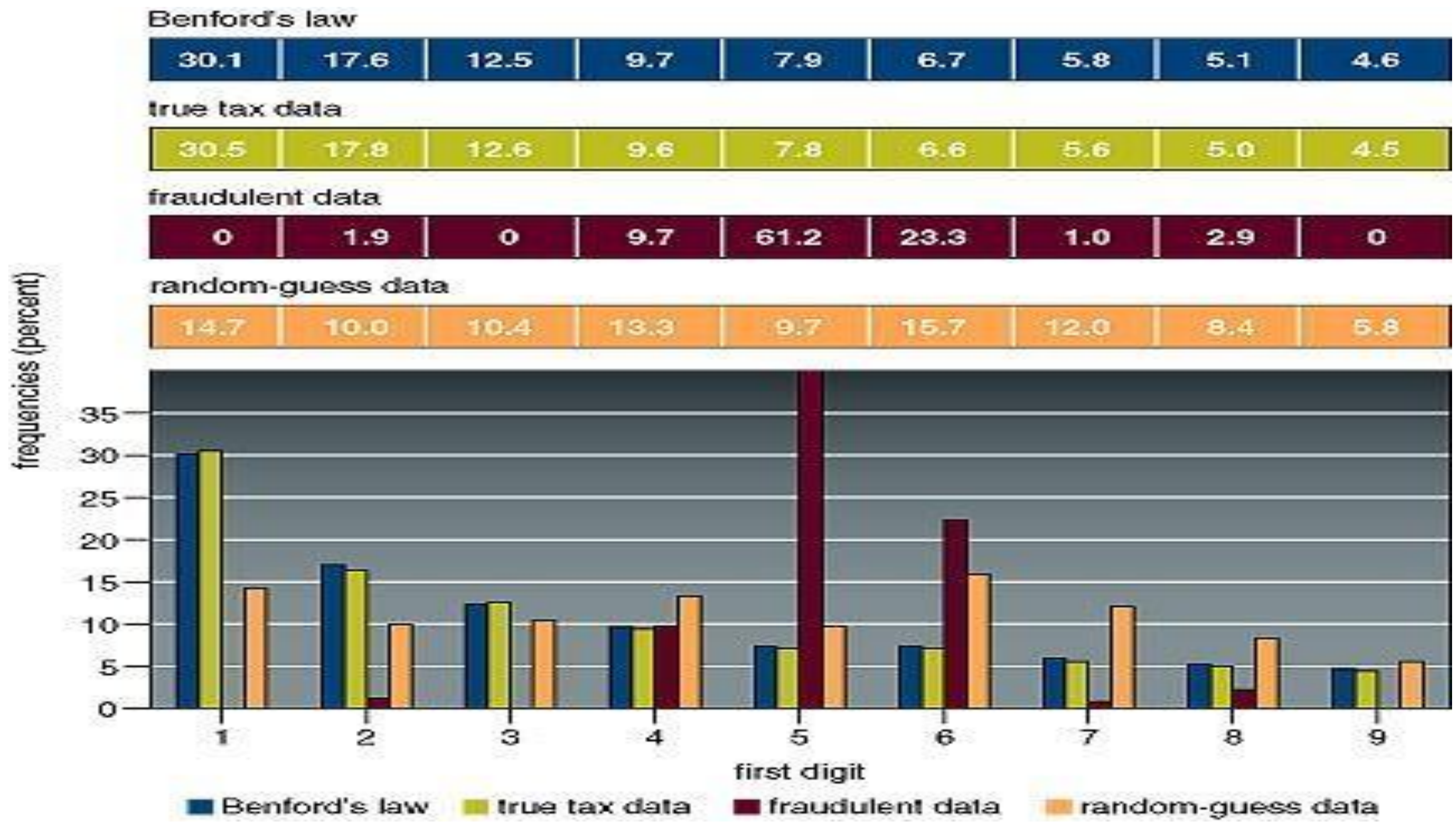


From ``The First-Digit Phenomenon'' by T. P. Hill, *American Scientist*, July-August 1998. [*The New York Times*, Tuesday, August 4, 1998]

Detecting Fraud

- An interesting application of Benford's law is to help in detecting possible **fraud** in **tax returns**.
- Empirical research in US has shown, the interest paid and received are very good fit to Benford's law.

First Significant Digits Tax Data



From ``The First-Digit Phenomenon" by T. P. Hill, *American Scientist*, July-August 1998. [*The New York Times*, Tuesday, August 4, 1998].

A Heuristic Analysis (Explanation)

- Suppose in month 0, Hang Seng Index is 100.
- We assume that it **increases at a rate of 10 percent** (it can be r%) per year.
- Let f(1) be the number of years for the index to reach 200 from 100, then we have

$$100*(1.1)^{f(1)}=200$$

or

$$f(1)=(\log(200)-\log(100)) / \log(1+1/10)$$

Continue

- Let f(2) be the number of years for the index to reach 300 from 200, then we have

$$200*(1.1)^{f(2)} = 300$$

or

$$f(2)=(\log(300)-\log(200)) / \log(1+1/10)$$

- Inductively we have for d=1,2,3,4,5,6,7,8,9

$$f(d) = (\log(100(d+1))-\log(100d)) / \log(1+1/10)$$

- We note that $\log(100d)=\log(100)+\log(d)$ and $\log(100(d+1))=\log(100)+\log(d+1)$.

Continue

- Thus f(d) can be simplified as follows:

$$f(d) = \log(1+1/d) / \log(1+1/10)$$

- We also note that log(10)=1 and

$$F=f(1)+f(2)+\ldots+f(9) =\log(10)/\log(1+1/10).$$

- Therefore, the probability of observing d (d=1,2,3,4,5,6,7,8,9) as **the first digit** is

$$P(d) = f(d)/F = \log(1+1/d).$$

Research

Research: Mathematical Models & Numerical Algorithms

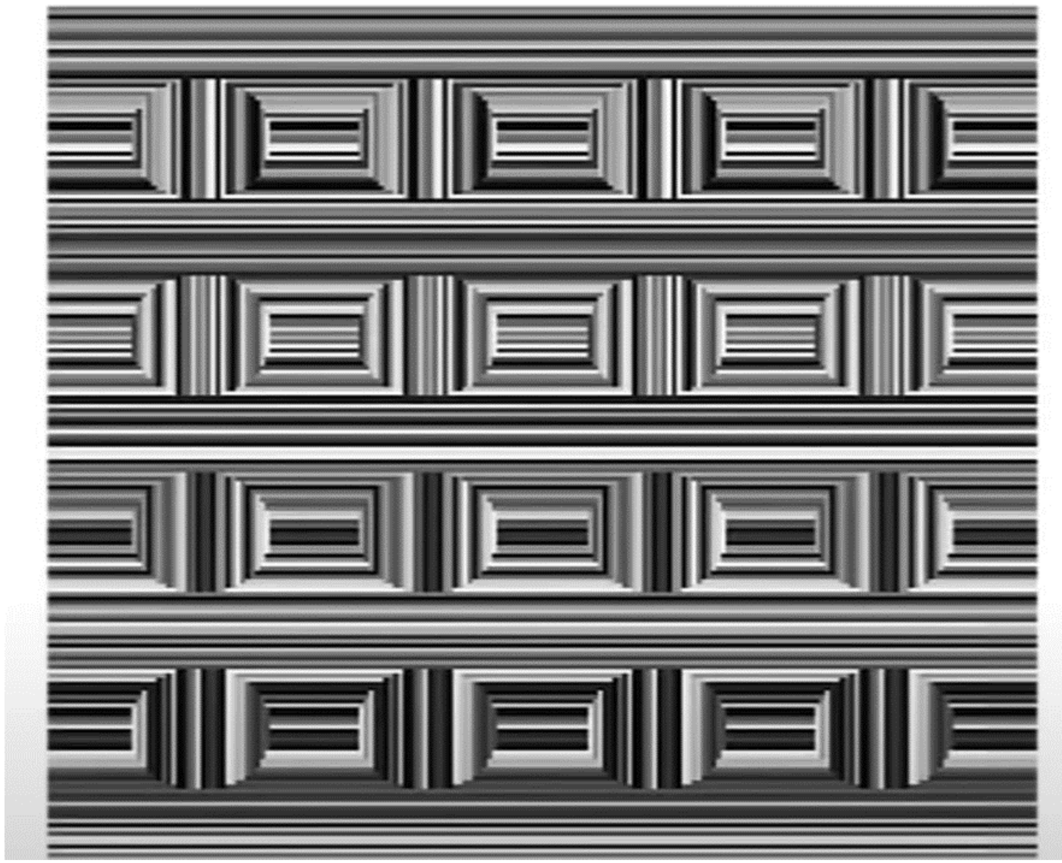
1. Bioinformatics [Biomarkers]
2. Quantitative Finance [High-Frequency Trading]
3. Machine Learning [Algorithms: Design & Analysis]

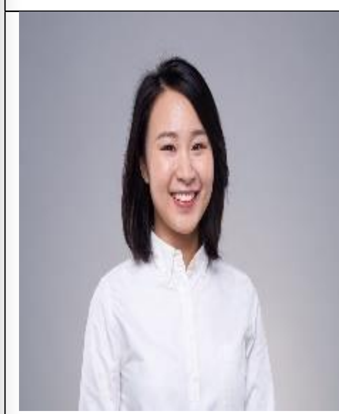
Coaching Postgraduates:

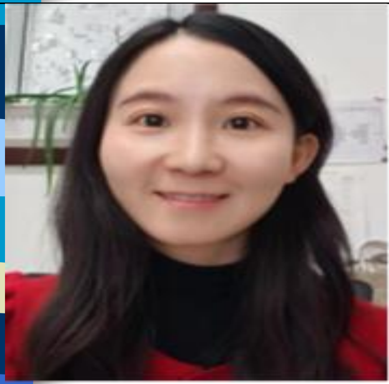
30 Ladies (24 PhD & 6 MPhil) + 5 Boys (3 PhD & 2 MPhil)

Examples: 9 PhD & 3 MPhil

世界的曲與直



	**L. Sun** is now an **Assistant Professor** at **Kyoto University**, 2025. She was awarded the prestigious **Japan Society for Promotion of Science Fellowship** (2023) for her postdoctoral research in Bioinformatics and Boolean networks at **Kyoto University.** She received the JSAI SIG Research Award (2025). 日本人工知能学会 研究会優秀賞受賞
	**W. Hou** is now a **Tenure-track Assistant Professor** at **Columbia University, New York, U.S**. She has been a Post-Doctoral Fellow **at Johns Hopkins University** before taking up the current post. She was awarded the **R35 Maximizing Investigators' Research Award (MIRA) from NIH/NIGMS** (2023) **and NIH Pathway to Independence Award (K99/R00), NIH/NHGRI** (2021).
	**F. Yu** is now a **Tenured Assistant Professor** (2024) working in Mathematical Finance and Risk Analysis at **TU Delft in the Netherlands**. She has been a **Post-Doctoral Fellow at ETH Zurich** before taking up the current post.

	**L. Li** is now a **Professor** working in Machine Learning at **Xian Jiaotong University, Xian, China**. She has been a post-doctoral fellow at **Max Planck institute for Intelligent Systems**, Germany. She has awarded **China's Excellent Young Scientists Fund** (2022). Currently, she is the **Head of Department**.
	**S. Zhang** is now a **Professor** at **Fudan University, Shanghai, China**. Her research interests are: bioinformatics and network biology. She is working on a semi-supervised cell-type annotation method for single-cell RNA sequencing data.
	**H. Jiang** is now a **Professor** and also **Associate Dean** of **Renmin University of China, Beijing, China**. Her research interests are: Bioinformatics, Data Mining and Machine Learning.

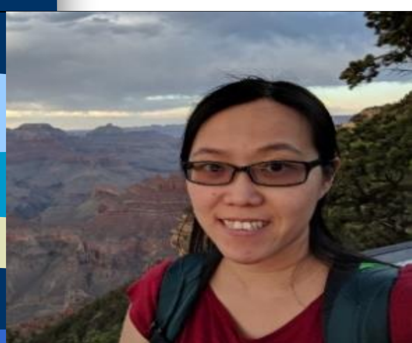
	**Y. Qiu** is now an **Associate Professor** at **Shenzhen University, Shenzhen, China**. She was awarded **Shenzhen City's Excellent Young Scientists Fund** (2024). Her research interests are: Bioinformatics and Machine Learning.
	**Y. Cong** is now the **Director of Analytics**, **Purecycle Technologies**, **Houston, Texas, United States**. Her research interests are: Data-driven Decision Making and Financial Modeling.
	**Q. Yang** is now a **Senior Researcher, Huawei, Hong Kong, China.** Her research interests are: Stochastic Control, Numerical Algorithms and Network Systems.

J. Lu is now a **Data Scientist** at **Google, U. S.** After receiving her M. Phil. at HKU, she moved to **Harvard University** to continue her postgraduate study in **Computational Sciences**.

Her research interests are: Data Analysis, Mathematical Modeling and Statistical Testing, Quantitative Research, Machine Learning and Software Development.

X. Huang is now a **Tenure-track Assistant Professor at Rutgers School of Business–Camden, US**. She received her Ph.D. in Operations Management from **Georgia Institute of Technology**.

Her research interests are: Impacts of environmental legislation on firms' sustainability strategies and how sustainable operational strategies help enhance firms' profitability.



S. Choi is now a **Staff Software Engineer** at **Google**.

She received her Ph.D. from Industrial Engineering and Operations Research, University of California, Berkeley, US.

科學的突破不一定讓我們更接近真理 (更美好)，

而只能更好地描述現實世界。


Paul Hermann Müller, (12 Jan. 1899 – 13 Oct. 1965), was a Swiss Chemist who received the 1948 Nobel prize in Physiology for his 1939 discovery of **insecticidal** qualities and use of DDT in the control of vector diseases such as Malaria and Yellow fever.

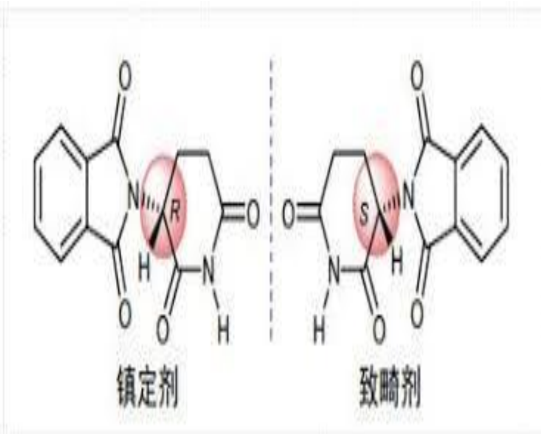
Evidence for Carcinogenicity and Cancer in Humans. In 1991, the International Agency for Research on Cancer (IARC) rated DDT as "possibly carcinogenic to humans (Group 2B)".

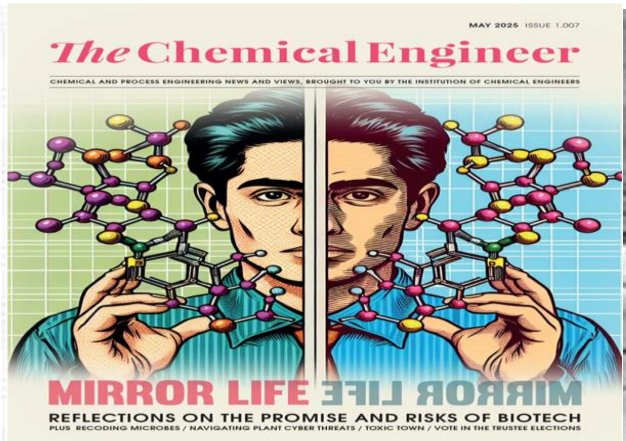
OpenAI 將人工智能分成五大等級，分別是:

1. **聊天機械人**(Chatbots) ChatGPT [2022]
2. 能解決人類水平**問題的推理者**(Reasoners) ChatGPT o1 [2023]
3. 能夠代表用戶採取**行動的代理** (Agents) Operator [2025]; Openclaw [2026]
4. 能夠幫助**發明的創新者** (Innovator) [2026]
5. 能夠完成組織工作的組織者 (Organizations)

The **Alphafold success story** sheds light on a peculiar way of doing science: solutionist, openwashed, gamified and epistemically suited to contests. The Nobel Committee congratulates the recipients of this award for solving **'protein folding', a "fifty-year-old problem" in structural biology** (Nobel Prize, 2024)

沙利度胺





Potential of Mirror Life: Mirror organisms could transform drug development by enabling more stable and effective therapeutics with fewer side effects

Technical Challenges: Scaling mirror life requires breakthroughs in synthetic biology, including mirror biomolecule synthesis and nutrient supply

Biosecurity Risks: Mirror organisms could **evade immune systems** and **disrupt ecosystems**, requiring strict containment and regulation (https://www.youtube.com/watch?v=7hcKFhZY314)

1. 人生三個重要的決定：跟什麼人一起，做什麼事，住在什麼地方。

與智慧人同行的，必得智慧；與愚昧人作伴的，必受虧損（箴言 13:20）。

2. 驕傲是昂貴的代價，自以為是，不肯接受失敗。不願意隨時從零開始。

驕傲在敗壞以先，狂心在跌倒之前（箴言 16:18）。

3. 重覆一件事一百次，不如迭代 (優化）一百次。

不要效法這個世界， 只要心意更新而變化 (羅馬書 12:2)。

4. 靈感是易逝品，一有就立刻抓着它。

不要銷滅聖靈的感動 (帖撒羅尼迦前書 5:19)。

5. 注意力在那，你的人生就在那。

因為你的財寶在那裡，你的心也在那裡 (馬太福音 6:21)。

一期一会 (いちごいちえ)

一期一會，日本茶 道 的用語。

「一期」，表示人的一生；

「一會」，意味着僅有一次相會，勸勉人們應知所珍惜身邊的人。