

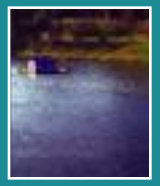

CS 333202 Probability and Statistics

Instructor: Shun-Ren Yang
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Course slides are adapted from slides provided by Prof. Jyh-Cheng Chen

People

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Course Objectives

- This course will cover topics of fundamental importance concerning the concepts, methodology, and the mathematics of probability. The covered topics are:
  - Axioms of Probability
  - Combinatorial Methods (skipped!)
  - Conditional Probability and Independence
  - Distribution Functions and Discrete Random Variables
  - Special Discrete Distributions
  - Continuous Random Variables
  - Special Continuous Distributions
  - Bivariate Distributions
  - Multivariate Distributions
  - More Expectations and Variances
  - Sums of Independent Random Variables and Limit Theorems

General Information

- Lectures:
  - Tuesday 2:10PM-3:00PM, Friday 3:20PM-5:10PM
- The course web page is located at
  - http://wmnet.cs.nthu.edu.tw/Course/PS/
- The course discussion group: to be announced
- Exams
  - Quizzes: once per week
  - Three closed-book exams, 1st: 10/23, 2nd: 12/4, 3rd: 1/15 (tentative)
- Grading
  - Homework: 0%
  - Quizzes: 25% - closed book, 10-15 minutes in duration
  - Midterm1: 25% - closed book
  - Midterm2: 25% - closed book
  - Final Exam: 25% - closed book
  - 期末不會調分

Reading Materials

- Text Book:
  - S. Ghahramani, *Fundamentals of Probability with Stochastic Processes,* 3rd edition, Prentice Hall, 2005
- Additional Reading:
  - A. H. Haddad, *Probabilistic Systems and Random Signals*, Prentice Hall, 2006
  - S. Ross, *A First Course in Probability,* 6th edition, Prentice Hall, 2002
  - T. T. Soong, *Fundamentals of Probability and Statistics for Engineers*, Wiley, 2004
  - R. E. Walpole, R. H. Myers, S. L. Myers, K. Ye, *Probability and Statistics for Engineers and Scientists*, 8th Edition, Prentice Hall, 2007
  - Check class website regularly
- Handouts:
  - Will be available before the class on the course website

Course Academic Integrity Policy

- You are not allowed:
  - Copying all or part of someone else's work
  - Giving another student in the class a copy of your work
  - Consulting with others during an exam

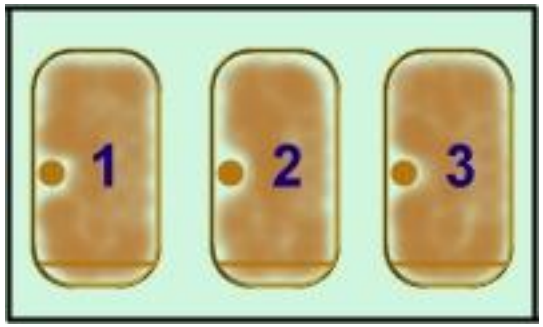
- Students who violate this policy
  - In the quizzes: no credit
  - In the exams: final score will be ZERO

Outline of our study

- Axioms of Probability (C1)
- Combinatorial Methods (C2) => not covered
- Conditional Probability and Independence (C3)
- Distribution Functions and Discrete Random Variables (C4)
- Special Discrete Distributions (C5)
- Continuous Random Variables (C6)
- Special Continuous Distributions (C7)
- Bivariate Distributions (C8)
- Multivariate Distributions (C9)
- More Expectations and Variances (C10)
- Sums of Independent Random Variables and Limit Theorems (C11)

An Interesting Probability Question

- 綜藝節目猜車子遊戲中，總共有三個門，其中一個門後面有車子。
- 在來賓任意選擇一個門之後，主持人隨便翻開其餘兩個門中沒有車子的一個，並給來賓一個更換選擇的機會。
- 請問來賓是否應該更換選擇呢？

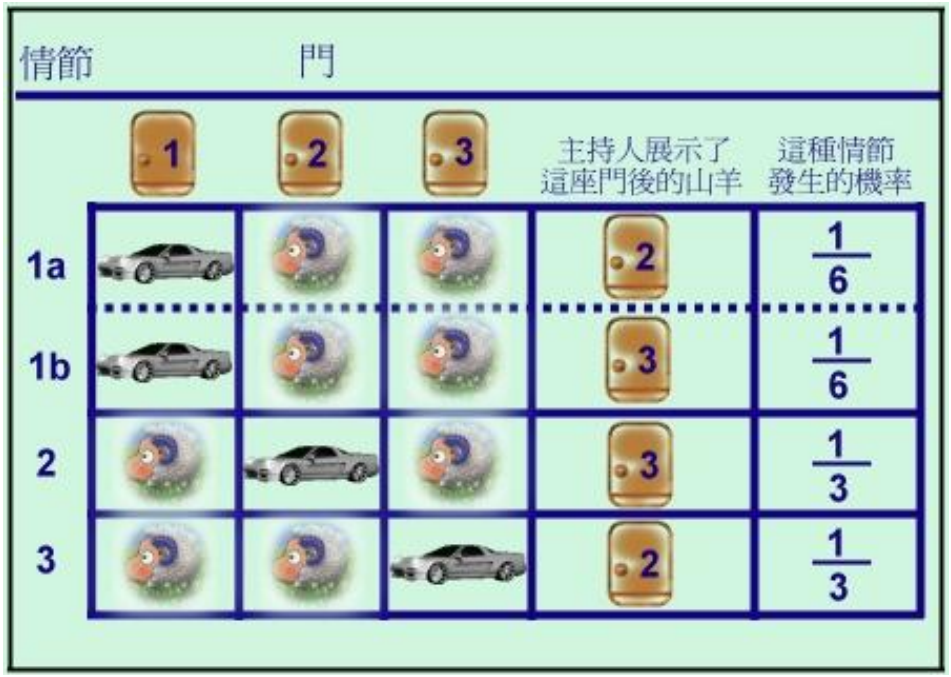


汽車-山羊問題(Car-Goat Problem), 改編自1991年7月21日 New York Times - http://probstat.nuk.edu.tw/book2/p1/p1.htm (國立高雄大學應用數學系)

Solution 1

- 來賓看到主持人翻開一個沒有車子的門後很高興。原先他只知道自己有1/3的機會獲獎，現因只剩兩個門了，所以他會獲獎的機會提高至1/2。
- 因此他決定不更換選擇。

Solution 2



- 假設主持人知道哪扇門後有汽車。
- 假設觀眾選定的是１號門。
- 改變選擇後獲獎的機率: 1/3 + 1/3 = 2/3。

Schedule

WEEK/DATE	TENTATIVE TOPICS
1 (9/15, 9/18)	Ch1
2 (9/22, 9/25)	Ch3
3 (9/29, 10/2)	Quiz 1(10/2), Ch3, Ch4 (10/2開始Ch4)
4 (10/6, 10/9)	Quiz 2(10/9), Ch4
5 (10/13, 10/16)	Quiz 3(10/16), Ch4
6 (10/20, 10/23)	Midterm 1(10/23), Ch5
7 (10/27, 10/30)	Ch5
8 (11/3, 11/6)	Quiz 4(11/6), Ch 5
9 (11/10, 11/13)	Quiz 5(11/13), Ch5, Ch6 (11/13開始Ch6)
10 (11/17, 11/20)	Quiz 6(11/20), Ch6

Schedule

WEEK/DATE	TENTATIVE TOPICS
11 (11/24, 11/27)	Quiz7(11/27), Ch7
12 (12/1, 12/4)	Midterm 2(12/4), Ch7
13 (12/8, 12/11)	Ch7, Ch8
14 (12/15, 12/18)	Quiz8(12/18), Ch8
15 (12/22, 12/25)	Quiz9(12/25), Ch10
16 (12/29)	Ch10, Ch11
17 (1/5, 1/8)	Quiz10(1/8), Ch11
18 (1/12, 1/15)	Final Exam(1/15)