題目：Towards Research for Beginners：
A Case Study
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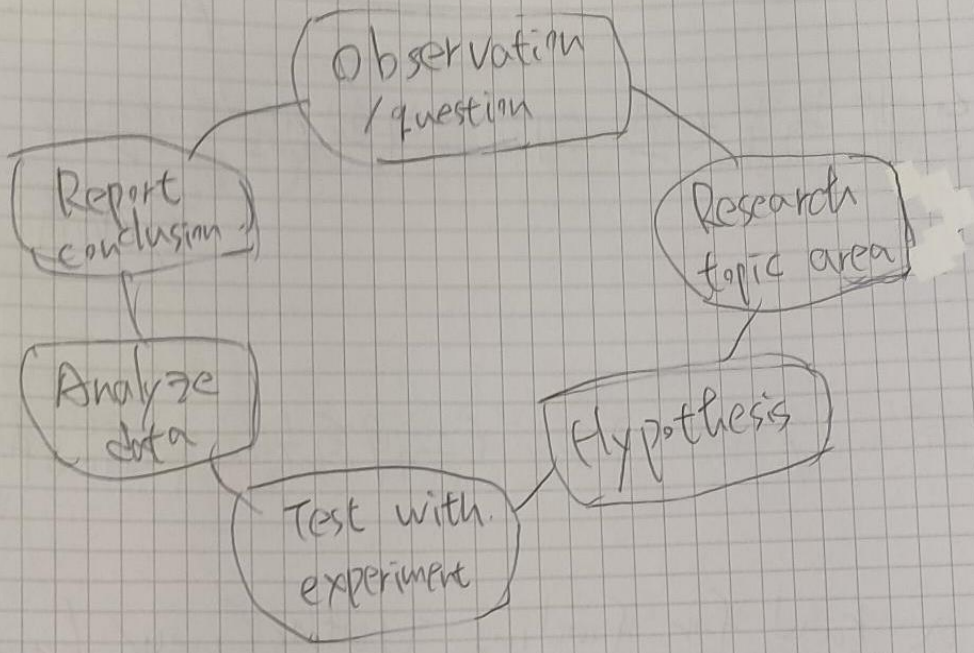
面試：你做什麼研究？ 自己覺得有趣 較能講得精彩

Research is a road for finding truths (new knowledge)
is also a road for solving problems

A Scientific Methods for Solving Problems

Comprehensive version
- observation
- Recognition
- Definition
- Hypothesis
- Prediction
- Experiment

Abbreviated Version
- observation
  Understanding the Problem
- Hypothesis / Prediction
  Computational / Design Thinking
- Experiment
  Algorithm Proof, Analysis
  Implementation (for simulation)



Research Feature.

Category	Characteristic	Methods.
mathematicians.	usually care weather the problem has a solution or not	Mathematical Proof
computer scientists	typically work on the theoretical side of computation	mathematical proof or analysis
computer engineers	typically propose or feasible solution to a practical problem	Experiment by simulation

Mathematics ← Computer Science → Engineering

Theoretical. Practical.

Conflict-free (Edge-) connection Coloring Problem

- A conflict-free path is colored path with some color that occurs on exactly one edge on path.
- Given a graph G and an integer k, the problem is to as whether G is k-colorable such that every two vertices. ha a conflict-free path.

(strong) Conflict-free Connectivity.

	Edge version	Vertex version
Connected by a path. Conflict-free connection coloring Problem	[Czap et al., 2018] [Chang et al., 2019] [Chang et al. 2021]	[Li et al., 2020] [Li & Zhu, 2020]. [Doan et al. 2022] [Doan et al. 2022]
Counted by a shortest path. Strong Conflict-free Connection Coloring Problem.	[Ji & Li, 2019] [Ji et al., 2020]	This study