Discrete Mathematics Final Project

2022/12/08

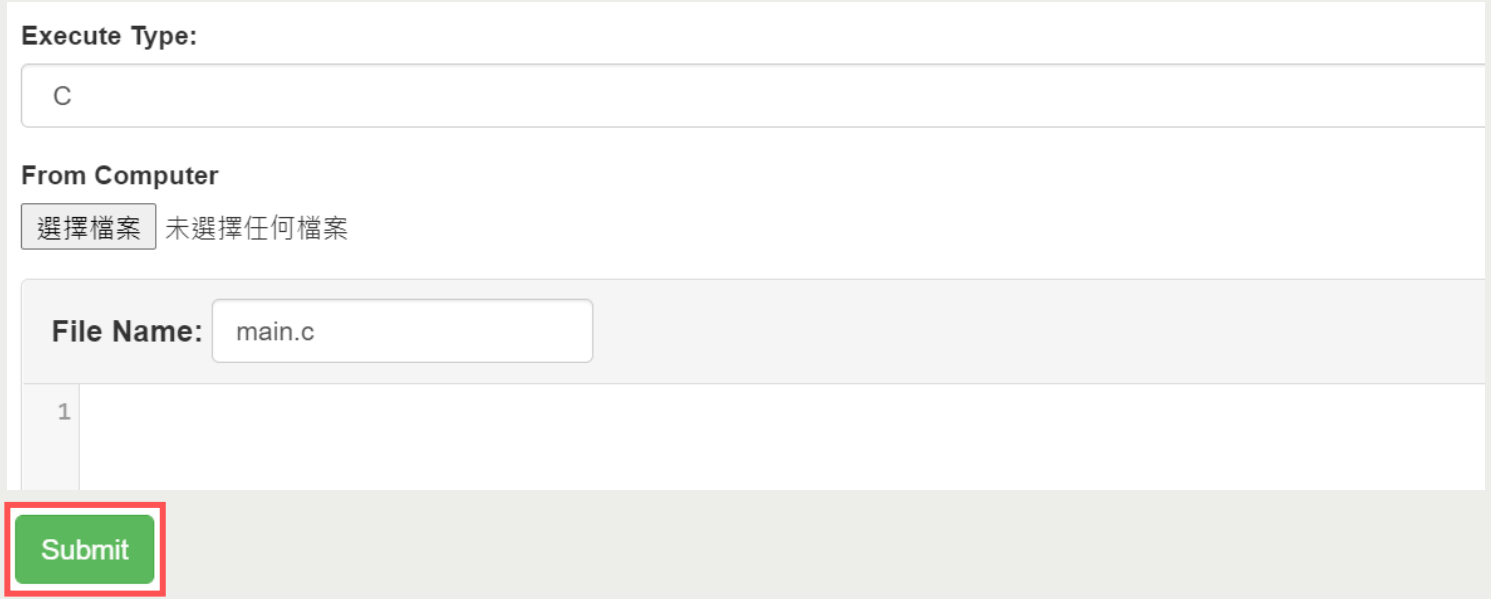
Formosa OJ

- 2 Problems

1526	Maximal K-clique
1527	Graph Coloring

Formosa OJ

- Execute Type: C / C++ / Python3



Formosa OJ - Verdict

- AC: Accepted (答對)
- WA: Wrong Answer (答案錯)
- CE: Compilation Error (編譯時錯誤)
- RE: Runtime Error (執行時錯誤)
  - Vector[50] is not enough to represent 1000 nodes/edges/outputs
  - Your code will work in the sample case since the nodes/edges/outputs is below 50
- TLE: Time Limit Exceeded (超過時間限制)
- MLE: Memory Limit Exceeded (超過記憶體限制)
- SE: System Error (系統錯誤)
- 遇到CE,RE,TLE,MLE,SE的問題請先上網查資料, 要跟助教討論時請描述你覺得可能的原因

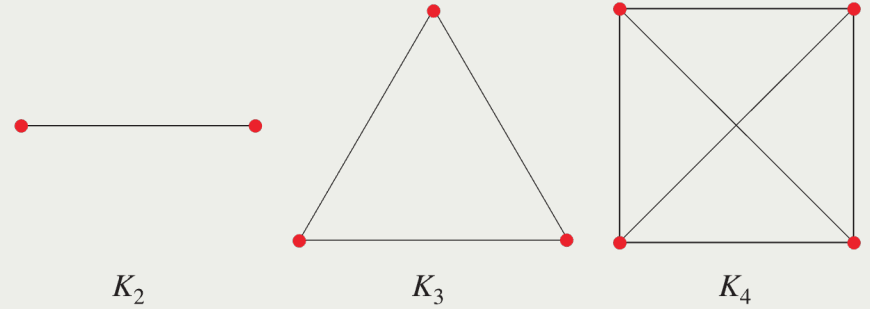
Problem Description

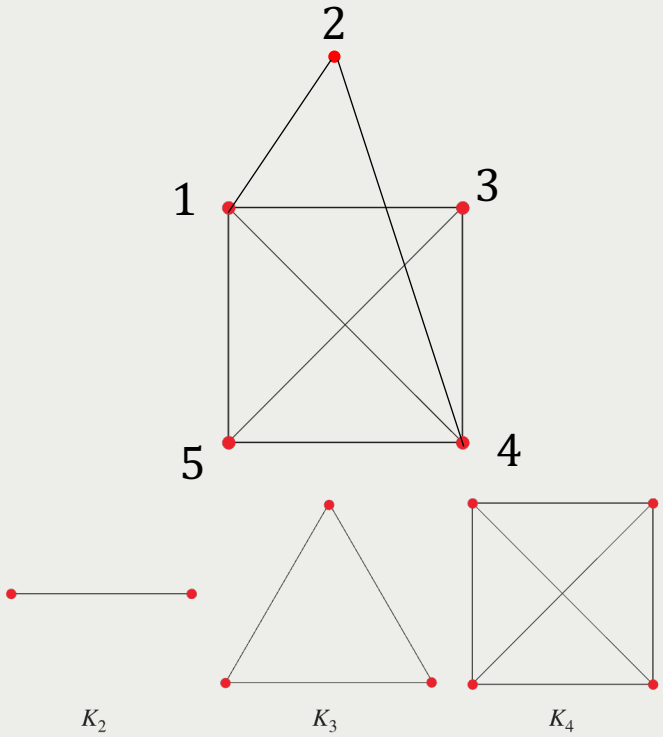
Final Project Outline

- (30%) Maximal K-clique
  - (20%) Correctness (OJ)
  - (10%) Execution Time with all ACs (OJ) – (Top 50%: 10%, The rest: 5%)
- (30%) Graph Coloring
  - (10%) Chromatic number k (OJ)
  - (20%) A possible solution for the minimum k coloring (Submit code to e3)
    - If we can't compile or the file name is not "學號_coloring.c/cpp/py", you will get -3 points.
    - If the answer is not one of the possible solution, you won't get this 10 points.
- (40%) Report (Maximal K-clique & Graph Coloring)
  - English / Chinese
  - **Novelty** – Using what kind of method to save more time?
  - **Comprehensiveness of experiments** – Any comparisons with different methods?
  - **Theoretical results** – Is there any way to describe or prove the complexity of your algorithm?

K-clique

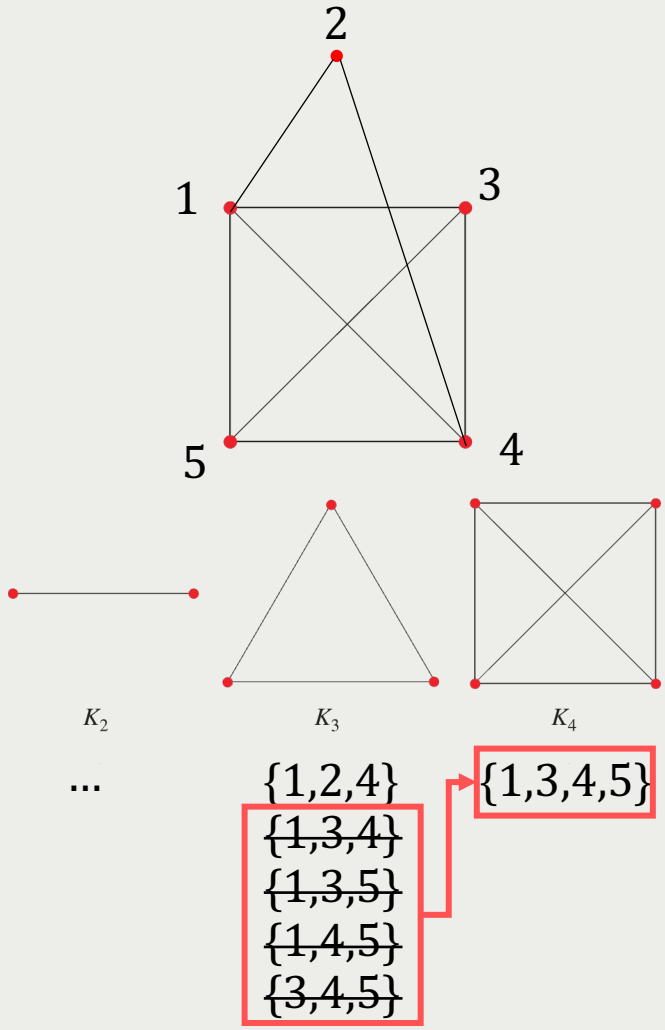
Complete Graph





Maximal K-clique

- You need to follow the specific order to get full points
- For example,



Output:

3 K: N (N elements in each node set)

{1,2,4}

4 Node Set: {a,b,c} (a<b<c)

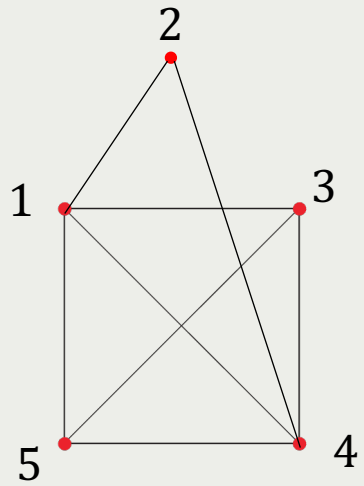
{1,3,4,5}

Ordering: $(a_1 \le a_2, b_1 \le b_2, c_1 \le c_2)$

$\{a_1,b_1,c_1\}$

$\{a_2,b_2,c_2\}$

Maximal K-clique – Case 1



Input:

1 2
1 3
1 4
1 5
2 4
3 4
3 5
4 5

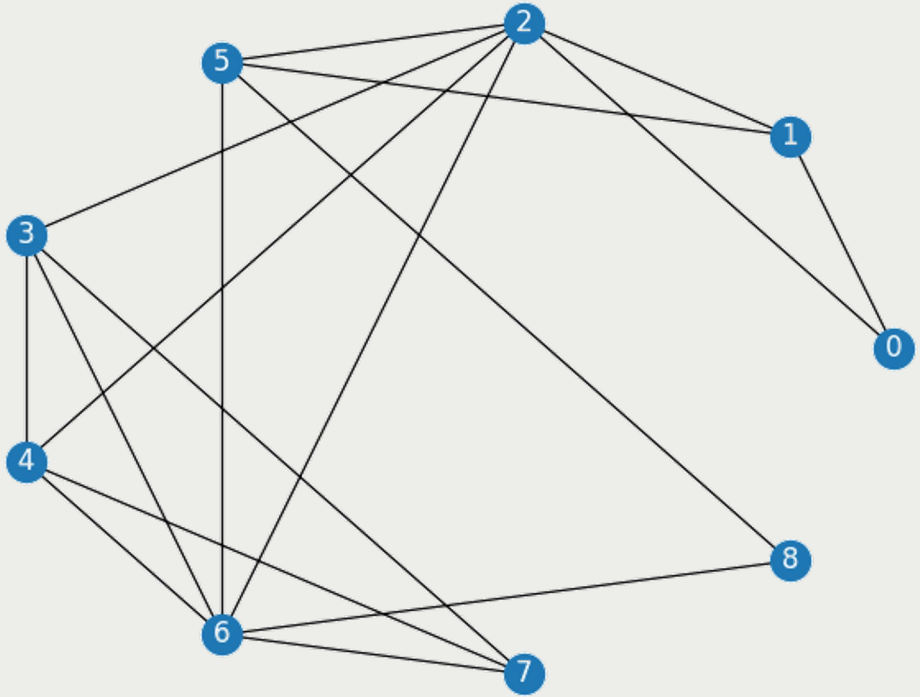
NodeA NodeB

Output:

3
{1,2,4}
4
{1,3,4,5}

Maximal K
{Node Set}

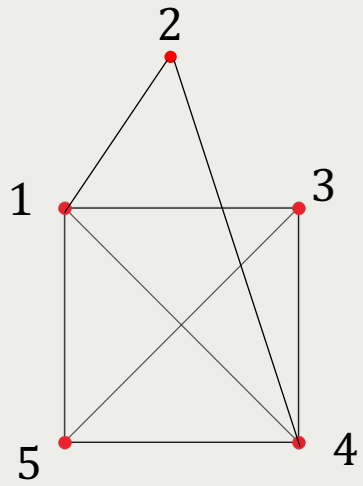
Maximal K-clique – Case 2



Output:
3
{0,1,2}
{1,2,5}
{2,5,6}
{5,6,8}
4
{2,3,4,6}
{3,4,6,7}

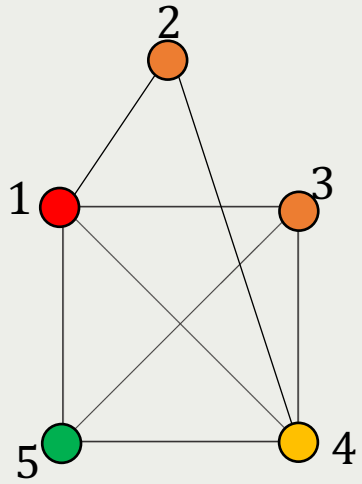
Maximal K
{Node Set}

Graph Coloring – Formosa OJ



Input:

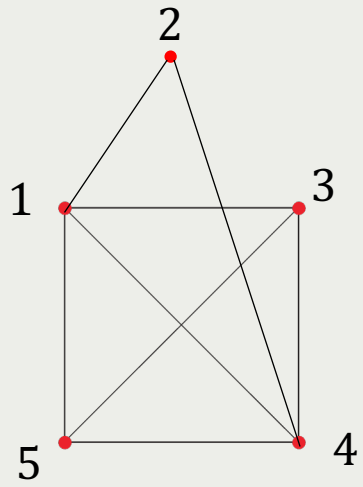
1 2
1 3
1 4
1 5
2 4
3 4
3 5
4 5



Output:

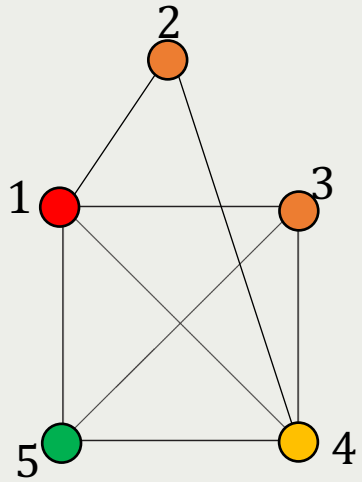
4

Graph Coloring – Submission to E3



Input:

1 2
1 3
1 4
1 5
2 4
3 4
3 5
4 5



Output:

4
1-1
2-2
3-2
4-3
5-4

Node Number – Color Number

We will prepare a sample txt file as input, your code should output another txt file.
Then, we will test for the new cases after you submit your code to E3

Policy

- You need to implement your own **Maximal K-clique & Graph Coloring** function!

- Existing source codes are forbidden.
  - Packages for graph or network are also forbidden (Ex. NetworkX).

- **No plagiarism! Otherwise, you will get no points.**

Important Dates

- You need to make submission to all problems (Maximal K-clique & Graph Coloring) to get the whole score.
- You need to submit your code to e3 (zip file).
  - Format: {student_id}_{clique/chromatic/coloring}.c / .cpp / .py
    → according to your programming language
    - Example: 309511041_clique.py
  - You need to upload a zip file to e3 with these 4 coding problems
    - Example: 309511041.zip (extract to 309511041 folder with 3 files in it)
- **Submission Deadline**
  - 1/6 23:59 – Formosa OJ Closed
  - 1/10 23:59 – Code and Report Submission Deadline

If you have any questions…

- We encourage everyone to ask questions in TA hours OR E3討論區.
  - 10:00 a.m. – 12:00 p.m. every **Wednesday** online
  - Link: https://meet.google.com/svk-ruwe-bus
- If the question is personal or the time slot is not available for you, please send an email to **both TAs**.
  - You should follow the rules to ask questions.
  - We will not answer any questions that can be found on this slides.
    - Ex. What does RE mean?
  - Questions without any detailed description will be directly ignored.
    - Ex. Why is my programming getting RE?

Q & A

Thank you!