## CSIE1212: Data Structures and Algorithms

Hsuan-Tien Lin

Dept. of CSIE, NTU

Course Introduction, March 3, 2020

H.-T. Lin (NTU CSIE)

Data Structures and Algorithms

今天(3/3)不會現場發授權碼

## 警告: High Expectations

 goal of NTU DSA class: as good as the best ones in the world

## 警告: High Expectations

- goal of NTU DSA class: as good as the best ones in the world
- tentatively, 6 homework sets and final project (http://www.csie.ntu.edu.tw/~htlin/course/dsa20spring)

## 警告: High Expectations

- goal of NTU DSA class: as good as the best ones in the world
- tentatively, 6 homework sets and final project (http://www.csie.ntu.edu.tw/~htlin/course/dsa20spring)
- will have HW1 next week

## 警告: High Expectations

- goal of NTU DSA class: as good as the best ones in the world
- tentatively, 6 homework sets and final project (http://www.csie.ntu.edu.tw/~htlin/course/dsa20spring)
- will have HW1 next week
- writing assignments and time-consuming programming assignments

## 警告: High Expectations

- goal of NTU DSA class: as good as the best ones in the world
- tentatively, 6 homework sets and final project (http://www.csie.ntu.edu.tw/~htlin/course/dsa20spring)
- will have HW1 next week
- writing assignments and time-consuming programming assignments

#### be prepared to work hard!

## 警告: Strict Instructor

 Will you give me a second chance if I copy homework from other people? No.

## 警告: Strict Instructor

- Will you give me a second chance if I copy homework from other people? No.
- Could you let me pass because I will be kicked out by the 1/2 rule? No.

## 警告: Strict Instructor

- Will you give me a second chance if I copy homework from other people? No.
- Could you let me pass because I will be kicked out by the 1/2 rule? No.
- Will you change my score from F to C? No.

## 警告: Strict Instructor

- Will you give me a second chance if I copy homework from other people? No.
- Could you let me pass because I will be kicked out by the 1/2 rule? No.
- Will you change my score from F to C? No.

be prepared to follow the rules!

警告: Uncertain Outcome

sixth-time teaching this course, but first time after five years

警告: Uncertain Outcome

- sixth-time teaching this course, but first time after five years
- ambitious and willing to experiment —live screencast teaching, for instance

警告: Uncertain Outcome

- sixth-time teaching this course, but first time after five years
- ambitious and willing to experiment —live screencast teaching, for instance
- How many people will not pass?
  I don't know yet.

警告: Uncertain Outcome

- sixth-time teaching this course, but first time after five years
- ambitious and willing to experiment —live screencast teaching, for instance
- How many people will not pass? I don't know yet.
- Will your investment (time) get good return (knowledge)? No guarantees, but I'll try my best.

警告: Uncertain Outcome

- sixth-time teaching this course, but first time after five years
- ambitious and willing to experiment —live screencast teaching, for instance
- How many people will not pass?
  I don't know yet.
- Will your investment (time) get good return (knowledge)? No guarantees, but I'll try my best.

#### be prepared to take some risks!

## Wise Words

# 給資訊系的同學們:努力加油 給想加選的同學們:審慎考慮

H.-T. Lin (NTU CSIE)

Data Structures and Algorithms

Once upon a time, when I was a freshman in NTU CSIE (1997).....

• 「計程」有兩學期,上學期教C,下學期教C++

Once upon a time, when I was a freshman in NTU CSIE (1997).....

- 「計程」有兩學期,上學期教C,下學期教C++
- 大二上學期教「資料結構」

Once upon a time, when I was a freshman in NTU CSIE (1997).....

- 「計程」有兩學期,上學期教C,下學期教C++
- 大二上學期教「資料結構」
- 大二下學期教「演算法」

Once upon a time, when I was a freshman in NTU CSIE (1997).....

- 「計程」有兩學期,上學期教C,下學期教C++
- 大二上學期教「資料結構」
- 大二下學期教「演算法」

Then, in my senior year (2001).....

• 「計程」變成一學期,大一下學期教「物件導向程式設計」(Java)

Once upon a time, when I was a freshman in NTU CSIE (1997).....

- 「計程」有兩學期,上學期教C,下學期教C++
- 大二上學期教「資料結構」
- 大二下學期教「演算法」

Then, in my senior year (2001).....

- 「計程」變成一學期,大一下學期教「物件導向程式設計」(Java)
- 大二上學期教「資料結構與演算法上」

Once upon a time, when I was a freshman in NTU CSIE (1997).....

- 「計程」有兩學期,上學期教C,下學期教C++
- 大二上學期教「資料結構」
- 大二下學期教「演算法」

Then, in my senior year (2001).....

- 「計程」變成一學期,大一下學期教「物件導向程式設計」(Java)
- 大二上學期教「資料結構與演算法上」
- 大二下學期教「資料結構與演算法下」

Once upon a time, when I was a freshman in NTU CSIE (1997).....

- 「計程」有兩學期,上學期教C,下學期教C++
- 大二上學期教「資料結構」
- 大二下學期教「演算法」

Then, in my senior year (2001).....

- 「計程」變成一學期,大一下學期教「物件導向程式設計」(Java)
- 大二上學期教「資料結構與演算法上」
- 大二下學期教「資料結構與演算法下」

Then, starting 2010.....

• 物件導向程式設計變為選修

Once upon a time, when I was a freshman in NTU CSIE (1997).....

- 「計程」有兩學期,上學期教C,下學期教C++
- 大二上學期教「資料結構」
- 大二下學期教「演算法」

Then, in my senior year (2001).....

- 「計程」變成一學期,大一下學期教「物件導向程式設計」(Java)
- 大二上學期教「資料結構與演算法上」
- 大二下學期教「資料結構與演算法下」

Then, starting 2010.....

- 物件導向程式設計變為選修
- 大一下學期教「資料結構與演算法」

Once upon a time, when I was a freshman in NTU CSIE (1997).....

- 「計程」有兩學期,上學期教C,下學期教C++
- 大二上學期教「資料結構」
- 大二下學期教「演算法」

Then, in my senior year (2001).....

- 「計程」變成一學期,大一下學期教「物件導向程式設計」(Java)
- 大二上學期教「資料結構與演算法上」
- 大二下學期教「資料結構與演算法下」

Then, starting 2010.....

- 物件導向程式設計變為選修
- 大一下學期教「資料結構與演算法」
- 大二上學期教「演算法設計與分析」

#### Reasons

 雨學期的「計程」變成一學期、「物件導向程式設計」變成選修: 相信同學們可以有自己學習不同語言的能力。

#### Reasons

- 兩學期的「計程」變成一學期、「物件導向程式設計」變成選修: 相信同學們可以有自己學習不同語言的能力。
- 把「資料結構」及「演算法」合成一門課:
  兩者互相依賴,其實不容易分散來教。

#### Reasons

- 兩學期的「計程」變成一學期、「物件導向程式設計」變成選修: 相信同學們可以有自己學習不同語言的能力。
- 把「資料結構」及「演算法」合成一門課:
  兩者互相依賴,其實不容易分散來教。
- 把「資料結構與演算法上/下」區分成「資料結構與演算法」和
  「演算法設計與分析」:
  - 前者以實作爲主,銜接計程做更深入的程式練習
  - 後者以分析為主,建立在前者的基礎上探討更多不同的演算法

## **Basic Information**

- instructor: 林軒田 Hsuan-Tien Lin (htlin@csie.ntu.edu.tw)
- office hour: after class or by appointment
- course webpage, mailing list: http://ceiba.ntu.edu.tw/1082dsa01 (CEIBA)
- course contents actually in www.csie.ntu.edu.tw/~htlin/course/dsa20spring
- course time: Tuesdays 13:20-16:20
  - 10-min break liberally in the middle
  - 10-min more teaching to fit 16 weeks
  - 10-min earlier ending (i.e. usually ends 16:10) to be fair

## **Basic Information**

- instructor: 林軒田 Hsuan-Tien Lin (htlin@csie.ntu.edu.tw)
- office hour: after class or by appointment
- course webpage, mailing list: http://ceiba.ntu.edu.tw/1082dsa01 (CEIBA)
- course contents actually in www.csie.ntu.edu.tw/~htlin/course/dsa20spring
- course time: Tuesdays 13:20–16:20
  - 10-min break liberally in the middle
  - 10-min more teaching to fit 16 weeks
  - 10-min earlier ending (i.e. usually ends 16:10) to be fair

#### Update your secondary email address on CEIBA!

• Will you repeat the previous code/slide again? Yes.

- Will you repeat the previous code/slide again? Yes.
- Will you discuss with me after class if I don't understand? Yes.

- Will you repeat the previous code/slide again? Yes.
- Will you discuss with me after class if I don't understand? Yes.
- Will you pardon my silly questions?

- Will you repeat the previous code/slide again? Yes.
- Will you discuss with me after class if I don't understand? Yes.
- Will you pardon my silly questions? There are no silly questions.

- Will you repeat the previous code/slide again? Yes.
- Will you discuss with me after class if I don't understand? Yes.
- Will you pardon my silly questions? There are no silly questions.

#### Feel free to ask me questions and give me feedback!

• 98 seats in room 102, limit =  $98 * 125\% \approx 123$ 

- 98 seats in room 102, limit =  $98 * 125\% \approx 123$
- priority-based:
  - zeroth: NTU CSIE
  - first: NTU EECS
  - other: NTU

- 98 seats in room 102, limit =  $98 * 125\% \approx 123$
- priority-based:
  - zeroth: NTU CSIE
  - first: NTU EECS
  - other: NTU

- 98 seats in room 102, limit =  $98 * 125\% \approx 123$
- priority-based:
  - zeroth: NTU CSIE
  - first: NTU EECS
  - other: NTU
- auditing: welcomed (to sit) only if there is an empty chair

- 98 seats in room 102, limit =  $98 * 125\% \approx 123$
- priority-based:
  - zeroth: NTU CSIE
  - first: NTU EECS
  - other: NTU
- auditing: welcomed (to sit) only if there is an empty chair

#### please think before you choose to enroll

• TAs (tentatively): 陳佳佑、周侑廷、李鈺昇、楊皓丞、吴崇維

- TAs (tentatively): 陳佳佑、周侑廷、李鈺昇、楊皓丞、吴崇維
- TA email: dsa\_ta@csie.ntu.edu.tw
  —5 TAs and 1 instructor around, usually faster than sending to individual

- TAs (tentatively): 陳佳佑、周侑廷、李鈺昇、楊皓丞、吴崇維
- TA email: dsa\_ta@csie.ntu.edu.tw -5 TAs and 1 instructor around, usually faster than sending to individual
- office hours: to be announced

- TAs (tentatively): 陳佳佑、周侑廷、李鈺昇、楊皓丞、吴崇維
- TA email: dsa\_ta@csie.ntu.edu.tw —5 TAs and 1 instructor around, usually faster than sending to individual
- office hours: to be announced

#### very friendly TAs; ask them more questions!

Taking any unfair advantages over other class members is not allowed. It is everyone's responsibility to maximize the level of fairness.

Taking any unfair advantages over other class members is not allowed. It is everyone's responsibility to maximize the level of fairness.

eating? fine, but no smells and no noise

Taking any unfair advantages over other class members is not allowed. It is everyone's responsibility to maximize the level of fairness.

- eating? fine, but no smells and no noise
- sleeping? fine, but no snoring

Taking any unfair advantages over other class members is not allowed. It is everyone's responsibility to maximize the level of fairness.

- eating? fine, but no smells and no noise
- sleeping? fine, but no snoring
- cellphone? fine, but silent mode, and speak outside

Taking any unfair advantages over other class members is not allowed. It is everyone's responsibility to maximize the level of fairness.

- eating? fine, but no smells and no noise
- sleeping? fine, but no snoring
- cellphone? fine, but silent mode, and speak outside

applies to instructor, TAs, students

Honesty

# **NO CHEATING**

# **NO LYING**

#### **NO PLAGIARISM**

H.-T. Lin (NTU CSIE)

Data Structures and Algorithms

Honesty

# **NO CHEATING**

# **NO LYING**

#### **NO PLAGIARISM**

#### very very very serious consequences

homework (best \* 1.5 + worst \* 0.5 + others), midterm, final project

- homework (best \* 1.5 + worst \* 0.5 + others), midterm, final project
- supplementary reference: participation in discussions

- homework (best \* 1.5 + worst \* 0.5 + others), midterm, final project
- supplementary reference: participation in discussions
- raw score goes through some order-preserving normalization steps, not just using default thresholds of university
  - raw score 80 with term rank A: possible

- homework (best \* 1.5 + worst \* 0.5 + others), midterm, final project
- supplementary reference: participation in discussions
- raw score goes through some order-preserving normalization steps, not just using default thresholds of university
  - raw score 80 with term rank A: possible
  - raw score 80 with term rank B: possible

- homework (best \* 1.5 + worst \* 0.5 + others), midterm, final project
- supplementary reference: participation in discussions
- raw score goes through some order-preserving normalization steps, not just using default thresholds of university
  - raw score 80 with term rank A: possible
  - raw score 80 with term rank B: possible
  - raw score 60 with term rank F: possible

- homework (best \* 1.5 + worst \* 0.5 + others), midterm, final project
- supplementary reference: participation in discussions
- raw score goes through some order-preserving normalization steps, not just using default thresholds of university
  - raw score 80 with term rank A: possible
  - raw score 80 with term rank B: possible
  - raw score 60 with term rank F: possible
  - raw scores 80, 60 with term scores B, B: possible, but unlikely

- homework (best \* 1.5 + worst \* 0.5 + others), midterm, final project
- supplementary reference: participation in discussions
- raw score goes through some order-preserving normalization steps, not just using default thresholds of university
  - raw score 80 with term rank A: possible
  - raw score 80 with term rank B: possible
  - raw score 60 with term rank F: possible
  - raw scores 80, 60 with term scores B, B: possible, but unlikely
  - raw scores 80, 60 with term scores F, B: impossible

- homework (best \* 1.5 + worst \* 0.5 + others), midterm, final project
- supplementary reference: participation in discussions
- raw score goes through some order-preserving normalization steps, not just using default thresholds of university
  - raw score 80 with term rank A: possible
  - raw score 80 with term rank B: possible
  - raw score 60 with term rank F: possible
  - raw scores 80, 60 with term scores B, B: possible, but unlikely
  - raw scores 80, 60 with term scores F, B: impossible

#### from the principle: no individual score change

• homework discussions: encouraged

- homework discussions: encouraged
- but fairness?
  write the final solutions alone and understand them fully

- homework discussions: encouraged
- but fairness?
  write the final solutions alone and understand them fully
- references (books, notes, Internet): consulted, but not copied from

- homework discussions: encouraged
- but fairness?
  write the final solutions alone and understand them fully
- references (books, notes, Internet): consulted, but not copied from
- no need to lend/borrow solutions

to maximize fairness (everyone's responsibility), lending/borrowing/buying/selling not allowed

Deal? If your classmate wants to borrow homework from you, what do you say?

- students: justify solutions clearly
- TAs: evaluate solutions fairly

- students: justify solutions clearly
- TAs: evaluate solutions fairly
- no individual extension unless not violating the principle (e.g. institute-established cases of illness or emergency)

- students: justify solutions clearly
- TAs: evaluate solutions fairly
- no individual extension unless not violating the principle (e.g. institute-established cases of illness or emergency)

#### • late penalty:

90% of the value for 12-hour late, 80% of value for 24-hour late, ...

- students: justify solutions clearly
- TAs: evaluate solutions fairly
- no individual extension unless not violating the principle (e.g. institute-established cases of illness or emergency)
- late penalty: 90% of the value for 12-hour late, 80% of value for 24-hour late, ...

#### four penalty-free late half-days (金牌) per person

#### Textbook

# Data Structures and Algorithms in C++, 2nd Edition by Goodrich, Tamassia and Mount.

please get it as early as possible

#### Textbook

Data Structures and Algorithms in C++, 2nd Edition by Goodrich, Tamassia and Mount.

- please get it as early as possible
- will teach selected parts from it, and ask you to read others

learning to read a textbook is part of the course

#### Getting the Book to Read

• NTU Library: reserved copy in the shared course material area

#### Getting the Book to Read

- NTU Library: reserved copy in the shared course material area
- R536: will put some shared copies to be read in the room

#### Getting the Book to Read

- NTU Library: reserved copy in the shared course material area
- R536: will put some shared copies to be read in the room
- If the book is not affordable to you: email me (htlin@csie.ntu.edu.tw) and I'll see how I can help.



- weekly
- sections related to what we teach, or sections that are worth reading by yourself
  - -we cannot teach all, but with reading you can learn all

- weekly
- sections related to what we teach, or sections that are worth reading by yourself
  - -we cannot teach all, but with reading you can learn all
- 3-6: 3 hour teaching, 6 hour reading/writing after class

- weekly
- sections related to what we teach, or sections that are worth reading by yourself
  - -we cannot teach all, but with reading you can learn all
- 3-6: 3 hour teaching, 6 hour reading/writing after class

some problems related to reading assignments may show up in your writing assignments as well

Mandarin: main language

- Mandarin: main language
- English: often encountered
  —coding, website, assignments, some teaching ....

- Mandarin: main language
- English: often encountered
  - -coding, website, assignments, some teaching ....
  - -important for your future and you are recommended to practice

- Mandarin: main language
- English: often encountered
  - -coding, website, assignments, some teaching ...
  - -important for your future and you are recommended to practice

#### don't be afraid of English

#### How to Pass the Class?

- catch up from day 1
- ask questions!
- have fun writing programs
- understand writing proof

#### Important TODOs

- Update your secondary email address on CEIBA
- Read the policy on the website thoroughly

**Enjoy the Class! Questions?**