

CSE 20

Lecture 2: Representing integers in different bases

TAs and Tutors

- Instructor:
Sourav Chakraborty (sochakraborty@ucsd.edu)
- TAs:
 - ① Cameron Helm (chelm@ucsd.edu)
 - ② Rossana Motta (rmotta@ucsd.edu)
 - ③ Yan Yan (yayan@ucsd.edu)
- Tutors:
 - ① Chen Helena (hec013@ucsd.edu)
 - ② Duan Jiajie (jduan@ucsd.edu)
 - ③ Lee Daniel Min (dml016@ucsd.edu)
 - ④ Li Yuan (yul173@ucsd.edu)
 - ⑤ Nguyen Timothy (tin018@ucsd.edu)

Classes

- Discussions: Wed, Fri 3PM-3:50PM (YORK 2622)
- Office Hours: Instructor office hour: by appointment
 - Mon 1PM - 3PM Li Yuan
 - Tue 1PM - 2PM Lee Daniel Min and
4PM - 6PM Nguyen Timothy
 - Wed 1PM - 2PM Lee Daniel Min and
5PM to 7PM Duan Jiajie
 - Thu 11AM - 12 PM Cameron (near CSE 2232) and
12PM -1PM Yan Yan (CSE 3148)
 - Fri 2-3 Cameron (near CSE 2232) and
4PM to 5PM Yan Yan (CSE 3148)

All office hours will be in the Basement Hallway (near the blackboard) of the CSE Building, unless specified otherwise.

Evaluation Process

- Assignments (no marks)
- Quizes
 - Around 6 quizzes.
 - 5% each.
 - Everything will be done on “Blackboard”.
- MidTerm 30%.
- Endterm Term 40%.

Books and references

Textbook for the course is

- A short course in Discrete Mathematics, by E.A.Bender and S.G.Williamson

Also one may refer to the following books:

- Essentials of Discrete Mathematics, by David Hunter.
- Discrete Mathematics, by Seymour Lipschutz and Marc Lipson

Representation of integers

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Digits: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9

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What does 217 read like?

Usually we represent our number in decimal representation.

Like: $217 = 2 * 10^2 + 1 * 10 + 7$

Numbers with base b

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Base b representation of a number x is the unique way of writing

$$x = x_0 * b^0 + x_1 * b^1 + \dots + x_k * b^k,$$

where $x_0, x_1, \dots, x_k \in \{0, 1, \dots, (b - 1)\}$

Algorithm for finding representation in base b

Unique representation in base “ b ”

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Let N be a number that be write in base b .

Let there be two different representation in base b :

$$N = x_0 * b^0 + x_1 * b^1 + \dots + x_k * b^k,$$

$$N = y_0 * b^0 + y_1 * b^1 + \dots + y_k * b^k.$$

Is it possible that there exists $(\exists) i$ such that $x_i \neq y_i$?