**Outline**

**Announcements**

* 2023-02-20: [Review: Optional Session](https://github.com/TT00FE39-3001/lecture-2023-02-20-review)
* 2023-02-27: Lecture 5
* 2023-03-10: Career coaching (OMA)
  + Consider: peer evaluation in social media
  + Remember: Degree first

**Topics**

* [Review](https://github.com/TT00FE39-3001/lecture4/blob/main/review.md)
* Divide & Conquer
  + Merge Sort
  + Quick sort
* Hash Tables
  + Space vs Time
  + Collision resolution
* Linked lists

**This Week in Points**

* Group Activities (Max 9 points)
* Homework (Max 9 points)
* Peer reviews (Max 7 points)

**Part 1: Divide & Conquer**

* [Merge Sort](https://opendsa-server.cs.vt.edu/OpenDSA/Books/Everything/html/Mergesort.html)
* [Quick sort](https://opendsa-server.cs.vt.edu/OpenDSA/Books/Everything/html/Quicksort.html)
* [Activity 1](https://github.com/TT00FE39-3001/lecture4/blob/main/activity1)

**Part 2: Hash Tables**

* Space vs Time
* Hash Tables
* Collision resolution
  + [Probability of a collision](https://opendsa-server.cs.vt.edu/ODSA/StandaloneModules/20200825204059/html/HashFunc.html)
  + [Open Hashing](https://opendsa-server.cs.vt.edu/OpenDSA/Books/Everything/html/OpenHash.html)
  + [Bucket Hashing](https://opendsa-server.cs.vt.edu/OpenDSA/Books/Everything/html/BucketHash.html)
* [Activity 2](https://github.com/TT00FE39-3001/lecture4/blob/main/activity2)

**Part 3: Linked Lists & Asymptotic Analysis**

* [Linked Lists](https://www.softwaretestinghelp.com/linked-list/)
* [Asymptotic Analysis and Upper Bounds](https://opendsa-server.cs.vt.edu/OpenDSA/Books/Everything/html/AnalAsymptotic.html)
* [Activity 3](https://github.com/TT00FE39-3001/lecture4/blob/main/activity3)

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**## Topics**

- [Review](./review.md)

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  - Merge Sort

  - Quick sort

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  - Space vs Time

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- [Activity 1](./activity1)

**## Part 2: Hash Tables**

- Space vs Time

- Hash Tables

- Collision resolution

  - [Probability of a collision](https://opendsa-server.cs.vt.edu/ODSA/StandaloneModules/20200825204059/html/HashFunc.html)

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review

**# Review**

**## Classification of Algorithm techniques**

- Brute Force

  - Linear search

  - Bubble sort

  - Selection sort

- Decrease and conquer

  - Binary Search

  - Insertion sort

- Divide-and-Conquer

  - `pow()`

**## Data Structures & ADT**

- Arrays, Linked Lists

- Queues

- Stacks

**## Analysis of Algorithm Efficiency**

- Big O Complexity

- Average case vs worst case

- Space vs Time

**## Misc**

- FIFO vs LIFO

- Recursion vs Iteration

- Logarithms vs Exponential

links

**# Links**

- [QuickSort](https://www.geeksforgeeks.org/quick-sort/)

- [Merge Sort Algorithm](https://www.geeksforgeeks.org/merge-sort/)

- [Data Structures and Algorithms ](https://opendsa-server.cs.vt.edu/OpenDSA/Books/Everything/html/)

- [Hashing](https://www.geeksforgeeks.org/hashing-data-structure/)

- https://cpp.sh/

HOMEWORK

**# Homework**

**## Task 1/3:Videos**

- [Hashes 1](https://youtu.be/)

- [Hashes 2](https://youtube.com/watch?v=XYmI-T-JJso&si=EnSIkaIECMiOmarE)

- [Hashes 3](https://youtube.com/watch?v=YIoZQwWJIDA&si=EnSIkaIECMiOmarE)

- [Hashes 4](https://youtube.com/watch?v=jtMwp0FqEcg&si=EnSIkaIECMiOmarE)

**## Task 2/3: Reading**

- [Quick Sort In C++](https://www.softwaretestinghelp.com/quick-sort/)

- [Merge Sort In C++](https://www.softwaretestinghelp.com/merge-sort/)

- [Hash Table In C++](https://www.softwaretestinghelp.com/hash-table-cpp-programs/)

- [Linked List Operations](https://www.softwaretestinghelp.com/linked-list/)

- [Asymptotic Analysis and Upper Bounds](https://opendsa-server.cs.vt.edu/OpenDSA/Books/Everything/html/AnalAsymptotic.html)

**## Task 3/3: Pre-Lecture (Videos)**

- [Trees and heaps](https://youtube.com/watch?v=lhTCSGRAlXI&si=EnSIkaIECMiOmarE)

- [Heaps 1](<https://youtube.com/watch?v=BzQGPA_v-vc&si=EnSIkaIECMiOmarE>)