Data Structures and Algorithms Design (S2-23\_SSZG519)

**### [Session-1] DSAD 1.1: Introduction to Algorithm Analysis**

**DSAD 1.1:** Notion of good algorithm, Pseudo code convention, Notion of complexity, Asymptotic Complexity

<https://www.youtube.com/watch?v=qA41Q1kPhgo>

**Note: DSAD 1.2 - 1.4** shall be read without referring to Divide and Conquer Algorithm. Following approaches to solving recurrences must be covered.

**DSAD 1.2:** Solving Recurrences using Substitution Method

<https://www.youtube.com/watch?v=mSQ9153XU7I&feature=youtu.be>

**DSAD 1.3:** Solving Recurrences using Recursion Tree Method

<https://www.youtube.com/watch?v=-3-JwutM2q0>

**DSAD 1.4:** Solving Recurrences Using Master Methods

<https://www.youtube.com/watch?v=xK1w1PwayGE>

**### [Session-2] DSAD 2.1: Stacks, Queues and Lists**

**DSAD 2.1:** <https://www.youtube.com/watch?v=QWH88uOPTJo>

**### [Session-3] DSAD 3.1: Trees - Representations - Traversals**

**### [Session-4 - First Half] DSAD 3.2: Heaps**

**DSAD 3.1:** <https://www.youtube.com/watch?v=MGarIr51jOU>

**DSAD 3.2**

**[0 to 53:00 MINS ONLY]:** <https://www.youtube.com/watch?v=sUkqETgkcMw>

**### [Session-4 and 5] DSAD 4.1, 4.2, 4.3: Dictionary Data Structures - Hash Tables, BST**

**DSAD 4.1:** <https://youtu.be/F_5RNNlcBlU>

**DSAD 4.2:** <https://youtu.be/Y47mGZgDf5U>

**DSAD 4.3:** <https://youtu.be/ZWAxj9PYH9A>

**### [Optional - Self Study Module- More on Dictionary Data Structures]**

**DSAD 4.4:** <https://youtu.be/FuS9YwA_YVc>

**DSAD 4.5:** <https://youtu.be/T4C1MWhn-oA>

**DSAD 4.6:** <https://youtu.be/XlKDm49CfJs>

**### [Session-6] DSAD 5.1: Divide and Conquer Algorithms**

**DSAD 5.1.1:** Divide and Conquer technique introduction

<https://www.youtube.com/watch?v=G4Dt4Wmpq_w>

**DSAD 5.1.2:** Merge Sort Algorithm

<https://www.youtube.com/watch?v=a3njLZAHSyg>

**DSAD 5.1.3:** Proof of Correctness of Merge Sort

<https://www.youtube.com/watch?v=HLeEB0AKfFI>

**DSAD 5.1.4:** Analysis of Merge Sort

<https://www.youtube.com/watch?v=P82_hrzLhE4>

**DSAD 5.1.5:** Introduction to the maximum sub-array problem

<https://www.youtube.com/watch?v=QUymf1tG_5o>

**DSAD 5.1.6:** The Algorithm to solve Maximum sub-array problem

<https://www.youtube.com/watch?v=m5Lc4RMLVPU>

**### [Session-7] DSAD 5.2: Dynamic Programming**

**DSAD 5.2.1:** <https://youtu.be/PdqtwOS3xL8>

**DSAD 5.2.2:** <https://youtu.be/n2Z9RMYi2_A>

**DSAD 5.2.3:** <https://youtu.be/CTX4qF7SJE8>

**DSAD 5.2.4:** <https://youtu.be/BpbpguxOyks>

**### [Session-8] DSAD 5.3: Greedy Solutions**

**DSAD 5.3.1:** <https://youtu.be/f_PHU3PbNXg>

**DSAD 5.3.2:** <https://youtu.be/mW0jZ0W8aT4>

**DSAD 5.3.3:** <https://youtu.be/q9vI9QJDQzk>

**DSAD 5.3.4:** <https://youtu.be/XKBr_Z9jWDo>

**DSAD 5.3.5:** <https://youtu.be/QBczCXhTWKg>

**DSAD 5.3.6:** <https://youtu.be/2Y9HLzFAK1M>

**### [Session-9] DSAD 5.4: Graph Algorithms**

**DSAD 5.4.1:** <https://youtu.be/Yfx7SRcNsCM>

**DSAD 5.4.2:** <https://youtu.be/WAzwonEnVQM>

**DSAD 5.4.3:** <https://youtu.be/wsD8LJ6OgXU>

**DSAD 5.4.4:** <https://youtu.be/LT6wE3DCQH8>

**DSAD 5.4.5:** <https://youtu.be/2Xxlb2Kw_vs>

s**### [Session-10] DSAD 6: NP Completeness**

**DSAD 6.1.1:** <https://youtu.be/m1JXI6YG20o>

**DSAD 6.1.2:** <https://youtu.be/cVxTWict6yE>

**DSAD 6.1.3:** <https://youtu.be/h026vh7iX9Y>

**DSAD 6.2.1:** <https://youtu.be/cgqtWVwwyzs>

**DSAD 6.2.2:** <https://youtu.be/KkQw67NfESA>

**DSAD 6.2.3:** <https://youtu.be/I0MNuxxyiLM>