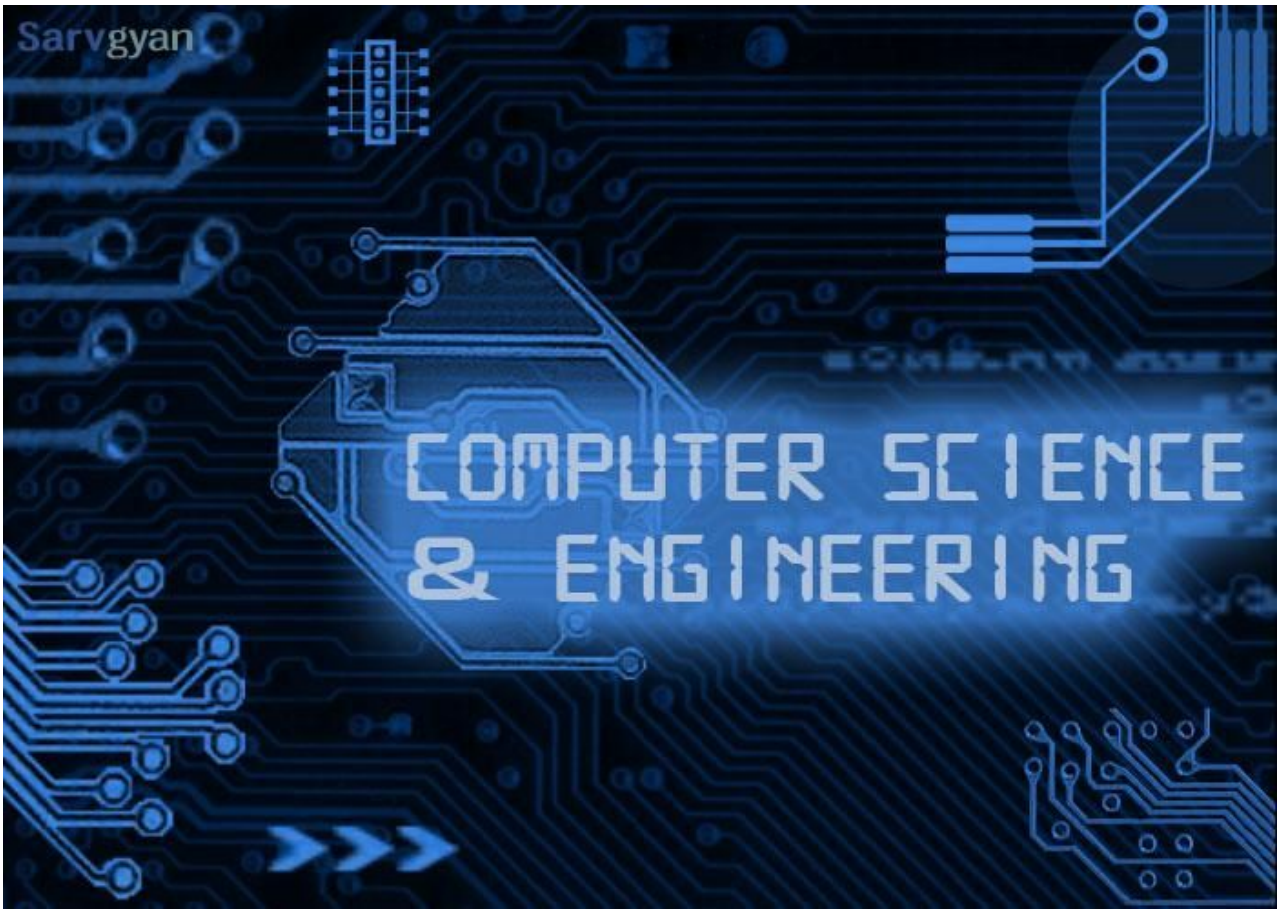
Principles of Computer Science: A Compendium of Video Lectures

Hammad Ur Rahman



Foreword

The single most important factor determining the quality of education at school, college or university levels is the quality of available faculty. At good universities the ratio of PhD level faculty to students is 1: 10 or even less. At the University of Cambridge where I happen be an Honorary Life Fellow (Kings College) it is 1:6. The quality of education and research at Cambridge is reflected from the fact that over 90 Nobel Prizes have been awarded to senior researchers associated with Cambridge University. Clearly it will take decades for universities in developing countries to reach those standards even if there are visionary governments providing liberal financial support.

However, there is hope. The manner in which education is being imparted is undergoing radical changes and distance education is allowing developing countries to benefit from lectures delivered by leading academicians from top Western Universities through Massive Open Online Courses (MOOCs). We launched an integrated version of MOOCs a few years ago which contains tens of thousands of lectures in various disciplines at school, college and university level from MIT, Stanford, Yale, University of California, Khan Academy and other institutions. These are freely available at www.lej4learning.com.pk

Another exciting initiative by us is the in the form of books without any text --- containing just video links under different headings and sub headings to lectures by leading professors. This should bring about a paradigm shift in the manner in which teaching is imparted as it will allow both students and teachers to study the materials in advance and free the class room time for discussion sessions so that concepts can be discussed and clarified. The first such book on chemical sciences, entitled “Basic Principles of Organic Chemistry – A Compendium of Video-Lectures”, was published early in 2016 and it has a Foreword by the Nobel Laureate Prof. Jean-Marie Lehn (Strasbourg, France). The present book by my grandson Hammad-Ur-Rahman represents a valiant effort in computer science, and it is suitable for undergraduate and postgraduate students. It contains

lectures by leading professors from MIT, Yale, University of California and other institutions.

I would like to congratulate Hammad, who is studying at A-levels in Karachi Grammar School, for the excellent work done and hope that it will be useful for students and researchers all over the world.

Atta-Ur-Rahman FRS, NI, HI, SI, TI

Professor Emeritus

University of Karachi

Honorary Life Fellow,

Kings College, Cambridge University

Preface:

I am a student in Karachi Grammar School currently doing my A levels. This project was given to me by my grandfather Dr. Atta Ur Rahman as a part of an internship at HEJ Research Institute of Chemistry, University of Karachi. Compiling this video book has been an enjoyable and remarkable learning experience for me.

I believe video books such as this are essential in this day and age. Education standards in Pakistan have been declining with Pakistan having one of the lowest literacy rates in the world and according to the United Nations Educational, Scientific and Cultural Organization (UNESCO), standing at 160th in total countries of the world. One of the main concerns is the lack of high quality teachers and the high cost of education. In view of the foregoing challenges, our system of education calls for a change. We have to develop schemes of education so that complete and harmonious improvement can be possible. Through these video books, students can acquire education through lectures by eminent experts in some of the most prestigious universities of the world absolutely free of cost, which should help in massively raising education standards worldwide.

Hammad Ur Rahman

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http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-046j-design-and-analysis-of-algorithms-spring-2015/lecture-videos/lecture-20-asynchronous-distributed-algorithms-shortest-paths-spanning-trees

4.21. Cryptography: Hash Functions

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-046j-design-and-analysis-of-algorithms-spring-2015/lecture-videos/lecture-21-cryptography-hash-functions

4.22. Cryptography: Encryption

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-046j-design-and-analysis-of-algorithms-spring-2015/lecture-videos/lecture-22-cryptography-encryption

4.23. Cache-Oblivious Algorithms: Medians and Matrices

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-046j-design-and-analysis-of-algorithms-spring-2015/lecture-videos/lecture-23-cache-oblivious-algorithms-medians-matrices

4.24. Cache-Oblivious Algorithms: Searching and Sorting

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-046j-design-and-analysis-of-algorithms-spring-2015/lecture-videos/lecture-24-cache-oblivious-algorithms-searching-sorting

Data Structure and Algorithms

5.1. Lecture 1

https://www.youtube.com/watch?v=RpRRUQFbePU&list=PLE621E25B3BF8B9D1&index=1

5.2. Lecture 2

https://www.youtube.com/watch?v=JTAkUs-NjxU&list=PLE621E25B3BF8B9D1&index=2

5.3. Lecture 3

https://www.youtube.com/watch?v=5hKEhXEui6w&list=PLE621E25B3BF8B9D1&index=3

5.4. Lecture 4

https://www.youtube.com/watch?v=EHtBa_2cUwY&list=PLE621E25B3BF8B9D1&index=4

5.5. Lecture 5

https://www.youtube.com/watch?v=Z76_G6vbgIU&list=PLE621E25B3BF8B9D1&index=5

5.6. Lecture 6

https://www.youtube.com/watch?v=D5C9bLnzDdI&list=PLE621E25B3BF8B9D1&index=6

5.7. Lecture 7

https://www.youtube.com/watch?v=-2StgSTRE6c&list=PLE621E25B3BF8B9D1&index=7

5.8. Lecture 8

https://www.youtube.com/watch?v=1uyl6l7arc8&list=PLE621E25B3BF8B9D1&index=8

5.9. Lecture 9

https://www.youtube.com/watch?v=r7bgwYkgC4c&list=PLE621E25B3BF8B9D1&index=9

5.10. Lecture 10

https://www.youtube.com/watch?v=3mxp4JLGasE&index=10&list=PLE621E25B3BF8B9D1

https://www.youtube.com/watch?v=k8lJ3kTT6e8&index=11&list=PLE621E25B3BF8B9D1

5.11. Lecture 11

https://www.youtube.com/watch?v=p1ogB-9DDwc&index=12&list=PLE621E25B3BF8B9D1

5.12. Lecture 12

https://www.youtube.com/watch?v=sNzt9kLdp7U&index=14&list=PLE621E25B3BF8B9D1

5.13. Lecture 13

https://www.youtube.com/watch?v=jGz9xwVwVmY&index=15&list=PLE621E25B3BF8B9D1

5.14. Lecture 14

https://www.youtube.com/watch?v=H_JgFrkorhc&index=16&list=PLE621E25B3BF8B9D1

5.15. Lecture 15

https://www.youtube.com/watch?v=nJHAxI7ux0s&index=17&list=PLE621E25B3BF8B9D1

5.16. Lecture 16

https://www.youtube.com/watch?v=S0RbfIrRxlo&index=18&list=PLE621E25B3BF8B9D1

5.17. Lecture 17

https://www.youtube.com/watch?v=HhEL9NKusTk&index=19&list=PLE621E25B3BF8B9D1

5.18. Lecture 18

https://www.youtube.com/watch?v=FjlOGQq_Z0c&index=20&list=PLE621E25B3BF8B9D1

5.19. Lecture 19

https://www.youtube.com/watch?v=K8nY_H8q5zA&index=21&list=PLE621E25B3BF8B9D1

5.20. Lecture 20

https://www.youtube.com/watch?v=KNICAjvDMns&index=22&list=PLE621E25B3BF8B9D1

5.21. Lecture 21

https://www.youtube.com/watch?v=uYR_Gb6q2c0&index=23&list=PLE621E25B3BF8B9D1

5.22. Lecture 22

https://www.youtube.com/watch?v=6K2SKMnQvUE&index=24&list=PLE621E25B3BF8B9D1

5.23. Lecture 23

https://www.youtube.com/watch?v=i2SqB4La1r8&index=25&list=PLE621E25B3BF8B9D1

5.24. Lecture 24

https://www.youtube.com/watch?v=aErYv5HyX8Y&index=26&list=PLE621E25B3BF8B9D1

5.25. Lecture 25

https://www.youtube.com/watch?v=r0VvhcDPH3g&index=27&list=PLE621E25B3BF8B9D1

5.26. Lecture 26

https://www.youtube.com/watch?v=tZe2uoU7Xtw&index=28&list=PLE621E25B3BF8B9D1

5.27. Lecture 27

https://www.youtube.com/watch?v=0k0mqrOzQaw&index=29&list=PLE621E25B3BF8B9D1

5.28. Lecture 28

https://www.youtube.com/watch?v=S2BehYAB_hY&index=30&list=PLE621E25B3BF8B9D1

5.29. Lecture 29

https://www.youtube.com/watch?v=skxZVhuOTOw&index=31&list=PLE621E25B3BF8B9D1

5.30. Lecture 30

https://www.youtube.com/watch?v=eJNh_-sPPI0&index=32&list=PLE621E25B3BF8B9D1

5.31. Lecture 31

https://www.youtube.com/watch?v=wafIacxERqU&index=33&list=PLE621E25B3BF8B9D1

5.32. Lecture 32

https://www.youtube.com/watch?v=qHIflU8C0WY&index=34&list=PLE621E25B3BF8B9D1

5.33. Lecture 33

https://www.youtube.com/watch?v=TQVbBEo-9LY&index=35&list=PLE621E25B3BF8B9D1

5.34. Lecture 34

https://www.youtube.com/watch?v=MXMqSjiNYyk&index=36&list=PLE621E25B3BF8B9D1

5.35. Lecture 35

https://www.youtube.com/watch?v=tbrQ8kkge-w&index=37&list=PLE621E25B3BF8B9D1

5.36. Lecture 36

https://www.youtube.com/watch?v=BRfpRWMOopY&index=38&list=PLE621E25B3BF8B9D1

5.37. Lecture 37

https://www.youtube.com/watch?v=zVCm1OVRIgg&index=39&list=PLE621E25B3BF8B9D1

5.38. Lecture 38

https://www.youtube.com/watch?v=PtnC4xFXIik&index=40&list=PLE621E25B3BF8B9D1

5.39. Lecture 39

https://www.youtube.com/watch?v=N9xG5IhaNug&index=41&list=PLE621E25B3BF8B9D1

5.40. Lecture 40

https://www.youtube.com/watch?v=WZyeCfXGqjE&index=42&list=PLE621E25B3BF8B9D1

5.41. Lecture 41

https://www.youtube.com/watch?v=NT6fNDObfCM&index=44&list=PLE621E25B3BF8B9D1

5.42. Lecture 42

https://www.youtube.com/watch?v=lEnJkef-5Ls&index=45&list=PLE621E25B3BF8B9D1

5.43. Lecture 43

https://www.youtube.com/watch?v=G5vUC5epTwc&index=46&list=PLE621E25B3BF8B9D1

5.44. Lecture 44

https://www.youtube.com/watch?v=GreOd9DzZn0&index=47&list=PLE621E25B3BF8B9D1

Artificial Intelligence

6.1. Introduction and Scope

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/lecture-videos/lecture-1-introduction-and-scope

6.2. Reasoning: Goal Trees and Problem Solving

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/lecture-videos/lecture-2-reasoning-goal-trees-and-problem-solving

6.3. Reasoning: Goal Trees and Rule-Based Expert Systems

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/lecture-videos/lecture-3-reasoning-goal-trees-and-rule-based-expert-systems

6.4. Search: Depth-First, Hill Climbing, Beam

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/lecture-videos/lecture-4-search-depth-first-hill-climbing-beam

6.5. Search: Optimal, Branch and Bound, A*

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/lecture-videos/lecture-5-search-optimal-branch-and-bound-a

6.6. Search: Games, Minimax, and Alpha-Beta

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/lecture-videos/lecture-6-search-games-minimax-and-alpha-beta

6.7. Constraints: Interpreting Line Drawings

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/lecture-videos/lecture-7-constraints-interpreting-line-drawings

6.8. Constraints: Search, Domain Reduction

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/lecture-videos/lecture-8-constraints-search-domain-reduction

6.9. Constraints: Visual Object Recognition

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/lecture-videos/lecture-9-constraints-visual-object-recognition

6.10. Introduction to Learning, Nearest Neighbors

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/lecture-videos/lecture-10-introduction-to-learning-nearest-neighbors

6.11. Learning: Identification Trees, Disorder

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/lecture-videos/lecture-11-learning-identification-trees-disorder

6.12. Neural and Deep Neural Nets

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/lecture-videos/lecture-12a-neural-nets

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/lecture-videos/lecture-12b-deep-neural-nets

6.13. Learning: Genetic Algorithms

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/lecture-videos/lecture-13-learning-genetic-algorithms

6.14. Learning: Sparse Spaces, Phonology

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/lecture-videos/lecture-14-learning-sparse-spaces-phonology

6.15. Learning: Near Misses, Felicity Conditions

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/lecture-videos/lecture-15-learning-near-misses-felicity-conditions

6.16. Learning: Support Vector Machines

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/lecture-videos/lecture-16-learning-support-vector-machines

6.17. Learning: Boosting

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/lecture-videos/lecture-17-learning-boosting

6.18. Representations: Classes, Trajectories, Transitions

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/lecture-videos/lecture-18-representations-classes-trajectories-transitions

6.19. Architectures: GPS, SOAR, Subsumption, Society of Mind

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/lecture-videos/lecture-19-architectures-gps-soar-subsumption-society-of-mind

6.20. Probabilistic Inference

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/lecture-videos/lecture-21-probabilistic-inference-i

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/lecture-videos/lecture-22-probabilistic-inference-ii

6.21. Model Merging, Cross-Modal Coupling, Course Summary

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/lecture-videos/lecture-23-model-merging-cross-modal-coupling-course-summary

Structure and Interpretation of Computer Programming

7.1. Overview and Introduction to Lisp

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-001-structure-and-interpretation-of-computer-programs-spring-2005/video-lectures/1a-overview-and-introduction-to-lisp

7.2. Procedures and Processes; Substitution Model

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-001-structure-and-interpretation-of-computer-programs-spring-2005/video-lectures/1b-procedures-and-processes-substitution-model

7.3. Higher-Order Procedures

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-001-structure-and-interpretation-of-computer-programs-spring-2005/video-lectures/2a-higher-order-procedures

7.4. Compound Data

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-001-structure-and-interpretation-of-computer-programs-spring-2005/video-lectures/2b-compound-data

7.5. Henderson Escher Example

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-001-structure-and-interpretation-of-computer-programs-spring-2005/video-lectures/3a-henderson-escher-example

7.6. Symbolic Differentiation; Quotation

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-001-structure-and-interpretation-of-computer-programs-spring-2005/video-lectures/3b-symbolic-differentiation-quotation

7.7. Pattern Matching and Rule-based Substitution

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-001-structure-and-interpretation-of-computer-programs-spring-2005/video-lectures/4a-pattern-matching-and-rule-based-substitution

7.8. Generic Operators

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-001-structure-and-interpretation-of-computer-programs-spring-2005/video-lectures/4b-generic-operators

7.9. Assignment, State, and Side-Effects

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-001-structure-and-interpretation-of-computer-programs-spring-2005/video-lectures/5a-assignment-state-and-side-effects

7.10. Computational Objects

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-001-structure-and-interpretation-of-computer-programs-spring-2005/video-lectures/5b-computational-objects

7.11. Streams

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-001-structure-and-interpretation-of-computer-programs-spring-2005/video-lectures/6a-streams-part-1

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-001-structure-and-interpretation-of-computer-programs-spring-2005/video-lectures/6b-streams-part-2

7.12. Metacircular Evaluator

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-001-structure-and-interpretation-of-computer-programs-spring-2005/video-lectures/7a-metacircular-evaluator-part-1

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-001-structure-and-interpretation-of-computer-programs-spring-2005/video-lectures/7b-metacircular-evaluator-part-2

7.13. Logic Programming

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-001-structure-and-interpretation-of-computer-programs-spring-2005/video-lectures/8a-logic-programming-part-1

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-001-structure-and-interpretation-of-computer-programs-spring-2005/video-lectures/8b-logic-programming-part-2

7.14. Register Machines

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-001-structure-and-interpretation-of-computer-programs-spring-2005/video-lectures/9a-register-machines

7.15. Explicit-Control Evaluator

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-001-structure-and-interpretation-of-computer-programs-spring-2005/video-lectures/9b-explicit-control-evaluator

7.16. Compilation

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-001-structure-and-interpretation-of-computer-programs-spring-2005/video-lectures/10a-compilation

7.17. Storage Allocation and Garbage Collection

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-001-structure-and-interpretation-of-computer-programs-spring-2005/video-lectures/10b-storage-allocation-and-garbage-collection

Computer Systems Security

8.1. Introduction, Threat Models

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-858-computer-systems-security-fall-2014/video-lectures/lecture-1-introduction-threat-models

8.2. Control Hijacking Attacks

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-858-computer-systems-security-fall-2014/video-lectures/lecture-2-control-hijacking-attacks

8.3. Buffer Overflow Exploits and Defenses

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-858-computer-systems-security-fall-2014/video-lectures/lecture-3-buffer-overflow-exploits-and-defenses

8.4. Privilege Seperation

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-858-computer-systems-security-fall-2014/video-lectures/lecture-4-privilege-separation

8.5. Capabilities

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-858-computer-systems-security-fall-2014/video-lectures/lecture-6-capabilities

8.6. Sandboxing Native Code

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-858-computer-systems-security-fall-2014/video-lectures/lecture-7-sandboxing-native-code

8.7. Web Security Model

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-858-computer-systems-security-fall-2014/video-lectures/lecture-8-web-security-model

8.8. Securing Web Applications

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-858-computer-systems-security-fall-2014/video-lectures/lecture-9-securing-web-applications

8.9. Symbolic Execution

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-858-computer-systems-security-fall-2014/video-lectures/lecture-10-symbolic-execution

8.10. Ur/Web

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-858-computer-systems-security-fall-2014/video-lectures/lecture-11-ur-web

8.11. Network Security

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-858-computer-systems-security-fall-2014/video-lectures/lecture-12-network-security

8.12. Network Protocols

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-858-computer-systems-security-fall-2014/video-lectures/lecture-13-network-protocols

8.13. SSL and HTTPS

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-858-computer-systems-security-fall-2014/video-lectures/lecture-14-ssl-and-https

8.14. Medical Software

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-858-computer-systems-security-fall-2014/video-lectures/lecture-15-medical-software

8.15. Side-Channel Attacks

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-858-computer-systems-security-fall-2014/video-lectures/lecture-16-side-channel-attacks

8.16. User Authentication

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-858-computer-systems-security-fall-2014/video-lectures/lecture-17-user-authentication

8.17. Private Browsing

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-858-computer-systems-security-fall-2014/video-lectures/lecture-18-private-browsing

8.18. Anonymous Communication

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-858-computer-systems-security-fall-2014/video-lectures/lecture-19-anonymous-communication

8.19. Mobile Phone Security

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-858-computer-systems-security-fall-2014/video-lectures/lecture-20-mobile-phone-security

8.20. Data Tracking

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-858-computer-systems-security-fall-2014/video-lectures/lecture-21-data-tracking

8.21. IS and T

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-858-computer-systems-security-fall-2014/video-lectures/lecture-22-guest-lecture-by-mit-is-t

8.22. Security Economics

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-858-computer-systems-security-fall-2014/video-lectures/lecture-23-security-economics

Information and Entropy

9.1. Bits and Codes

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-050j-information-and-entropy-spring-2008/videos-homework-and-readings/unit1-lecture-2

9.2. Compression

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-050j-information-and-entropy-spring-2008/videos-homework-and-readings/unit-2-lecture-1

9.3. Noise and Errors

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-050j-information-and-entropy-spring-2008/videos-homework-and-readings/unit-3-lecture-2

9.4. Probability

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-050j-information-and-entropy-spring-2008/videos-homework-and-readings/unit-4-lecture-1

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-050j-information-and-entropy-spring-2008/videos-homework-and-readings/unit-4-lecture-2

9.5. Communications

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-050j-information-and-entropy-spring-2008/videos-homework-and-readings/unit-5-lecture-1

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-050j-information-and-entropy-spring-2008/videos-homework-and-readings/unit-5-lecture-2

9.6. Processes

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-050j-information-and-entropy-spring-2008/videos-homework-and-readings/unit-6-lecture-1

9.7. Inference

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-050j-information-and-entropy-spring-2008/videos-homework-and-readings/unit-7-lecture-1

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-050j-information-and-entropy-spring-2008/videos-homework-and-readings/unit-7-lecture-2

9.8. Maximum Entropy

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-050j-information-and-entropy-spring-2008/videos-homework-and-readings/unit-8-lecture-1

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-050j-information-and-entropy-spring-2008/videos-homework-and-readings/unit-8-lecture-2

9.9. Physical Systems

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-050j-information-and-entropy-spring-2008/videos-homework-and-readings/unit-10-lecture-1

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-050j-information-and-entropy-spring-2008/videos-homework-and-readings/unit-10-lecture-3

9.10. Energy

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-050j-information-and-entropy-spring-2008/videos-homework-and-readings/unit-11-lecture-1

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-050j-information-and-entropy-spring-2008/videos-homework-and-readings/unit-11-lecture-2

9.11. Temperature

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-050j-information-and-entropy-spring-2008/videos-homework-and-readings/unit-12-lecture-1

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-050j-information-and-entropy-spring-2008/videos-homework-and-readings/unit-12-lecture-2

9.12. Quantum Information

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-050j-information-and-entropy-spring-2008/videos-homework-and-readings/unit-13-lecture-1

Advanced Data Structures

10.1. Persistent Data Structures

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-851-advanced-data-structures-spring-2012/lecture-videos/session-1-persistent-data-structures

10.2. Retroactive Data Structures

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-851-advanced-data-structures-spring-2012/lecture-videos/session-2-retroactive-data-structures

10.3. Geometric Structures

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-851-advanced-data-structures-spring-2012/lecture-videos/session-3-geometric-structures-i

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-851-advanced-data-structures-spring-2012/lecture-videos/session-4-geometric-structures-ii

10.4. Dynamic Optimality

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-851-advanced-data-structures-spring-2012/lecture-videos/session-5-dynamic-optimality-i

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-851-advanced-data-structures-spring-2012/lecture-videos/session-6-dynamic-optimality-ii

10.5. Memory Hierarchy Models

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-851-advanced-data-structures-spring-2012/lecture-videos/session-7-memory-hierarchy-models

10.6. Cache-Oblivious Structures

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-851-advanced-data-structures-spring-2012/lecture-videos/session-8-cache-oblivious-structures-i

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-851-advanced-data-structures-spring-2012/lecture-videos/session-9-cache-oblivious-structures-ii

10.7. Dictionaries

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-851-advanced-data-structures-spring-2012/lecture-videos/session-10-dictionaries

10.8. Integer Models

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-851-advanced-data-structures-spring-2012/lecture-videos/session-11-integer-models

10.9. Fusion Trees

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-851-advanced-data-structures-spring-2012/lecture-videos/session-12-fusion-trees

10.10. Integer Lower Bounds

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-851-advanced-data-structures-spring-2012/lecture-videos/session-13-integer-lower-bounds

10.11. Sorting in Linear Time

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-851-advanced-data-structures-spring-2012/lecture-videos/session-14-sorting-in-linear-time

10.12. Static Trees

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-851-advanced-data-structures-spring-2012/lecture-videos/session-15-static-trees

10.13. Strings

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-851-advanced-data-structures-spring-2012/lecture-videos/session-16-strings

10.14. Succinct Structures

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-851-advanced-data-structures-spring-2012/lecture-videos/session-17-succinct-structures-i

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-851-advanced-data-structures-spring-2012/lecture-videos/session-18-succinct-structures-ii

10.15. Dynamic Graphs

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-851-advanced-data-structures-spring-2012/lecture-videos raphs-/session-19-dynamic-gi

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-851-advanced-data-structures-spring-2012/lecture-videos/session-20-dynamic-graphs-ii

10.16. Dynamic Connectivity Lower Bound

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-851-advanced-data-structures-spring-2012/lecture-videos/session-21-dynamic-connectivity-lower-bound

10.17. History of Memory Models

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-851-advanced-data-structures-spring-2012/lecture-videos/session-22-history-of-memory-models

Computer Graphics (In Urdu)

11.1. Introduction to computer graphics

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11.2. Introduction to graphic systems

https://docs.google.com/file/d/0B3uVX4mPJSC1ZUVLYjJ1M3RNcTg/preview

11.3. Raster-Scan Systems

https://docs.google.com/file/d/0B3uVX4mPJSC1cHByNzZEaGxBaHc/preview

11.4. Point

https://docs.google.com/file/d/0B3uVX4mPJSC1R0J1bVhoWFhacGM/preview

11.5. Line Drawing Techniques

https://docs.google.com/file/d/0B3uVX4mPJSC1S0pydzJ2M3VveWc/preview

11.6. Circle Drawing Techniques

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11.7. Ellipse and other Curves

http://lej4learning.com.pk/category/applied-sciences/computer-science/computer-graphics-vu/%3Ciframe%20src=%22https://docs.google.com/file/d/0B3uVX4mPJSC1dEprRlJkSnhOblE/preview%22%20width=%22640%22%20height=%22385%22%3E%3C/iframe%3E

11.8. Filled Area Primitives

https://docs.google.com/file/d/0B3uVX4mPJSC1b2VNU01ySWMzMlE/preview

https://docs.google.com/file/d/0B3uVX4mPJSC1TllLSWRYVHlVU2s/preview

11.9. Mathematical Fundamentals

https://docs.google.com/file/d/0B3uVX4mPJSC1YzFYck1ZV29QNE0/preview

11.10. 2D Transformations

https://docs.google.com/file/d/0B3uVX4mPJSC1VmhGNjcyczdYVXc/preview

https://docs.google.com/file/d/0B3uVX4mPJSC1UUJMSTlPY05fWjg/preview

11.11. Drawing Example

https://docs.google.com/file/d/0B3uVX4mPJSC1ZkhwZFFSSGc0Yzg/preview

11.12. Clipping

https://docs.google.com/file/d/0B3uVX4mPJSC1Y0dQcmFuSXRka3c/preview

https://docs.google.com/file/d/0B3uVX4mPJSC1dXJHbkI5U2U1WUE/preview

11.13. 3D Concepts

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11.14. 3D Transformations

https://docs.google.com/file/d/0B3uVX4mPJSC1dTJrd1ItUGpFN2s/preview

https://docs.google.com/file/d/0B3uVX4mPJSC1SVM1amxfR1hLWlU/preview

11.15. Projections

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https://docs.google.com/file/d/0B3uVX4mPJSC1S2pWWGd1VGlaWWs/preview

11.16. Triangles and Planes

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11.17. Lighting

https://docs.google.com/file/d/0B3uVX4mPJSC1TTJUNlhVTmNfVjQ/preview

https://docs.google.com/file/d/0B3uVX4mPJSC1WDVQM2UwVkx3b2M/preview

11.18. Mathematics of Lighting and Shading

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11.19. Review

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11.20. Introduction to Open GL

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11.21. Open GL Programming

https://docs.google.com/file/d/0B3uVX4mPJSC1UzJ1QXZySnRRN1k/preview

https://docs.google.com/file/d/0B3uVX4mPJSC1MEpwNGltOVNEUFE/preview

11.22. Curves

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11.23. Space Curves

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11.24. The Tangent Vector

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11.25. Bezier Curves

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11.26. Building Polygonal Models of Surfaces

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11.27. Fractals

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11.28. Viewing Using Open GL

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11.29. Real World and Open GL Lighting

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11.30. Evaluators, Curves and Surfaces

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11.31. Animations

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Object Oriented Programming (In Urdu)

12.1. https://docs.google.com/file/d/0B3uVX4mPJSC1YWNUel9JWkNwMm8/preview

12.2. https://docs.google.com/file/d/0B3uVX4mPJSC1bjNucDRObW03YkE/preview

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12.4. https://docs.google.com/file/d/0B3uVX4mPJSC1d1o5Z0h0cG4wOE0/preview

12.5. https://docs.google.com/file/d/0B3uVX4mPJSC1b21BWVR6NzFjRkE/preview

12.6. https://docs.google.com/file/d/0B3uVX4mPJSC1T1V6b3NPNFp2a1k/preview

12.7. https://docs.google.com/file/d/0B3uVX4mPJSC1akczRjVWTUdoSm8/preview

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12.23. https://docs.google.com/file/d/0B3uVX4mPJSC1QlVWci16SnJNMmM/preview

12.24. https://docs.google.com/file/d/0B3uVX4mPJSC1YnVmOVh2S1RSM28/preview

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12.27.
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12.28. https://docs.google.com/file/d/0B3uVX4mPJSC1UlRPRmhUMG5CbFU/preview

12.29. https://docs.google.com/file/d/0B3uVX4mPJSC1WlhNVE55VE1DSVE/preview

12.30. https://docs.google.com/file/d/0B3uVX4mPJSC1dkI5UnZpZ3J5Qmc/preview

12.31. https://docs.google.com/file/d/0B3uVX4mPJSC1TFpuSzlRT25LcEk/preview

12.32. https://docs.google.com/file/d/0B3uVX4mPJSC1Snk1RF9UdklFOXc/preview

12.33. https://docs.google.com/file/d/0B3uVX4mPJSC1dHVQbWZKTlJ4X3M/preview

12.34. https://docs.google.com/file/d/0B3uVX4mPJSC1dlU1RHdjOTNablU/preview

12.35. https://docs.google.com/file/d/0B3uVX4mPJSC1VnJIcGx2bWVBS1U/preview

12.36. https://docs.google.com/file/d/0B3uVX4mPJSC1bFMyR0ljbmNjUms/preview

12.37. https://docs.google.com/file/d/0B3uVX4mPJSC1Qml5djh5dlNObU0/preview

12.38. https://docs.google.com/file/d/0B3uVX4mPJSC1QzJLcGhENTZXamM/preview

12.39. https://docs.google.com/file/d/0B3uVX4mPJSC1MmJsU2NHZjlrdmc/preview

12.40. https://docs.google.com/file/d/0B3uVX4mPJSC1YkxZWUV1ZGt4NEk/preview

12.41. https://docs.google.com/file/d/0B3uVX4mPJSC1U3Fkd25FVXpKZHM/preview

12.42. https://docs.google.com/file/d/0B3uVX4mPJSC1amRtMHAzRXpuVW8/preview

12.43. https://docs.google.com/file/d/0B3uVX4mPJSC1OG5SN1Y5OWtvaHM/preview

12.44. https://docs.google.com/file/d/0B3uVX4mPJSC1UXFYSXQ1X09ZYXM/preview

12.45. https://docs.google.com/file/d/0B3uVX4mPJSC1TzVOWGlsTmR1azg/preview

Visual Programming (In Urdu)

13.1. Windows Programming

https://docs.google.com/file/d/0B3uVX4mPJSC1bzVzU3EyM1MycFk/preview

13.2. Basic C Language Concepts

https://docs.google.com/file/d/0B3uVX4mPJSC1bDJtVVY1THJKTDA/preview

13.3. Arrays and Pointers

https://docs.google.com/file/d/0B3uVX4mPJSC1a3pza2pSUEI1NHM/preview

13.4. Structures and Unions

https://docs.google.com/file/d/0B3uVX4mPJSC1cldhdjdWekRDOG8/preview

13.5. Preprocessor Directives

https://docs.google.com/file/d/0B3uVX4mPJSC1blJCOTBLMF9UbFE/preview

13.6. Bitwise Operators and Macros

https://docs.google.com/file/d/0B3uVX4mPJSC1eDF3TENHYkd0LWM/preview

13.7. Calling Conventions, Storage Classes..

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13.8. Windows Basics

https://docs.google.com/file/d/0B3uVX4mPJSC1dk5XeFhWRm05RkE/preview

13.9. Windows Creation and Message Handling

https://docs.google.com/file/d/0B3uVX4mPJSC1NWJHQm1jaWRpWGc/preview

13.10. Architecture of Standard Win32 Application

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13.11. User Interfaces

https://docs.google.com/file/d/0B3uVX4mPJSC1ZnlxdzBuQmdHYnc/preview

13.12. Windows Classes

https://docs.google.com/file/d/0B3uVX4mPJSC1M3dTLXdUZGdmRU0/preview

13.13. Graphics Design Interface

https://docs.google.com/file/d/0B3uVX4mPJSC1cXBqSGV3ZTlFc3c/preview

13.14. Painting and Drawing

https://docs.google.com/file/d/0B3uVX4mPJSC1UkgteWRZNVlnOFk/preview

13.15. Windows Management

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13.16. Input Devices

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13.17. Resources

https://docs.google.com/file/d/0B3uVX4mPJSC1ODRiRm9rZ0xpdVE/preview

13.18. String and Menu Resources

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13.19. Menu and Dialogs

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13.20. Dialogs

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13.21. Using Dialogs and Windows Controls

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13.22. Using Common Dialogs and Window Controls

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13.23. Common Controls

https://docs.google.com/file/d/0B3uVX4mPJSC1dm9Qa2Y4WjdGWW8/preview

13.24. Dynamic Link Libraries

https://docs.google.com/file/d/0B3uVX4mPJSC1b0lxREQ0R2JERDg/preview

13.25. Threads and Dynamic Link Libraries

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13.26. Threads and Synchronization

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13.27. Network Programming

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Web Design and Development (In Urdu)

14.1. Java Features

https://docs.google.com/file/d/0B3uVX4mPJSC1dW5YSWQ5dnV6Tkk/preview

14.2. Java Virtual Machine and Runtime Environment

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14.3. Learning Basics

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14.4. Object Oriented Programming

https://docs.google.com/file/d/0B3uVX4mPJSC1bVc4YkdhUmlKVTQ/preview

14.5. Inheritance

https://docs.google.com/file/d/0B3uVX4mPJSC1Y3J5WVFoUktYaTA/preview

14.6. Collections

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14.7. Introduction to Exceptions

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14.8. Streams

https://docs.google.com/file/d/0B3uVX4mPJSC1T01vNHZ4bUFMR3c/preview

14.9. Abstract Classes and Interfaces

https://docs.google.com/file/d/0B3uVX4mPJSC1UkVKZm9JUDN6X0k/preview

14.10. Graphical User Interfaces

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14.11. Event Handling

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14.12. Event Handling 2

https://docs.google.com/file/d/0B3uVX4mPJSC1akZYU3E1M2luZ2s/preview

14.13. Adapter Classes

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14.14. Java Database Connectivity

https://docs.google.com/file/d/0B3uVX4mPJSC1c1puTzdJMU1maFk/preview

https://docs.google.com/file/d/0B3uVX4mPJSC1VTRzYzhvV3Vzc0k/preview

14.15. Result Set

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14.16. Meta Data

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14.17. Java Graphics

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Information Systems (In Urdu)

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