Certificate Course

On

Analysis of Algorithms

12/11/2021 to 26/11/2021

Coordinators: Dr. K. Srinivasa Rao

Mr. Md. Rahmathulla

Co –Coordinator: Mr. B. Mahesh Reddy

K.S.R.M. COLLEGE OF ENGINEERING

(UGC - AUTONOMOUS)

Kadapa, Andhra Pradesh, India - 516003

Approved by AICTE, New Delhi & Affiliated to JNTUA, Ananthapuramu.

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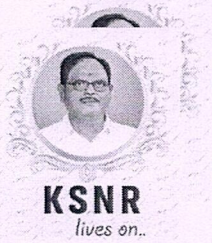

(2)

Lr./KSRMCE/ (Department of CSE)/2021-22

Date: 05/11/2021

To
The Principal
KSRM College of Engineering
Kadapa, AP.

From
Dr.K.Srinivasa Rao,Professor.
Mr.Md.Rahamathulla, Assistant Professor.
Mr.B.Mahesh Reddy, Assistant Professor.
CSE Department,
K.S.R.M College of Engineering
Kadapa.

Sub: KSRMCE - (Department of CSE) – Permission to conduct certification course on Analysis of Algorithms – Requested – reg.

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Respected Sir,

With reference to the cited, the Department of CSE is planning to conduct certificate course on Analysis of Algorithms for B.Tech III sem students from 12.11.2021 to 26.11.2021. In this I kindly request you to sir, grant me permission to conduct certificate course. This is submitted for your kind perusal.

Thanking you sir,

Yours Faithfully

Dr. K. Srinivasa Rao

Mr. Md. Rahmathulla

Mr. B. Mahesh Reddy

Forwarded to the principal sir,

Permitted
U. S. S. Murty

K.S.R.M. COLLEGE OF EGINEERING

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(3)

Dated: 06/11/2021

Circular

All the B.Tech III Sem Students are here by informed that department of CSE is going to conduct 30 hours certification course on Analysis of Algorithms from 12/11/2021 to 26/11/2021. Instructed students may register their names with following link on or before 10/11/2021.

Registration Link: https://forms.gle/obWq3bpCAmTh3y3S9

For any queries contact,

Coordinators:
Dr. Dr. K. Srinivasa Rao, Professor, CSE Dept.,
Mr. Md. Rahmathulla, Assistant Professor, CSE Dept.,
Co-Coordinator :

Mr. B. Mahesh Reddy ,Assistant Professor, CSE Dept.,

HOD

Cc to:

The Management /Director / All Deans / All HODS/Staff / Students for information

The IQAC Cell for Documentation

KSRM College of Engineering(autonomous) Registrations Form

"Analysis of Algorithms"

* Required

1. Email *

2. "Analysis of Algorithms" *

3. Name: *

4. Email id: *

5. Section: *

6. Mobile No: *

Google Forms

K.S.R.M. COLLEGE OF ENGINEERING

(AUTONOMOUS)

Pulivendala Road, Kadapa-516 005
Andhra Pradesh, India

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Department of Computer Science & Engineering

Certificate Course on Analysis of Algorithms (12/11/2021 to 26/11/2021)
Registered Student List

S.No.	Roll Number	Name of the Student	Year & Branch	Email id
1	209Y1A0546	DANDUBOINA SRIKANTH	B.Tech III sem&CSE	209y1a0546@ksrmce.ac.in
2	209Y1A0548	JAI KONDAL RAO	B.Tech III sem&CSE	209y1a0548@ksrmce.ac.in
3	209Y1A0550	D.NIRANJAN REDDY	B.Tech III sem&CSE	209y1a0550@ksrmce.ac.in
4	209Y1A0542	C.JAGADEESWAR REDDY	B.Tech III sem&CSE	209y1a0542@ksrmce.ac.in
5	209Y1A0541	C.RAVINDRA	B.Tech III sem&CSE	209y1a0541@ksrmce.ac.in
6	209Y1A0545	AJAYDANDU	B.Tech III sem&CSE	209y1a0545@ksrmce.ac.in
7	209Y1A0560	G.SANTOSH	B.Tech III sem&CSE	209y1a0560@ksrmce.ac.in
8	209Y1A0573	J. RAMU	B.Tech III sem&CSE	209y1a0573@ksrmce.ac.in
9	209Y1A0538	C.MAHESH	B.Tech III sem&CSE	209y1a0538@ksrmce.ac.in
10	209Y1A05B0	N.NIROOPA	B.Tech III sem&CSE	209y1a05b0@ksrmce.ac.in
11	209Y1A0575	K. SAI KRUPA	B.Tech III sem&CSE	209y1a0575@ksrmce.ac.in
12	209Y1A0532	B. MOUNIKA	B.Tech III sem&CSE	209y1a0532@ksrmce.ac.in
13	209Y1A0559	GEETHA SRI GONGATI	B.Tech III sem&CSE	209y1a0559@ksrmce.ac.in
14	209Y1A0513	AVULA VANI	B.Tech III sem&CSE	209y1a0513@ksrmce.ac.in
15	209Y1A0507	ANCHALA NIHARIKA	B.Tech III sem&CSE	209y1a0507@ksrmce.ac.in
16	209Y1A05A3	M.NANDINI	B.Tech III sem&CSE	209y1a05a3@ksrmce.ac.in
17	209Y1A0577	KASIREDDY VARSHINI	B.Tech III sem&CSE	209y1a0577@ksrmce.ac.in
18	209Y1A05I4	V.VENKATA JAGADEESHWAR REDDY	B.Tech III sem&CSE	209y1a05i4@ksrmce.ac.in

19	209Y1AO582	K. SWATHI REDDY	B.Tech III sem&CSE	209y1a0582@ksrmce.ac.in
20	209Y1A05G3	S.RAVI KRISHNA	B.Tech III sem&CSE	209y1a05g3@ksrmce.ac.in
21	209Y1A05H2	T BHANU PRAKASH	B.Tech III sem&CSE	209y1a05h2@ksrmce.ac.in
22	209Y1A05A2	M.SOPHIYA	B.Tech III sem&CSE	209y1a05a2@ksrmce.ac.in
23	209Y1A0506	GOWTHAM KUMAR	B.Tech III sem&CSE	209y1a0506@ksrmce.ac.in
24	209Y1A05E5	S. VENUGOPALREDDY	B.Tech III sem&CSE	209y1a05e5@ksrmce.ac.in
25	209Y1A05F5	RAHIL AZAM SHAIK	B.Tech III sem&CSE	209y1a05f5@ksrmce.ac.in
26	209Y1A05E0	R.SIVA KAMAKSHI	B.Tech III sem&CSE	209y1a05e0@ksrmce.ac.in
27	209Y1A05H9	MYNA VEERAMREDDY	B.Tech III sem&CSE	209y1a05h9@ksrmce.ac.in
28	209Y1A05G9	TALLAPALLI UDAY KUMAR	B.Tech III sem&CSE	209y1a05g9@ksrmce.ac.in
29	209Y1A05E4	S. REDDY SAI VARMA	B.Tech III sem&CSE	209y1a05e4@ksrmce.ac.in
30	209Y1A0592	M VISHNU PRABU	B.Tech III sem&CSE	209y1a0592@ksrmce.ac.in
31	209Y1A0568	GURRAMKONDA UMARFAROOK	B.Tech III sem&CSE	209y1a0568@ksrmce.ac.in
32	209Y1A05I2	VEMU YESU RATHNAM	B.Tech III sem&CSE	209y1a05i2@ksrmce.ac.in
33	209Y1A0578	K. HARSHA NITHIN	B.Tech III sem&CSE	209y1a0578@ksrmce.ac.in
34	209Y1A0520	B.RAJU	B.Tech III sem&CSE	209y1a0520@ksrmce.ac.in
35	209Y1A05A7	M. JAYASIMHA REDDY	B.Tech III sem&CSE	209y1a05a7@ksrmce.ac.in
36	209Y1A0558	G.YOGA LAKSHMI	B.Tech III sem&CSE	209y1a0558@ksrmce.ac.in
37	209Y1A0580	K. REVATHI	B.Tech III sem&CSE	209y1a0580@ksrmce.ac.in
38	209Y1A0563	G RAMMOHANREDDY	B.Tech III sem&CSE	209y1a0563@ksrmce.ac.in
39	209Y1A05C7	PEDAMALA BHARATH	B.Tech III sem&CSE	209y1a05c7@ksrmce.ac.in
40	209Y1A05I9	YELUGOTI JESHNAVI	B.Tech III sem&CSE	209y1a05i9@ksrmce.ac.in
41	209Y1A0544	ADITHYA	B.Tech III sem&CSE	209y1a05a5@ksrmce.ac.in
42	209Y1A0587	KURUBA AKHILA	B.Tech III sem&CSE	209y1a0587@ksrmce.ac.in
43	209Y1A0579	K.JAYASREE	B.Tech III sem&CSE	209y1a0579@ksrmce.ac.in
44	209Y1A05H1	T. NAGAPRANEETH	B.Tech III sem&CSE	209y1a05h1@ksrmce.ac.in
45	209Y1A0590	MOHAMMED AMAAN	B.Tech III sem&CSE	209y1a0590@ksrmce.ac.in
46	209Y1A0523	B.S.HUBAIR	B.Tech III sem&CSE	209y1a0523@ksrmce.ac.in
47	209Y1A0529	OBULESH	B.Tech III sem&CSE	209y1a0529@ksrmce.ac.in

48	209Y1A0564	G. ANUSHA	B.Tech III sem&CSE	209y1a0564@ksrmce.ac.in
49	209Y1A0517	B.NANDA KISHORE	B.Tech III sem&CSE	209y1a0517@ksrmce.ac.in
50	209Y1A05B6	P.BHOOMIKA	B.Tech III sem&CSE	209y1a05b6@ksrmce.ac.in
51	209Y1A0502	SAINATHREDDY	B.Tech III sem&CSE	209y1a0502@ksrmce.ac.in
52	209Y1A05G7	SYED AMMAJI	B.Tech III sem&CSE	209y1a05g7@ksrmce.ac.in
53	209Y1A05B7	P.SHIRISHA	B.Tech III sem&CSE	209y1a05b7@ksrmce.ac.in
54	209Y1A0567	G. KAVYA	B.Tech III sem&CSE	209y1a0567@ksrmce.ac.in
55	209Y1A0599	MVS JASWANTH	B.Tech III sem&CSE	209y1a0599@ksrmce.ac.in
56	209Y1A05A0	M. NAVANESWAR	B.Tech III sem&CSE	209y1a05a0@ksrmce.ac.in
57	209Y1A0598	M.PAVANI	B.Tech III sem&CSE	209y1a0598@ksrmce.ac.in
58	209Y1A05F2	SHAIK NAASAR MOHIDDIN	B.Tech III sem&CSE	209y1a05f2@ksrmce.ac.in
59	209Y1A0522	B KASHYAP SHIVA VARDHAN	B.Tech III sem&CSE	209y1a0522@ksrmce.ac.in
60	209Y1A0514	A.SIVA KRISHNA	B.Tech III sem&CSE	209y1a0514@ksrmce.ac.in

Coordinator(s)

HOD

Dr. V. LOKESWARA REDDY
M.Tech., Ph.D.,
Professor & HOD CSE
K.S.R.M. College of Engineering (Autonomous)
KADAPA - 516 005.

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Department of Computer Science and Engineering
Certificate Course on 'Analysis of Algorithms'
Schedule

S.No	Date& Time	Session	Faculty	Topic
1	12-11-2021 9:00AM to 12:00Noon	1	Md. Rahmathulla	Introduction to Analysis of Algorithm
	12-11-2021 1:00PM to 4:00PM	2	Dr. K. Srinivasa Rao Md. Rahmathulla	Pseudo code with Examples
2	13-11-2021 9:00AM to 12:00Noon	1	Dr. K. Srinivasa Rao Md. Rahmathulla	Flowchart with Examples
3	15-11-2021 9:00AM to 12:00Noon	1	Md. Rahmathulla B. Mahesh Reddy	Basics of Analysis, functions, Recursive function Examples
	15-11-2021 1:00PM to 4:00PM	2	Md. Rahmathulla B. Mahesh Reddy	Different types of notation used to measure Time Complexity
4	16-11-2021 9:00AM to 12:00Noon	1	Dr. K. Srinivasa Rao Md. Rahmathulla	Space Complexity Example
	16-11-2021 1:00PM to 4:00PM	2	B. Mahesh Reddy Md. Rahmathulla	Pseudo code Examples and Practice
5	17-11-2021 9:00AM to 12:00Noon	1	Dr. K. Srinivasa Rao Md. Rahmathulla	Polynomial functions Examples and Practice
	17-11-2021 1:00PM to 4:00PM	2	Dr. K. Srinivasa Rao Md. Rahmathulla B. Mahesh Reddy	non Polynomial functions Examples and Practice
7	18-11-2021 4:00PM to 5:00PM	1	Dr. K. Srinivasa Rao	Practice of Writing Algorithms
8	19-11-2021 4:00PM to 5:00PM	1	Md. Rahmathulla	Practice of Flowchart
9	20-11-2021 4:00PM to 5:00PM	1	B. Mahesh Reddy	Practice of Writing Pseudo code
10	22-11-2021 4:00PM to 5:00PM	1	Dr. K. Srinivasa Rao	Practice on how to solve Polynomial functions
11	23-11-2021 4:00PM to 5:00PM	1	Md. Rahmathulla	Practice on how to solve non Polynomial functions
12	24-11-2021 4:00PM to 5:00PM	1	B. Mahesh Reddy	Practice on How to Analyze the Algorithm

13	25-11-2021 4:00PM to 5:00PM	1	Md. Rahmathulla	Practical Exam
14	26-11-2021 4:00PM to 5:00PM	1	Dr. K. Srinivasa Rao Md. Rahmathulla B. Mahesh Reddy	Feed Back and Valedictory Functions

Coordinator(s)

HOD

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M.Tech., Ph.D.,
Professor & HOD CSE
K.S.R.M. College of Engineering (Autonomous)
KADAPA - 516 005.

Analysis of Algorithms

Course Overview:

Algorithms are essential to the study of computer science and are increasingly important. This course will cover basic concepts in the design and analysis of algorithms. Asymptotic complexity, O()..

Course Objectives

Upon completion of this course, students will be able to do the following:

1. Analyze the asymptotic performance of algorithms.
2. Write rigorous correctness proofs for algorithms.
3. Demonstrate a familiarity with major algorithms and data structures.

Course Outcomes

Students who complete the course will have demonstrated the ability to do the following:

- Argue the correctness of algorithms using inductive proofs.
- Analyze worst-case running times of algorithms using asymptotic analysis.

Unit-1

Module 1: Introduction to Analysis of Algorithm
Module 2: Pseudo code with Examples
Module 3: Flowchart with Examples

Unit-2

Module 1: Basics of Analysis, functions, Recursive function Examples
Module 2: Different types of notation used to measure Time Complexity
Module 3: Space Complexity Example

Unit-3

Module 1: Pseudo code Examples and Practice
Module 2: Polynomial functions Examples and Practice
Module 3: non Polynomial functions Examples and Practice

Unit-4

Module 1: Practice of Writing Algorithms
Module 2: Practice of Flowchart
Module 3: Practice of Writing Pseudo code

Unit-5

Module 1:Practice on how to solve Polynomial functions
Module 2:Practice on how to solve non Polynomial functions
Module 3:Practice on How to Analyze the Algorithm
MCQ/Fill in blanks (unique answer) Practical Exam

Text Books:

1)'THE DESIGN AND ANALYSIS OF COMPUTER ALGORITHMS', Alfred V. Aho Bell Laboratories, John E. Hopcroft Cornell University, Jeffrey D. U II man Princeton University, Addison-Wesley Publishing Company

2)'AN INTRODUCTION TO THE ANALYSIS OF ALGORITHMS', *Second Edition,* Robert Sedgewick Princeton University, Philippe Flajolet INRIA Rocquencourt, Addison-Wesley.

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Web References:

https://www.cs.princeton.edu/courses/archive/spr10/cos226/lectures/02-14Analysis-2x2.pdf

https://onlinecourses.nptel.ac.in/noc19_cs47/preview

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Department of Computer Science and Engineering

Certification Course on "Analysis of Algorithms"

Attendance Sheet

S. No	Roll Num	Student Name	12/11/21		13/11/21		15/11/21		16/11/21		17/11/21		18/11/21	19/11/21	20/11/21	22/11/21	23/11/21	24/11/21	25/11/21	26/11/21
			FN	AN	FN	AN	FN	AN	FN	AN	FN	AN	AN	AN	AN	AN	AN	AN	AN	AN
1	209Y1A0546	DANDUBOINA SRIKANTH	P	P	A	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P
2	209Y1A0548	JAI KONDAL RAO	P	A	P	P	P	A	P	P	P	P	P	P	A	P	A	P	P	P
3	209Y1A0550	D.NIRANJAN REDDY	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P
4	209Y1A0542	C.JAGADEESWAR REDDY	P	P	P	P	A	P	A	P	P	P	P	A	P	A	P	A	P	P
5	209Y1A0541	C.RAVINDRA	P	A	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P
6	209Y1A0545	AJAYDANDU	P	P	P	P	P	A	P	P	P	A	P	P	P	P	P	P	P	P
7	209Y1A0560	G.SANTOSH	P	P	P	P	P	P	A	P	P	P	P	P	P	A	P	P	P	P
8	209Y1A0573	J. RAMU	P	P	P	A	P	P	P	P	P	P	P	P	P	P	A	P	P	P
9	209Y1A0538	C.MAHESH	P	P	P	P	A	P	P	P	P	P	P	A	P	P	P	A	A	P
10	209Y1A05B0	N.NIROOPA	P	P	P	P	P	P	P	A	P	P	A	P	P	P	P	P	P	P
11	209Y1A0575	K. SAI KRUPA	P	P	P	A	P	P	P	P	P	P	P	P	A	P	P	P	A	P

12	209Y1A0532	B. MOUNIKA	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
13	209Y1A0559	GEETHA SRI GONGATI	P	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
14	209Y1A0513	AVULA VANI	P	P	P	A	A	P	P	P	P	P	P	P	P	P	P	P	P	P
15	209Y1A0507	ANCHALA NIHARIKA	P	P	P	P	P	P	A	P	P	P	A	P	P	P	P	P	P	P
16	209Y1A05A3	M.NANDINI	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
17	209Y1A0577	KASIREDDY VARSHINI	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
18	209Y1A05I4	V.VENKATA JAGADEESHWAR REDDY	P	P	A	P	P	A	P	P	A	A	P	P	A	P	P	P	P	P
19	209Y1AO582	K. SWATHI REDDY	P	P	P	P	P	P	P	P	P	P	P	P	P	P	A	P	P	P
20	209Y1A05G3	S.RAVI KRISHNA	P	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P
21	209Y1A05H2	T BHANU PRAKASH	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
22	209Y1A05A2	M.SOPHIYA	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
23	209Y1A0506	GOWTHAM KUMAR	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P
24	209Y1A05E5	S. VENUGOPALREDDY	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P
25	209Y1A05F5	RAHIL AZAM SHAIK	P	A	P	P	A	P	P	P	P	P	P	P	P	A	P	P	P	P
26	209Y1A05E0	R.SIVA KAMAKSHI	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	A	P	P
27	209Y1A05H9	MYNA VEERAMREDDY	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
28	209Y1A05G9	TALLAPALLI UDAY KUMAR	P	P	P	A	P	P	P	P	P	P	P	P	P	P	P	P	A	P
29	209Y1A05E4	S. REDDY SAI VARMA	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
30	209Y1A0592	M VISHNU PRABU	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
31	209Y1A0568	GURRAMKONDA UMARFAROOK	P	P	A	P	P	A	P	P	P	P	P	A	P	P	P	P	P	P
32	209Y1A05I2	VEMU YESU RATHNAM	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
33	209Y1A0578	K. HARSHA NITHIN	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
34	209Y1A0520	B.RAJU	P	P	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P
35	209Y1A05A7	M. JAYASIMHA REDDY	P	P	P	P	P	P	P	A	A	P	A	P	P	P	A	P	P	P
36	209Y1A0558	G.YOGA LAKSHMI	P	P	P	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P
37	209Y1A0580	K. REVATHI	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P	P
38	209Y1A0563	G RAMMOHANREDDY	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
39	209Y1A05C7	PEDAMALA BHARATH	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
40	209Y1A05I9	YELUGOTI JESHNAVI	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

41	209Y1A0544	ADITHYA	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P	P	P
42	209Y1A0587	KURUBA AKHILA	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P	P	P	P
43	209Y1A0579	K.JAYASREE	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P	P
44	209Y1A05H1	T. NAGAPRANEETH	P	P	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
45	209Y1A0590	MOHAMMED AMAAN	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	A	P
46	209Y1A0523	B.S.HUBAIR	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
47	209Y1A0529	OBULESH	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P
48	209Y1A0564	G. ANUSHA	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
49	209Y1A0517	B.NANDA KISHORE	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P
50	209Y1A05B6	P.BHOOMIKA	P	P	P	P	P	P	A	P	P	P	A	P	P	P	P	A	P	P
51	209Y1A0502	SAINATHREDDY	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	A	P	P
52	209Y1A05G7	SYED AMMAJI	P	P	P	A	P	P	P	P	P	P	P	P	A	P	A	P	P	P
53	209Y1A05B7	P.SHIRISHA	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
54	209Y1A0567	G. KAVYA	P	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P
55	209Y1A0599	MVS JASWANTH	P	A	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P
56	209Y1A05A0	M. NAVANESWAR	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
57	209Y1A0598	M.PAVANI	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
58	209Y1A05F2	SHAIK NAASAR MOHIDDIN	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P
59	209Y1A0522	B KASHYAP SHIVA VARDHAN	P	P	A	P	P	P	P	P	P	P	P	P	P	P	P	P	A	P
60	209Y1A0514	A.SIVA KRISHNA	P	P	P	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P

COORDINATOR(S)

HOD

Dr. V. LOKESWARA REDDY
M.Tech., Ph.D.,
Professor & HOD CSE
K.S.R.M. College of Engineering (Autonomous)
KADAPA - 516 005.

(1)

K.S.R.M. COLLEGE OF ENGINEERING

(UGC - Autonomous)

Kadapa, Andhra Pradesh, India– 516 003

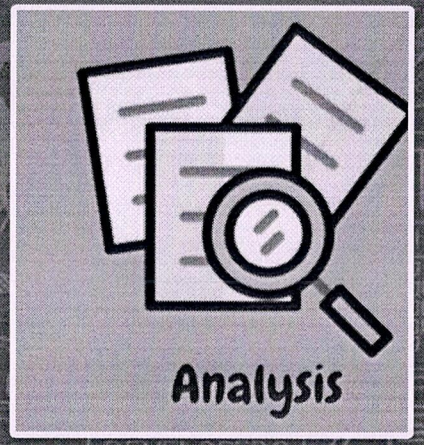
Approved by AICTE, New Delhi & Affiliated to JNTUA, Ananthapuramu.

KSNR
lives on..

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CERTIFICATION COURSE ON:

Analysis of Algorithms



DATES : 12.11.2021 TO 26.11.2021

TIMINGS: 9.00 am to 4.00 pm

VENUE : Database Lab

RESOURCE PERSONS:

Dr.K.Srinivasa Rao

Mr.Md.Rahmathulla

Mr.B. Mahesh Reddy

COORDINATOR :

Dr.K.Srinivasa Rao,
M-Tech.,Ph.D.,Prof.

Mr.Md.Rahmathulla,
M-Tech.,Asst.Prof.

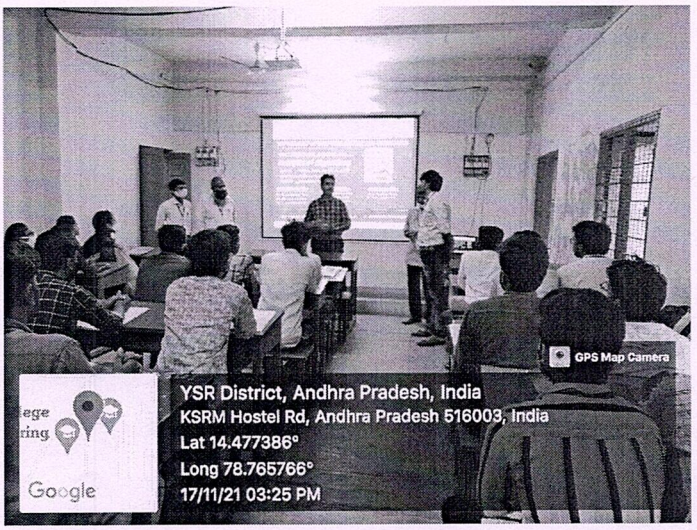
CO-CORDINATOR :

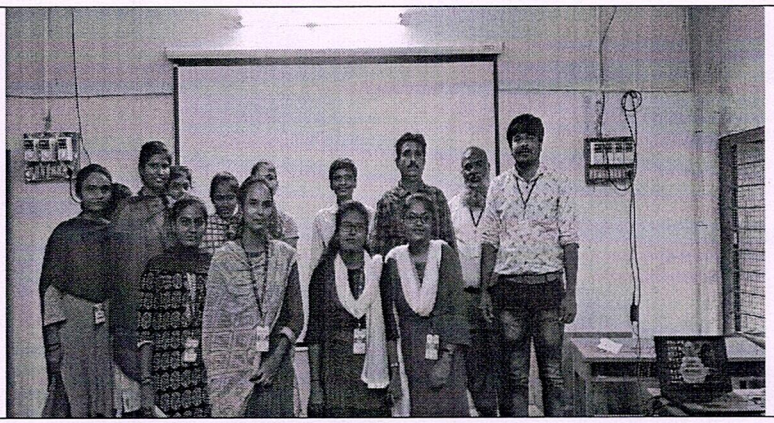
Mr.B. Mahesh Reddy,
M-Tech.,Asst. Prof.

Sri V. Lokeshwara Reddy (HOD)	*Dr. V.S.S. Murthy* (Principal)	*Prof. A. Mohan* (Director)	*Dr. Kandula Chandra Obul Reddy* (Managing Director)	*Smt. K. Rajeswari* (Correspondent, Secretary, Treasurer)	*Sri K. Madan Mohan Reddy* (Vice- chairman)	*Sri. K. Raja Mohan Reddy* (Chairman)

ksrmceofficial www.ksrmce.ac.in 8143731980, 8575697569

Activity Report

Name of the Activity	Analysis of Algorithms
Type of Activity	certification course
Date and Time of Activity	from 12th November to 26th November 2021.
Details of Participants	B.Tech – III sem Students
Coordinator(s)	Dr K. SrinivasaRao M.Tech., Ph. D., Professor, Dept of CSE Mr. Md. Rahmathulla M.Tech, Asst..Prof, Dept of CSE
Co-Coordinator	Mr. B. Mahesh Reddy M.Tech.,Asst..Prof, Dept of CSE
Organizing Dept./Support System	CSE
Description	How to analyze and measure of algorithms. How to write an pseudocode and draw a flowchart for a problem. Time Complexity of an algorithms. How to get and solve the function (Recursive and non recursive). Explained with many examples.
Photos	



Coordinator(s)

HOD

Dr. V. LOKESWARA REDDY
M.Tech., Ph.D.,
Professor & HOD CSE
K.S.R.M. College of Engineering (Autonomous)
KADAPA - 516 005.

Certificate
of Completion

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K.S.R.M. COLLEGE OF ENGINEERING

UGC - AUTONOMOUS
KADAPA , AP – 516 005

This is to certify that

Mr/Ms. A. SIVA KRISHNA

Bearing the Roll No 209Y1A0514

has Succesfully completed certification course on

"Analysis of Algorithms"

From 12 th November to 26 th November 2021 at ,

Organized by Department of CSE at KSRMCE Campus.

Coordinator	Head Of Department	Principal

Certificate
of Completion

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KADAPA , AP – 516 005

This is to certify that

Mr/Ms. K. REVATHI

Bearing the Roll No 20941A0580

has Succesfully completed certification course on

"Analysis of Algorithms"

Ffrom 12 th November to 26 th November 2021 at ,

Organized by Department of CSE at KSRMCE Campus.

Coordinator	Head Of Department	Principal

Certificate
of Completion

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K.S.R.M. COLLEGE OF ENGINEERING

UGC - AUTONOMOUS
KADAPA , AP – 516 005

This is to certify that

Mr/Ms. G. SANTOSH

Bearing the Roll No 20941A0560

has Succesfully completed certification course on

"Analysis of Algorithms"

From 12 th November to 26 th November 2021 at ,

Organized by Department of CSE at KSRMCE Campus.

Coordinator	Head Of Department	Principal

Feedback formon CertificateCourse

Analysis of Algorithms(12/11/2021to26/11/2021)

*Required

1. RollNumber*

2. Nameof the Student*

3. B.TechSemester*

Markonlyoneoval.

- ISem
- II Sem
- III Sem
- IV Sem
- V Sem
- VISem
- VII Sem
- VIIISem

4. Branch*

Markonlyoneoval.

- CivilEngineering
- EEE
- ME
- ECE
- CSE
- AI&ML

5. EmailID*

6. Is the course content met your expectation.*

Markonlyoneoval.

- Yes
- No

7. Is the lecture sequence well planned?*

Markonlyoneoval.

- Yes
- No

8. The contents of the course are explained with examples.*

Markonlyoneoval.

- Agree
- Moderate
- stronglyagree

9. Is the level of course high.*

Markonlyoneoval.

- Agree
- Moderate
- stronglyagree

10. Is the course exposed you to the new knowledge and practice.*

Markonlyoneoval.

- Agree
- Moderate
- stronglyagree

11. Isthe lecture clear and easy to understand?*

Markonlyoneoval.

- 1
- 2
- 3
- 4
- 5

12. Rate the value of the course increasing your skills.*

Markonlyoneoval.

- 1
- 2
- 3
- 4
- 5

Note: 1. Below average 2. Average 3. Good 4. Very Good 5. Excellent

13. Any Issues

K.S.R.M.COLLEGEOFENGINEERING

(UGC-AUTONOMOUS)

Kadapa,AndhraPradesh,India–516 003

ApprovedbyAICTE,NewDelhi&AffiliatedtoJNTUA,Ananthapuramu.

AnISO14001:2004&9001:2015CertifiedInstitution

CertificateCourseon"AnalysisofAlgorithm"

12-NOV-2021To 26-NOV-2021

Feedbackresponses

S.No.	Year &Semester	Branch	Is the courseco ntent met yourexpect ation	Is thelect ureseq uence wellpl anned	Thecontents ofthecourseis explained withexamples	Is thelev el ofcour se high	Is the courseexpose dyoutothene w knowledge andpractices	Is thelectu rerclear and easy tounderst and	Ratethe valueofc oursein increasi ngyours kills	Anyissues
1	B.TechIIIsem	CSE	Yes	Yes	Agree	Agree	Stronglyagree	4	5	Good
2	B.TechIII sem	CSE	Yes	Yes	Agree	Agree	Stronglyagree	5	5	Good
3	B.TechIII sem	CSE	Yes	Yes	Agree	Agree	Stronglyagree	4	5	Good
4	B.TechIII sem	CSE	Yes	Yes	Agree	Agree	Stronglyagree	5	4	Nothing
5	B.TechIII sem	CSE	Yes	Yes	Agree	Agree	Stronglyagree	5	4	verygood
6	B.TechIII sem	CSE	Yes	Yes	Agree	Agree	Stronglyagree	4	4	verygood
7	B.TechIII sem	CSE	Yes	Yes	Stronglyagree	Agree	Stronglyagree	4	4	Nothing
8	B.TechIIIsem	CSE	Yes	Yes	agree	Agree	Stronglyagree	4	5	no
9	B.TechIII sem	CSE	Yes	Yes	Stronglyagree	Agree	Stronglyagree	5	4	Nothing
10	B.TechIII sem	CSE	Yes	Yes	Stronglyagree	Agree	Stronglyagree	5	5	Good
11	B.TechIII sem	CSE	Yes	Yes	Agree	Agree	Stronglyagree	5	4	Good

12	B.TechIII sem	CSE	Yes	Yes	agree	Agree	Stronglyagree	4	5	Good
13	B.TechIII sem	CSE	Yes	Yes	agree	Agree	Stronglyagree	4	5	Good
14	B.TechIII sem	CSE	Yes	Yes	agree	Agree	Stronglyagree	4	5	verygood
15	B.TechIII sem	CSE	Yes	Yes	agree	Agree	Stronglyagree	5	4	verygood
16	B.TechIII sem	CSE	Yes	Yes	agree	Agree	Stronglyagree	4	4	verygood
17	B.TechIII sem	CSE	Yes	Yes	agree	Agree	Stronglyagree	3	5	no
18	B.TechIII sem	CSE	Yes	Yes	agree	Agree	Stronglyagree	4	5	Good
19	B.TechIII sem	CSE	Yes	Yes	Stronglyagree	Agree	Stronglyagree	5	5	Good
20	B.TechIII sem	CSE	Yes	Yes	Stronglyagree	Agree	Stronglyagree	3	4	Good
21	B.TechIII sem	CSE	Yes	Yes	Stronglyagree	Agree	Stronglyagree	5	3	Good
22	B.TechIII sem	CSE	Yes	Yes	agree	Agree	Stronglyagree	4	4	Good
23	B.TechIII sem	CSE	Yes	Yes	agree	Agree	Stronglyagree	3	4	Good
24	B.TechIII sem	CSE	Yes	Yes	Stronglyagree	Agree	Stronglyagree	5	4	Good
25	B.TechIII sem	CSE	Yes	Yes	agree	Agree	Stronglyagree	3	5	Good
26	B.TechIII sem	CSE	Yes	Yes	agree	Agree	Stronglyagree	5	5	Nothing
27	B.TechIII sem	CSE	Yes	Yes	agree	Agree	Stronglyagree	5	5	Good
28	B.TechIII sem	CSE	Yes	Yes	agree	Agree	Stronglyagree	3	4	verygood
29	B.TechIII sem	CSE	Yes	Yes	Stronglyagree	Agree	Stronglyagree	3	4	Good
30	B.TechIII sem	CSE	Yes	Yes	Stronglyagree	Agree	Stronglyagree	5	5	Good
31	B.TechIII sem	CSE	Yes	Yes	Stronglyagree	Agree	Stronglyagree	5	4	Good
32	B.TechIII sem	CSE	Yes	Yes	agree	Agree	Stronglyagree	5	5	Good
33	B.TechIII sem	CSE	Yes	Yes	agree	Agree	Stronglyagree	5	4	no
34	B.TechIII sem	CSE	Yes	Yes	agree	Agree	Stronglyagree	5	4	Nothing
35	B.TechIII sem	CSE	Yes	Yes	agree	Agree	Stronglyagree	5	4	Good
36	B.TechIII sem	CSE	Yes	Yes	agree	Agree	Stronglyagree	5	5	Good
37	B.TechIII sem	CSE	Yes	Yes	agree	Agree	Stronglyagree	5	5	Good
38	B.TechIII sem	CSE	Yes	Yes	Stronglyagree	Agree	Stronglyagree	5	5	Good
39	B.TechIII sem	CSE	Yes	Yes	Stronglyagree	Agree	Stronglyagree	5	5	Good
40	B.TechIII sem	CSE	Yes	Yes	Stronglyagree	Agree	Stronglyagree	5	5	Good
41	B.TechIII sem	CSE	Yes	Yes	agree	Agree	Stronglyagree	4	4	Good
42	B.TechIII sem	CSE	Yes	Yes	agree	Agree	Stronglyagree	4	5	Good
43	B.TechIII sem	CSE	Yes	Yes	agree	Agree	Stronglyagree	4	5	Good

44	B.TechIII sem	CSE	Yes	Yes	agree	Agree	Stronglyagree	3	5	Good
45	B.TechIII sem	CSE	Yes	Yes	agree	Agree	Stronglyagree	3	5	Nothing
46	B.TechIII sem	CSE	Yes	Yes	Stronglyagree	Agree	Stronglyagree	2	5	Nothing
47	B.TechIII sem	CSE	Yes	Yes	agree	Agree	Stronglyagree	2	5	verygood
48	B.TechIII sem	CSE	Yes	Yes	agree	Agree	Stronglyagree	4	5	verygood
49	B.TechIII sem	CSE	Yes	Yes	Stronglyagree	Agree	Stronglyagree	5	5	verygood
50	B.TechIII sem	CSE	Yes	Yes	Stronglyagree	Agree	Stronglyagree	4	5	nothing
51	B.TechIII sem	CSE	Yes	Yes	agree	Agree	Stronglyagree	4	5	Good
52	B.TechIII sem	CSE	Yes	Yes	agree	Agree	Stronglyagree	4	5	Good
53	B.TechIII sem	CSE	Yes	Yes	agree	Agree	Stronglyagree	4	5	nothing
54	B.TechIII sem	CSE	Yes	Yes	agree	Agree	Stronglyagree	4	5	nothing
55	B.TechIII sem	CSE	Yes	Yes	agree	Agree	Stronglyagree	4	5	nothing
56	B.TechIII sem	CSE	Yes	Yes	agree	Agree	Stronglyagree	4	5	Good
57	B.TechIII sem	CSE	Yes	Yes	agree	Agree	Stronglyagree	5	5	Good
58	B.TechIII sem	CSE	Yes	Yes	agree	Agree	Stronglyagree	5	5	verygood
59	B.TechIII sem	CSE	Yes	Yes	Stronglyagree	Agree	Stronglyagree	5	5	verygood
60	B.TechIII sem	CSE	Yes	Yes	Stronglyagree	Agree	Stronglyagree	5	5	nothing

COORDINATORS

HOD

Dr. V. LOKESWARA REDDY
M.Tech., Ph.D.
Professor & HOD CSE
K.S.R.M. College of Engineering (Autonomous)
KADAPA - 516 005.

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA-516003
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
VALUE ADDED / CERTIFICATE COURSE ON
ANALYSIS OF ALGORITHMS FROM 12/11/2021 TO 26/11/2021
AWARD LIST

S.No	Roll Number	Name of the Student	Marks Obtained
1	209Y1A0546	Danduboina Srikanth	13
2	209Y1A0548	Jai Kondal Rao	14
3	209Y1A0550	D.Niranjan Reddy	12
4	209Y1A0542	C.Jagadeeswar Reddy	16
5	209Y1A0541	C.Ravindra	15
6	209Y1A0545	Ajaydandu	17
7	209Y1A0560	G.Santosh	18
8	209Y1A0573	J. Ramu	15
9	209Y1A0538	C.Mahesh	12
10	209Y1A05B0	N.Niroopa	10
11	209Y1A0575	K. Sai Krupa	11
12	209Y1A0532	B. Mounika	09
13	209Y1A0559	Geetha Sri Gongati	12
14	209Y1A0513	Avula Vani	15
15	209Y1A0507	Anchala Niharika	16
16	209Y1A05A3	M.Nandini	12
17	209Y1A0577	Kasireddy Varshini	18
18	209Y1A05I4	V.Venkata Jagadeeshwar Reddy	19
19	209Y1AO582	K. Swathi Reddy	12
20	209Y1A05G3	S.Ravi Krishna	16
21	209Y1A05H2	T Bhanu Prakash	17
22	209Y1A05A2	M.Sophiya	13
23	209Y1A0506	Gowtham Kumar	15
24	209Y1A05E5	S. Venugopalreddy	14
25	209Y1A05F5	Rahil Azam Shaik	16
26	209Y1A05E0	R.Siva Kamakshi	12
27	209Y1A05H9	Myna Veeramreddy	14
28	209Y1A05G9	Tallapalli Uday Kumar	08
29	209Y1A05E4	S. Reddy Sai Varma	16
30	209Y1A0592	M Vishnu Prabu	15
31	209Y1A0568	Gurramkonda Umarfarook	14
32	209Y1A05I2	Vemu Yesu Rathnam	17
33	209Y1A0578	K. Harsha Nithin	15
34	209Y1A0520	B.Raju	16
35	209Y1A05A7	M. Jayasimha Reddy	13
36	209Y1A0558	G.Yoga Lakshmi	15
37	209Y1A0580	K. Revathi	05
38	209Y1A0563	G Rammohanreddy	16
39	209Y1A05C7	Pedamala Bharath	15
40	209Y1A05I9	Yelugoti Jeshnavi	17
41	209Y1A0544	Adithya	18
42	209Y1A0587	Kuruba Akhila	15

43	209Y1A0579	K.Jayasree	14
44	209Y1A05H1	T. Nagapraneeth	15
45	209Y1A0590	Mohammed Amaan	13
46	209Y1A0523	B.S.Hubair	15
47	209Y1A0529	Obulesh	14
48	209Y1A0564	G. Anusha	16
49	209Y1A0517	B.Nanda Kishore	17
50	209Y1A05B6	P.Bhoomika	15
51	209Y1A0502	Sainathreddy	14
52	209Y1A05G7	Syed Ammaji	15
53	209Y1A05B7	P.Shirisha	14
54	209Y1A0567	G. Kavya	16
55	209Y1A0599	Mvs Jaswanth	15
56	209Y1A05A0	M. Navaneswar	12
57	209Y1A0598	M.Pavani	09
58	209Y1A05F2	Shaik Naasar Mohiddin	17
59	209Y1A0522	B Kashyap Shiva Vardhan	18
60	209Y1A0514	A.Siva Krishna	16

Coordinator(s)

HoD CSE

Dr. V. LOKESWARA REDDY
M.Tech., Ph.D.,
Professor & HOD CSE
K.S.R.M. College of Engineering (Autonomous)
KADAPA - 516 005.

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA-516003
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
VALUE ADDED /CERTIFICATE COURSE ON
ANALYSIS OF ALGORITHMS FROM 12/11/2021 TO 26/11/2021
ASSESSMENT TEST

Roll Number: _____ **Name of the Student:** _____

Time: 20 Min **(Objective Questions)** **Max.Marks:20**

Note: Answer the following Questions and each question carries **one** mark.

1. Hamiltonian path problem is _____ . [ ]
   A. P class problem B. NP problem
   C. N class problem D. NP complete problem

2. Dynamic programming is used to find_____. [ ]
   A. One Solution Is Generated B. All Optimal Solution Is Generated
   C. No Optimal Solution Is Generated D. Partial Solution Is Generated

3. An algorithm that always runs in polynomial time but possibly returns erroneous answers is called a _____. [ ]
   A. Monte Carlo Algorithm B. Las Vegas Algorithm
   C. Atlantic City Algorithm D. Approximation algorithm

4. What are dendrites? [ ]
   A. uclear projections B. other Name For Nucleus C. Fibers Of Nerves D. Twisted Network
   B.

5. Which Data Structure is used to perform Recursion? [ ]
   A. queue B. Array C. stack D. linked list

6. Which of the following statements about loop invariants is false? [ ]
   A. A loop invariant is the opposite, that is the negation, of the condition of the loop
   B. Loop invariants are used to show that algorithms produce the correct results.
   C. To prove that a statement is a loop invariant, we use mathematical induction
   D. Loop invariants remain true each time a loop is executed

7. Which is not the important aspect of Loop_____. [ ]
   A. nested loop B. initial condition C. invariant relation D. termination

8. What is Adaline in neural networks? [ ]
   A. Automatic Linear Element B. Adaptive Line Element
   C. Adaptive Linear Element D. Adaptive Nonlinear Element

9. What is the objective of the knapsack problem? [ ]
   A. To Get Maximum Weight In The Knapsack
   B. To Get Minimum Total Value In The Knapsack
   C. To Get Maximum Total Value In The Knapsack
   D. To Get Minimum Weight In The Knapsack

10. What is the purpose of using randomized quick sort over standard quick sort? [ ]

A. To reduce worst case time complexity
B. To improve average case time complexity
C. To reduce worst case space complexity
D. To improve accuracy

11. Fractional knapsack problem is solved most efficiently by which of the following algorithm? [ ]

A. Dynamic Programming B. Greedy Algorithm
C. Divide And Conquer D. Backtracking

12. Which of the following is not basic control structure_____. [ ]

A. the loop B. the decision C. the process D. the sequential

13. Which data structure has a better amortized running time than others? [ ]

A. Stack B. Queue C. Priority Queue D. List

14. What is the average case time complexity of merge sort? [ ]

A. O(N Log N) B. O(Log Log N) C. O(Log N) D. O(n*n)

15. Which of the following algorithm can be used to solve the Hamiltonian path problem efficiently? [ ]

A. iterative improvement B. branch and bound
C. divide and conquer D. greedy algorithm

16. Which data structure is most suitable for implementing best first branch and bound strategy? [ ]

A. Queue B. Stack C. Priority Queue D. Linked List

17. Which data structure is used for implementing a FIFO branch and bound strategy? [ ]

A. Queue B. Array C. Stack D. Linked List

18. Time taken in decreasing the node value in a binomial heap is_____. [ ]

A. O(log n) B. O(1) C. O(n) D. O(n log n)

19. What is the worst case time complexity of merge sort? [ ]

A. O(n*n) B. O(Log N) C. O(N Log N) D. O(Log Log N)

20. Which of the following algorithms has worst time complexity? [ ]

A. binary search B. insertion sort C. linear search D. merge sort

18/20
M.Rekha

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA-516003
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
VALUE ADDED /CERTIFICATE COURSE ON
ANALYSIS OF ALGORITHMS FROM 12/11/2021 TO 26/11/2021
ASSESSMENT TEST

Roll Number: 209Y1A0522 **Name of the Student:** B. Shiva Vardhan

Time: 20 Min **(Objective Questions)** **Max.Marks:20**

Note: Answer the following Questions and each question carries **one** mark.

1. Hamiltonian path problem is _____ . [d]
   A. P class problem B. NP problem
   C. N class problem D. NP complete problem

2. Dynamic programming is used to find_____. [b]
   A. One Solution Is Generated B. All Optimal Solution Is Generated
   C. No Optimal Solution Is Generated D. Partial Solution Is Generated

3. An algorithm that always runs in polynomial time but possibly returns erroneous answers is called a _____. [a]
   A. Monte Carlo Algorithm B. Las Vegas Algorithm
   C. Atlantic City Algorithm D. Approximation algorithm

4. What are dendrites? [c]
   A. uclear projections B. other Name For Nucleus C. Fibers Of Nerves D. Twisted Network
   B.

5. Which Data Structure is used to perform Recursion? [c]
   A. queue B. Array C. stack D. linked list

6. Which of the following statements about loop invariants is false? [a]
   A. A loop invariant is the opposite, that is the negation, of the condition of the loop
   B. Loop invariants are used to show that algorithms produce the correct results.
   C. To prove that a statement is a loop invariant, we use mathematical induction
   D. Loop invariants remain true each time a loop is executed

7. Which is not the important aspect of Loop_____. [a]
   A. nested loop B. initial condition C. invariant relation D. termination

8. What is Adaline in neural networks? [c]
   A. Automatic Linear Element B. Adaptive Line Element
   C. Adaptive Linear Element D. Adaptive Nonlinear Element

9. What is the objective of the knapsack problem? [b] ✗
   A. To Get Maximum Weight In The Knapsack
   B. To Get Minimum Total Value In The Knapsack
   C. To Get Maximum Total Value In The Knapsack
   D. To Get Minimum Weight In The Knapsack

10. What is the purpose of using randomized quick sort over standard quick sort? [c]

A. To reduce worst case time complexity
B. To improve average case time complexity
C. To reduce worst case space complexity
D. To improve accuracy

11. Fractional knapsack problem is solved most efficiently by which of the following algorithm? [b]

A. Dynamic Programming B. Greedy Algorithm
C. Divide And Conquer D. Backtracking

12. Which of the following is not basic control structure_____. [b]

A. the loop B. the decision C. the process D. the sequential

13. Which data structure has a better amortized running time than others? [c]

A. Stack B. Queue C. Priority Queue D. List

14. What is the average case time complexity of merge sort? [a]

A. O(N Log N) B. O(Log Log N) C. O(Log N) D. O(n*n)

15. Which of the following algorithm can be used to solve the Hamiltonian path problem efficiently? [b]

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16. Which data structure is most suitable for implementing best first branch and bound strategy? [c]

A. Queue B. Stack C. Priority Queue D. Linked List

17. Which data structure is used for implementing a FIFO branch and bound strategy? [a]

A. Queue B. Array C. Stack D. Linked List

18. Time taken in decreasing the node value in a binomial heap is_____. [a]

A. O(log n) B. O(1) C. O(n) D. O(n log n)

19. What is the worst case time complexity of merge sort? [c]

A. O(n*n) B. O(Log N) C. O(N Log N) D. O(Log Log N)

20. Which of the following algorithms has worst time complexity? [b]

A. binary search B. insertion sort C. linear search D. merge sort

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
VALUE ADDED /CERTIFICATE COURSE ON
ANALYSIS OF ALGORITHMS FROM 12/11/2021 TO 26/11/2021
ASSESSMENT TEST

Roll Number: 209Y1A0548 **Name of the Student:** Jai Kondal Rao

Time: 20 Min **(Objective Questions)** **Max.Marks:20**

Note: Answer the following Questions and each question carries **one** mark.

1. Hamiltonian path problem is _____ . [B] X
   A. P class problem B. NP problem
   C. N class problem D. NP complete problem

2. Dynamic programming is used to find_____. [A] X
   A. One Solution Is Generated B. All Optimal Solution Is Generated
   C. No Optimal Solution Is Generated D. Partial Solution Is Generated

3. An algorithm that always runs in polynomial time but possibly returns erroneous answers is called a _____. [A]
   A. Monte Carlo Algorithm B. Las Vegas Algorithm
   C. Atlantic City Algorithm D. Approximation algorithm

4. What are dendrites? [C]
   A. uclear projections B. other Name For Nucleus C. Fibers Of Nerves D. Twisted Network
   B.

5. Which Data Structure is used to perform Recursion? [C]
   A. queue B. Array C. stack D. linked list

6. Which of the following statements about loop invariants is false? [B] X
   A. A loop invariant is the opposite, that is the negation, of the condition of the loop
   B. Loop invariants are used to show that algorithms produce the correct results.
   C. To prove that a statement is a loop invariant, we use mathematical induction
   D. Loop invariants remain true each time a loop is executed

7. Which is not the important aspect of Loop_____. [B] X
   A. nested loop B. initial condition C. invariant relation D. termination

8. What is Adaline in neural networks? [C]
   A. Automatic Linear Element B. Adaptive Line Element
   C. Adaptive Linear Element D. Adaptive Nonlinear Element

9. What is the objective of the knapsack problem? [C]
   A. To Get Maximum Weight In The Knapsack
   B. To Get Minimum Total Value In The Knapsack
   C. To Get Maximum Total Value In The Knapsack
   D. To Get Minimum Weight In The Knapsack

10. What is the purpose of using randomized quick sort over standard quick sort? [C]

A. To reduce worst case time complexity
B. To improve average case time complexity
C. To reduce worst case space complexity
D. To improve accuracy

11. Fractional knapsack problem is solved most efficiently by which of the following algorithm? [A]

A. Dynamic Programming B. Greedy Algorithm
C. Divide And Conquer D. Backtracking

12. Which of the following is not basic control structure_____. [D]

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13. Which data structure has a better amortized running time than others? [C]

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17. Which data structure is used for implementing a FIFO branch and bound strategy? [A]

A. Queue B. Array C. Stack D. Linked List

18. Time taken in decreasing the node value in a binomial heap is_____. [A]

A. O(log n) B. O(1) C. O(n) D. O(n log n)

19. What is the worst case time complexity of merge sort? [C]

A. O(n*n) B. O(Log N) C. O(N Log N) D. O(Log Log N)

20. Which of the following algorithms has worst time complexity? [B]

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15/20
NA-Rubbish

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ASSESSMENT TEST

Roll Number: 209Y1A0587 **Name of the Student:** K. Akhila

Time: 20 Min **(Objective Questions)** **Max.Marks:20**

Note: Answer the following Questions and each question carries **one** mark.

1. Hamiltonian path problem is _____ . [A] X
   A. P class problem B. NP problem
   C. N class problem D. NP complete problem

2. Dynamic programming is used to find_____. [B] ✓
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3. An algorithm that always runs in polynomial time but possibly returns erroneous answers is called a _____. [A] ✓
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   C. Atlantic City Algorithm D. Approximation algorithm

4. What are dendrites? [C] ✓
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   B.

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   A. queue B. Array C. stack D. linked list

6. Which of the following statements about loop invariants is false? [A] ✓
   A. A loop invariant is the opposite, that is the negation, of the condition of the loop
   B. Loop invariants are used to show that algorithms produce the correct results.
   C. To prove that a statement is a loop invariant, we use mathematical induction
   D. Loop invariants remain true each time a loop is executed

7. Which is not the important aspect of Loop_____. [B] X
   A. nested loop B. initial condition C. invariant relation D. termination

8. What is Adaline in neural networks? [B] X
   A. Automatic Linear Element B. Adaptive Line Element
   C. Adaptive Linear Element D. Adaptive Nonlinear Element

9. What is the objective of the knapsack problem? [B] X
   A. To Get Maximum Weight In The Knapsack
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   C. To Get Maximum Total Value In The Knapsack
   D. To Get Minimum Weight In The Knapsack

10. What is the purpose of using randomized quick sort over standard quick sort? [B]

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D. To improve accuracy

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12. Which of the following is not basic control structure_____. [C]

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17. Which data structure is used for implementing a FIFO branch and bound strategy? [A]

A. Queue B. Array C. Stack D. Linked List

18. Time taken in decreasing the node value in a binomial heap is_____. [A]

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19. What is the worst case time complexity of merge sort? [C]

A. O(n*n) B. O(Log N) C. O(N Log N) D. O(Log Log N)

20. Which of the following algorithms has worst time complexity? [B]

A. binary search B. insertion sort C. linear search D. merge sort

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ASSESSMENT TEST

Roll Number: 209Y1A0537 **Name of the Student:** B. Girish

Time: 20 Min **(Objective Questions)** **Max.Marks:20**

Note: Answer the following Questions and each question carries **one** mark.

1. Hamiltonian path problem is _____ . [d] ✓
   A. P class problem B. NP problem
   C. N class problem D. NP complete problem

2. Dynamic programming is used to find_____. [a] ✗
   A. One Solution Is Generated B. All Optimal Solution Is Generated
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3. An algorithm that always runs in polynomial time but possibly returns erroneous answers is called a _____. [c] ✗
   A. Monte Carlo Algorithm B. Las Vegas Algorithm
   C. Atlantic City Algorithm D. Approximation algorithm

4. What are dendrites? [c] ✓
   A. uclear projections B. other Name For Nucleus C. Fibers Of Nerves D. Twisted Network
   B.

5. Which Data Structure is used to perform Recursion? [c] ✓
   A. queue B. Array C. stack D. linked list

6. Which of the following statements about loop invariants is false? [b] ✗
   A. A loop invariant is the opposite, that is the negation, of the condition of the loop
   B. Loop invariants are used to show that algorithms produce the correct results.
   C. To prove that a statement is a loop invariant, we use mathematical induction
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   A. nested loop B. initial condition C. invariant relation D. termination

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   A. Automatic Linear Element B. Adaptive Line Element
   C. Adaptive Linear Element D. Adaptive Nonlinear Element

9. What is the objective of the knapsack problem? [c] ✓
   A. To Get Maximum Weight In The Knapsack
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   C. To Get Maximum Total Value In The Knapsack
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ASSESSMENT TEST

Roll Number: 209y1a0512 **Name of the Student:** Vemu Yasu Rathnam

Time: 20 Min **(Objective Questions)** **Max.Marks:20**

Note: Answer the following Questions and each question carries **one** mark.

1. Hamiltonian path problem is _____ . [b] ✓
   A. P class problem B. NP problem
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2. Dynamic programming is used to find_____. [c] ✗
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9. What is the objective of the knapsack problem? [c] —
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20. Which of the following algorithms has worst time complexity? [b]

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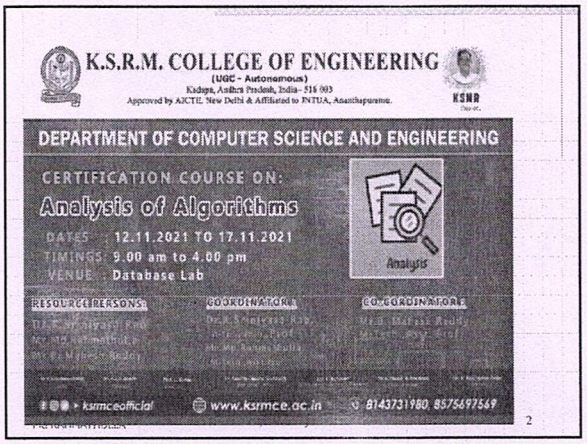
Analysis of Algorithms

Input Algorithm Output



Analysis of Algorithms

Input Algorithm Output

An **algorithm** is a step-by-step procedure for solving a problem in a finite amount of time.

A Quick Math Review

Logarithms and Exponents

properties of logarithms:

- $\log_b(xy) = \log_b x + \log_b y$
- $\log_b(x/y) = \log_b x - \log_b y$
- $\log_b(x^a) = a\log_b x$
- $\log_b a = \log_x a / \log_x b$

A Quick Math Review

properties of exponentials:

$$a^{(b+c)} = a^b a^c$$

$$a^{bc} = (a^b)^c$$

$$a^b / a^c = a^{(b-c)}$$

$$b = a^{\log_a b}$$

$$b^c = a^{c*\log_a b}$$

A Quick Math Review

- Floor $\lfloor x \rfloor$ = the largest integer $\leq x$
- Ceiling $\lceil x \rceil$ = the smallest integer x
- Summations

- general definition:

$$\sum_{i=s}^{t} f(i) = f(s) + f(s+1) + f(s+2) + \ldots + f(t)$$

- where *f is a function, s is the start index, and t is* the end index

A Quick Math Review

- Geometric progression: $f(i) = a^i$
  - given an integer n 0 and a real number $0 < a \neq 1$

$$\sum_{i=0}^{n} a^i - 1 + a + a^2 + \ldots + a^n - \frac{1 - a^{n+1}}{1 - a}$$

- geometric progressions exhibit exponential growth

What is an **algorithm**?

A simple, unambiguous, mechanical procedure to carry out some task.

Why algorithm instead of program?

1. Writing an algorithm is simpler (we don't need to worry about the detailed implementation, or the language syntax).
2. An algorithm is easier to read than a program written in, for instance, C.

Why Analyze an Algorithm?

The most straightforward reason for analyzing an algorithm is to discover its characteristics in order to evaluate its suitability for various applications or compare it with other algorithms for the same application. Moreover, the analysis of an algorithm can help us understand it better, and can suggest informed improvements. Algorithms tend to become shorter, simpler, and more elegant during the analysis process.

How to represent an algorithm?

1. Give a description in your own language, e.g. English, Spanish, ...
2. Pseudo code
3. Graphical

Example – multiplying two positive integers A and B

For example: 45*19

Usually:

```
  45
  19   (x
 405
  45   (+
 855
```


A different algorithm:

Multiplier (A/2)	Multiplicand (B*2)	Result (pick numbers in column 2 when the corresponding number under the multiplier is odd)
45	19	19
22	38	
11	76	76
5	152	152
2	304	
1	608	608 (+
		855

An instance of a problem is a specific assignment of values to the parameters.

This algorithm can be used for multiplying any two positive integers, we say that (45, 19) is an **instance** of this problem. Most problems have infinite collection of instances.

It's ok to define the **domain** (i.e. the set of instances) to be considered, and the algorithm should work for all instances in that domain.

Although the above algorithm will not work if the first operand is negative, this does not invalidate the algorithm since (-45, 19) is not an instance of the problem being considered.

Order:

Usually we use the **frequency count** to compare algorithms. Consider the following 3 programs:

```
(a)                (b)                  (c)
x ← x + y          for i ← 1 to n do    for  i ← 1 to n do
                     x ← x + y            for j ← 1 to n do
                   end                      x ← x + y
                                          end
                                        end
```

The frequency count of stmt x ← x + y is 1, n, n^2.
No matter which machine we use to run these programs, we know that the execution time of (b) is n times the execution time of (a).

Big-O notation:

Def f(n) = O(g(n)) if and only if ∃ 2 positive constants c and n_0, such that

$|f(n)| \le c \bullet |g(n)| \ \forall\ n \ge n_0$.

So, g(n) actually is the upper bound of f(n).

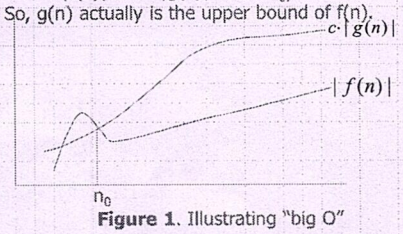


Figure 1. Illustrating "big O"

Examples:

- Is $17n^2 - 5 = O(n^2)$?

$$\because \quad 17n^2 - 5 \le 17n^2 \qquad \forall n \ge 1$$
$$(c = 17, n_0 = 1)$$
$$\therefore \quad 17n^2 - 5 = O(n^2)$$

- Is $35n^3 + 100 = O(n^3)$?

$$\because \quad 35n^3 + 100 \le 36n^3 \qquad \forall n \ge 5$$
$$(c = 36, n_0 = 5)$$
$$\therefore \quad 35n^3 + 100 = O(n^3)$$

- Is $6 \bullet 2^n + n^2 = O(2^n)$?

$$\because \quad 6 \cdot 2^n + n^2 \le 7 \cdot 2^n \qquad \forall n \ge 5$$
$$(c = 7, n_0 = 5)$$
$$\therefore \quad 6 \cdot 2^n + n^2 = O(2^n)$$

Complexity classes

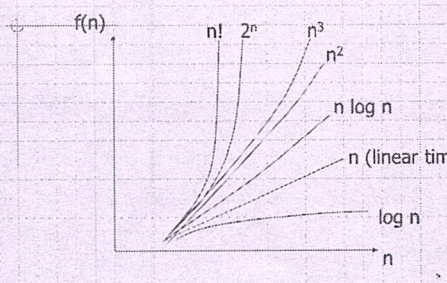


Figure 2. Growth rates of some important complexity classes

Assume that we have a machine that can execute 1,000,000 required operations per sec

	Algorithm 1	Algorithm 2	Algorithm 3	Algorithm 4	Algorithm 5
Frequency count	33n	6nlogn	$13n^2$	$3.4n^3$	2^n
n=10	< 1 sec	< 1 sec	< 1 sec	< 1 sec	< 1 sec
n=10,000	< 1 sec	< 1 sec	22 min	39 days	many many centuries

Table 1. Execution time for algorithms with the given time complexities

Note:

- log n
- n(linear)
- n log n
- n^2
- n^3

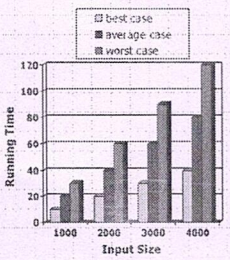
} polynomial time (easy or tractable)

- 2^n
- n!

} exponential time (hard or intractable)

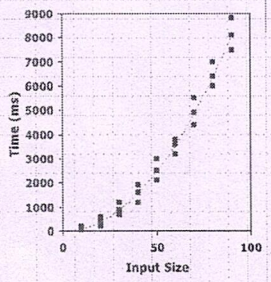
Running Time

- Most algorithms transform input objects into output objects.
- The running time of an algorithm typically grows with the input size.
- Average case time is often difficult to determine.
- We focus on the worst case running time.
  - Easier to analyze
  - Crucial to applications such as games, finance and robotics



Experimental Studies

- Write a program implementing the algorithm
- Run the program with inputs of varying size and composition
- Use a method like System.currentTimeMillis() to get an accurate measure of the actual running time
- Plot the results



Limitations of Experiments

- It is necessary to implement the algorithm, which may be difficult
- Results may not be indicative of the running time on other inputs not included in the experiment.
- In order to compare two algorithms, the same hardware and software environments must be used

Theoretical Analysis

- Uses a high-level description of the algorithm instead of an implementation
- Characterizes running time as a function of the input size, *n*.
- Takes into account all possible inputs
- Allows us to evaluate the speed of an algorithm independent of the hardware/software environment

Pseudocode

- Is a High-level description of an algorithm
- More structured than English prose
- Less detailed than a program
- Preferred notation for describing algorithms
- Hides program design issues

Example: find max element of an array

```
Algorithm arrayMax(A, n)
  Input array A of n integers
  Output maximum element of A

  currentMax ← A[0]
  for i ← 1 to n − 1 do
    if A[i] > currentMax then
      currentMax ← A[i]
  return currentMax
```

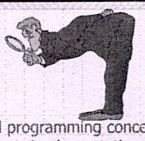
Pseudo-code

- Pseudo-code is a description of an algorithm that is more structured than usual prose but less formal than a programming language.
- Example: finding the maximum element of an array.

```
Algorithm arrayMax(A, n)
  Input array A of n integers
  Output maximum element of A
  currentMax ← A[0]
  for i ← 1 to n − 1 do
    if A[i] > currentMax then
      currentMax ← A[i]
  return currentMax
```

- Pseudo-code is our preferred notation for describing algorithms.
- However, pseudo-code hides program design issues.

What is Pseudo-code



- A mixture of natural language and high-level programming concepts that describes the main ideas behind a generic implementation of a data structure or algorithm.
- Expressions: use standard mathematical symbols to describe numeric and boolean expressions
  - Use ← Assignment (like = in Java)
  - Use = Equality testing (like == in Java)
  - n^2 Superscripts and other mathematical formatting allowed
- Method Declarations:
  - **Algorithm name(*param1, param2*)**

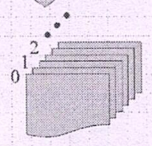
Pseudocode Details

- Programming Constructs:
  - decision structures: **if ... then ... [else ...]**
  - while-loops: **while ... do**
  - repeat-loops: **repeat ... until ...**
  - for-loop: **for ... do**
  - array indexing: **A[*i*]**
- Methods:
  - calls: object method(args)
  - returns: **return value**

The Random Access Memory (RAM) Model

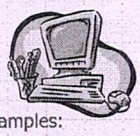
- A **CPU**

- An potentially unbounded bank of **memory** cells, each of which can hold an arbitrary number or character



- Memory cells are numbered and accessing any cell in memory takes unit time.

Primitive Operations



- Basic computations performed by an algorithm
- Identifiable in pseudocode
- Largely independent from the programming language
- Exact definition not important (we will see why later)
- Assumed to take a constant amount of time in the RAM model
- Examples:
  - Evaluating an expression
  - Assigning a value to a variable
  - Indexing into an array
  - Calling a method
  - Returning from a method

Counting Primitive Operations (§3.4)

- By inspecting the pseudocode, we can determine the maximum number of primitive operations executed by an algorithm, as a function of the input size

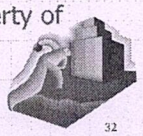
Algorithm *arrayMax*(*A*, *n*)	# operations
currentMax ← *A*[0]	2
for *i* ← 1 **to** *n* − 1 **do**	2*n*
if *A*[*i*] > *currentMax* **then**	2(*n* − 1)
currentMax ← *A*[*i*]	2(*n* − 1)
{ increment counter *i* }	2(*n* − 1)
return *currentMax*	1
Total	8*n* − 2

Estimating Running Time

- Algorithm *arrayMax* executes $8n - 2$ primitive operations in the worst case. Define:
  - a = Time taken by the fastest primitive operation
  - b = Time taken by the slowest primitive operation
- Let $T(n)$ be worst-case time of *arrayMax*. Then
  $$a(8n - 2) \leq T(n) \leq b(8n - 2)$$
- Hence, the running time $T(n)$ is bounded by two linear functions

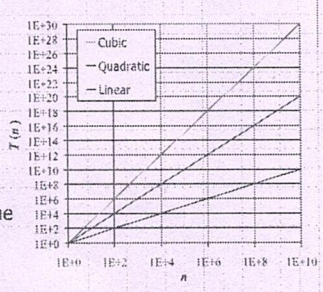
Growth Rate of Running Time

- Changing the hardware/ software environment
  - Affects $T(n)$ by a constant factor, but
  - Does not alter the growth rate of $T(n)$
- The linear growth rate of the running time $T(n)$ is an intrinsic property of algorithm *arrayMax*



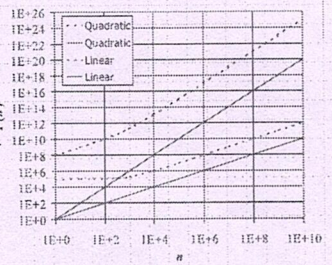
Seven Important Functions (§3.3)

- Seven functions that often appear in algorithm analysis:
  - Constant ≈ 1
  - Logarithmic ≈ log n
  - Linear ≈ n
  - N-Log-N ≈ n log n
  - Quadratic ≈ n^2
  - Cubic ≈ n^3
  - Exponential ≈ 2^n
- In a log-log chart, the slope of the line corresponds to the growth rate of the function



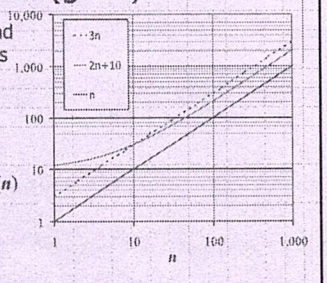
Constant Factors

- The growth rate is not affected by
  - constant factors or
  - lower-order terms
- Examples
  - $10^2n + 10^5$ is a linear function
  - $10^5n^2 + 10^8n$ is a quadratic function



Big-Oh Notation (§3.4)

- Given functions $f(n)$ and $g(n)$, we say that $f(n)$ is $O(g(n))$ if there are positive constants c and n_0 such that
  $f(n) \leq cg(n)$ for $n \geq n_0$
- Example: $2n + 10$ is $O(n)$
  - $2n + 10 \leq cn$
  - $(c - 2)n \geq 10$
  - $n \geq 10/(c - 2)$
  - Pick $c = 3$ and $n_0 = 10$



Big-Oh Example

- Example: the function n^2 is not $O(n)$
  - $n^2 \leq cn$
  - $n \leq c$
  - The above inequality cannot be satisfied since c must be a constant