

# Introduction to Automata Theory, Languages, and Computation

## Solutions for Chapter 2

Revised 9/6/09.

### Solutions for Section 2.2

#### Exercise 2.2.1(a)

States correspond to the eight combinations of switch positions, and also must indicate whether the previous roll came out at *D*, i.e., whether the previous input was accepted. Let 0 represent a position to the left (as in the diagram) and 1 a position to the right. Each state can be represented by a sequence of three 0's or 1's, representing the directions of the three switches, in order from left to right. We follow these three bits by either *a* indicating it is an accepting state or *r*, indicating rejection. Of the 16 possible states, it turns out that only 13 are accessible from the initial state, 000r. Here is the transition table:

	A	B
→000r	100r	011r
*000a	100r	011r
*001a	101r	000a
000r	110r	001a
*010a	110r	001a
001r	111r	010a
100r	000r	111r
*100a	000r	111r
101r	011r	100a
*101a	011r	100a
110r	000a	101a
*110a	000a	101a
111r	001a	110a

# Introduction To Automata Theory Solutions

**Amy Neustein, Judith A. Markowitz**



## **Introduction To Automata Theory Solutions:**

**Emerging Solutions for Future Manufacturing Systems** Luis M. Camarinha-Matos,2006-01-04 Industries and particularly the manufacturing sector have been facing difficult challenges in a context of socio economic turbulence characterized by complexity as well as the speed of change in causal interconnections in the socio economic environment In order to respond to these challenges companies are forced to seek new technological and organizational solutions In this context two main characteristics emerge as key properties of a modern automation system agility and distribution Agility because systems need not only to be flexible in order to adjust to a number of a priori defined scenarios but rather must cope with unpredictability Distribution in the sense that automation and business processes are becoming distributed and supported by collaborative networks Emerging Solutions for Future Manufacturing Systems includes the papers selected for the BASYS 04 conference which was held in Vienna Austria in September 2004 and sponsored by the International Federation for Information Processing IFIP

**Mobile Speech and Advanced Natural Language Solutions** Amy Neustein,Judith A. Markowitz,2013-02-03 Mobile Speech and Advanced Natural Language Solutions presents the discussion of the most recent advances in intelligent human computer interaction including fascinating new study findings on talk in interaction which is the province of conversation analysis a subfield in sociology sociolinguistics a new and emerging area in natural language understanding Editors Amy Neustein and Judith A Markowitz have recruited a talented group of contributors to introduce the next generation natural language technologies for practical speech processing applications that serve the consumer s need for well functioning natural language driven personal assistants and other mobile devices while also addressing business need for better functioning IVR driven call centers that yield a more satisfying experience for the caller This anthology is aimed at two distinct audiences one consisting of speech engineers and system developers the other comprised of linguists and cognitive scientists The text builds on the experience and knowledge of each of these audiences by exposing them to the work of the other

*The William Lowell Putnam Mathematical Competition 1985-2000: Problems, Solutions, and Commentary* Kiran S. Kedlaya,Bjorn Poonen,Ravi Vakil,2020-01-16 This third volume of problems from the William Lowell Putnam Competition is unlike the previous two in that it places the problems in the context of important mathematical themes The authors highlight connections to other problems to the curriculum and to more advanced topics The best problems contain kernels of sophisticated ideas related to important current research and yet the problems are accessible to undergraduates The solutions have been compiled from the American Mathematical Monthly Mathematics Magazine and past competitors Multiple solutions enhance the understanding of the audience explaining techniques that have relevance to more than the problem at hand In addition the book contains suggestions for further reading a hint to each problem separate from the full solution and background information about the competition The book will appeal to students teachers professors and indeed anyone interested in problem solving as a gateway to a deep understanding of mathematics

Discrete-event System Theory Antonio Tornambò, 1995 This book provides a clear understandable and motivated account on the subject that spans both conventional and modern materials about discrete event systems material that up to now has been presented in the literature in different fields such as the graph theory the probability theory the automata theory and the queueing theory The book gives a complete introduction to the discrete event system theory and simultaneously applies the theory to practical problems The book gives students of computer sciences system sciences and of electrical engineering a clear unambiguous and relevant account of discrete event systems Numerous illustrations are included for better understanding Problems as well as their solutions are included in each chapter It can be used as a basic introduction for undergraduates and graduate students Although it is logically self contained it presupposes the mathematical maturity acquired by students with two years of calculus

**15th Annual Symposium on Switching and Automata Theory**, 1974

**Computational and Experimental Group Theory** Alexandre Borovik, Alexei G. Myasnikov, 2004 The focus of algorithmic group theory shifted from the decidability undecidability type of result to the complexity of algorithms This title contains papers that reflect that paradigm shift It presents articles that are based on the AMS ASL Joint Special Session Interactions Between Logic Group Theory and Computer Science

**College of Engineering** Cornell University. College of Engineering, 1972

*The Structure of Solutions in the Iterated Prisoner's Dilemma* Bjørn Lomborg, 1993

**Coyote Papers**, 2000

Theory of Computation Lucien Sina, 2025-09-30 Theory of Computation Clear Concise and Practical This book guides you step by step through the fundamentals of formal languages and computability from finite automata to pushdown automata and context free grammars all the way to the powerful Turing machine You will not only learn about the formal models but also understand the proof techniques used to establish properties of languages and above all where the limits of computability lie With numerous examples illustrative graphics clear proofs and exercises with sample solutions this book is ideal for students instructors and anyone who wants to systematically dive into the subject Key concepts such as the Pumping Lemma Myhill Nerode theorem Kleene's theorem diagonalization and Rice's theorem are presented in an accessible way and discussed with respect to their implications Special emphasis is placed on clarity and practicality chapters are modular proofs are fully detailed and wherever technicalities might be distracting intuition is highlighted A wealth of exercises and their solutions encourages active understanding perfect as a companion to lectures or for self study Whether you are seeking foundational knowledge for advanced courses e.g complexity theory or want to build solid mathematical skills in computation theory this book provides a well structured readable introduction to one of the central areas of theoretical computer science

**On Finding Approximate Solutions to Some Problems** Teofilo Francisco Gonzales-Arce, 1975 *Mathematical Systems Theory I* Diederich Hinrichsen, Anthony J. Pritchard, 2011-08-03 This book presents the mathematical foundations of systems theory in a self contained comprehensive detailed and mathematically rigorous way It is devoted to the analysis of dynamical systems and combines features of a detailed introductory textbook with that of a reference source The book

contains many examples and figures illustrating the text which help to bring out the intuitive ideas behind the mathematical constructions     The Proceedings of the Thirtieth SIGCSE Technical Symposium on Computer Science Education Jane Prey, SIGCSE99: The 30th ACM SIGCSE Technical Symposium, 1999     *Foundations of Genetic Algorithms 4* Richard K. Belew, Michael D. Vose, 1997     Engineering Education , 1977     **Catalogue** Florida State College for Women, 1974

**Papers of John Von Neumann on Computing and Computer Theory** John Von Neumann, 1987     **Mathematical Reviews** , 1990     *Undergraduate Catalog ...* Northern Illinois State Teachers College, Northern Illinois University, 1974

**Intelligent Engineering Systems Through Artificial Neural Networks** Cihan H. Dagli, 1995 As a follow up to the previous four volumes of Intelligent Engineering Systems Through Artificial Neural Networks by the same editor the present volume contains the edited versions of the technical presentations of ANNIE 95 held November 1995 in St Louis Missouri The 160 some contributions are grouped into six categories artificial neural network architectures including subsections on architectures and learning algorithms and training fuzzy neural networks and systems evolutionary programming pattern recognition adaptive control and smart engineering system design including bio medical engineering systems signal processing forecasting environmental applications machining and robotics process control monitoring and automated inspection and general engineering Includes bandw photographs diagrams and charts Annotation copyright by Book News Inc Portland OR

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for the nitration 4.01 ml of nitric acid 4.00 ml of sulfuric acid and 4.56 ml bromobenzene were used to complete the reaction with these measurements bromobenzene was found to be the limiting reagent since only 4.56 ml of bromobenzene was used the amount of product predicted to be recovered was 8.7533 g

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the aim of the experiment is to determine and study electrophilic aromatic substitution reaction especially nitration of methyl benzoate to give methyl m nitrobenzoate thus determine the weight melting point and percentage yield of the pure methyl m nitrobenzoate abstract

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in this experiment we will carry out the nitration of bromobenzene bromine substituted on an aromatic ring is an ortho para directing group it will direct an incoming electrophile to the ortho and para positions it is also deactivating meaning that its reactions will be slower than the identical reactions of benzene

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section 20711 lab experiment nitration of bromobenzene introduction the chemical reaction of nitration consists of a nitro group being added to or substituted in a molecule nitration can basically be carried out by a mixture of concentrated nitric acid and sulfuric acid this mixture is useful to obtain the active nitronium ion

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1 go to the restroom and wash the affected area with lots of soap and water the soap in the lab is not suitable for this purpose 2 return to the lab and apply mineral oil to the affected area 3 the summary to this warning is not to touch any part of your body while performing this experiment if you must leave the lab for any reason 1

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in the nitration of bromobenzene a mixture of sulfuric acid and nitric acid react with one another nitric acid the weaker of the two acids will serve as base to form nitronium ion bromobenzene will attack the nitronium ion by nucleophilic attack

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show more this experiment was performed in order to demonstrate the principles of nitration through electrophilic aromatic substitution it also examined the effects of bromine on an aromatic ring ortho para vs meso directing

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then actual is your actual findings yield actual theoretical  $\times 100$  what are the possible side reactions of nitration of bromobenzene dinitration can occur at ortho para or at both ortho positions occurs in overheating meta product happens very rarely because bromine is an ortho para director

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the soap in the lab is not suitable for this purpose 2 return to the lab and apply mineral oil to the affected area theory and explanation of the nitration of bromobenzene if the temperature of the reaction mixture exceeds 60 o

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the bromine substituent in bromobenzene is an ortho para director the para position is favored due to steric effects in the reaction that takes place in this lab a nitro group is substituted onto bromobenzene at the para position to form 1 bromo 4 nitrobenzene

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study with quizlet and memorize flashcards containing terms like reacting sulfuric and nitric acid together produces the nitronium ion alone nitric acid is not a strong enough electrophile to react with bromobenzene sulfuric acid is added to the nitric acid the reverse rxn can overheat and boil easily includes a claisen adaptor and

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over 5 minutes slowly pipet this bromobenzene into the icy cold nitration mixture hno 3 h 2 so 4 in the 125 ml flask and stir continue to stir the reaction mixture in the ice bath for 30 minutes do not heat in a new 250 ml erlenmeyer

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on the right the arenium cation has a nitro set with incredibly small 0.6 angstrom bond distances this will result in an optimization failure as the atoms are even close for the programme to accommodate their electrons demonstration of creating the p arenium cation by to nitration of bromobenzene

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the purpose of this lab was to observe where substituents are added on a benzene ring by way of electrophilic aromatic substitution the electrophilic source in the nitration of bromobenzene comes from a nitronium ion  $\text{NO}_2^+$  which acts as the electrophilic species

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nitration of bromobenzene is an electrophilic aromatic substitution reaction the electrophile will be formed from 4 0ml of nitric acid and 4 0ml of sulfuric acid and will then react with 4 5ml of bromobenzene this will produce o bromonitrobenzene and p bromonitrobenzene

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lab report 10 nitration of bromobenzene raekwon filmore cm 244 section 40 march 27 2018 introduction for this experiment nitration of bromobenzene was the focus of the lab the benzene is an aromatic compound and when it reacts with wither a mixture of sulfuric acid or nitric acid creates what is known as a nitro group

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