

INTERNATIONAL EDITION

Sixth Edition

Engineering Circuit Analysis

William H. Hayt, Jr.

Jack E. Kemmerly

Steven M. Durbin

Engineering Circuit Analysis 6th Edition Solutions Manual

Sebastian Brünink



Engineering Circuit Analysis 6th Edition Solutions Manual:

Basic Engineering Circuit Analysis J. David Irwin, R. Mark Nelms, 2020-08-18 Basic Engineering Circuit Analysis has long been regarded as the most dependable textbook for computer and electrical engineering majors. In this new edition, Irwin and Nelms continue to develop the most complete set of pedagogical tools available and provide the highest level of support for students entering into this complex subject. Irwin and Nelms' trademark student-centered learning design focuses on helping students complete the connection between theory and practice. Key concepts are explained clearly and illustrated by detailed worked examples. These are then followed by Learning Assessments which allow students to work similar problems and check their results against the answers provided.

Engineering Circuit Analysis J. David Irwin, R. M. Nelms, 2021-12-07 Circuit analysis is the fundamental gateway course for computer and electrical engineering majors. Irwin and Nelms' Engineering Circuit Analysis has long been regarded as the most dependable textbook on the subject. Focusing on the most complete set of pedagogical tools available and student-centered learning design, this book helps students complete the connection between theory and practice and build their problem-solving skills. Key concepts are explained multiple times in varying formats to support diverse learning styles, followed by detailed examples including application and design examples. These are then followed by Learning Assessments which allow students to work similar problems and check their results against the answers provided. At the end of each chapter, the book includes a robust set of conceptual and computational problems at a wide range of difficulty levels. This International Adaptation enhances the coverage of network theorems by adding new theorems such as reciprocity, compensation, and Millman's, and strengthens the topic of filter networks by including cascaded and Butterworth filters. This edition also includes inverse hybrid and inverse transmission parameters to describe two-port networks and a dedicated chapter on diodes.

Subject Guide to Books in Print, 1996
Books in Print Supplement, 2002 *Solutions Manual to Accompany Introductory Circuit Analysis, 6th Edition* Robert L. Boylestad, 1990 **Books in Print**, 1977 The Publishers' Trade List Annual, 1980 Books in Series, 1985 Vols for 1980 issued in three parts Series Authors and Titles *Scientific and Technical Books in Print*, 1972 Books in Series in the United States R.R. Bowker Company, Dept. of Bibliography Staff, 1978

This is likewise one of the factors by obtaining the soft documents of this **Engineering Circuit Analysis 6th Edition Solutions Manual** by online. You might not require more era to spend to go to the ebook introduction as skillfully as search for them. In some cases, you likewise reach not discover the statement Engineering Circuit Analysis 6th Edition Solutions Manual that you are looking for. It will utterly squander the time.

However below, past you visit this web page, it will be suitably unconditionally easy to acquire as well as download lead Engineering Circuit Analysis 6th Edition Solutions Manual

It will not acknowledge many mature as we explain before. You can complete it even though discharge duty something else at home and even in your workplace. for that reason easy! So, are you question? Just exercise just what we meet the expense of under as well as review **Engineering Circuit Analysis 6th Edition Solutions Manual** what you in the same way as to read!

https://staging.conocer.cide.edu/About/scholarship/fetch.php/laboratory_manual_biology_sylvia_mader.pdf

Table of Contents Engineering Circuit Analysis 6th Edition Solutions Manual

1. Understanding the eBook Engineering Circuit Analysis 6th Edition Solutions Manual
 - The Rise of Digital Reading Engineering Circuit Analysis 6th Edition Solutions Manual
 - Advantages of eBooks Over Traditional Books
2. Identifying Engineering Circuit Analysis 6th Edition Solutions Manual
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an Engineering Circuit Analysis 6th Edition Solutions Manual
 - User-Friendly Interface

4. Exploring eBook Recommendations from Engineering Circuit Analysis 6th Edition Solutions Manual
 - Personalized Recommendations
 - Engineering Circuit Analysis 6th Edition Solutions Manual User Reviews and Ratings
 - Engineering Circuit Analysis 6th Edition Solutions Manual and Bestseller Lists
5. Accessing Engineering Circuit Analysis 6th Edition Solutions Manual Free and Paid eBooks
 - Engineering Circuit Analysis 6th Edition Solutions Manual Public Domain eBooks
 - Engineering Circuit Analysis 6th Edition Solutions Manual eBook Subscription Services
 - Engineering Circuit Analysis 6th Edition Solutions Manual Budget-Friendly Options
6. Navigating Engineering Circuit Analysis 6th Edition Solutions Manual eBook Formats
 - ePub, PDF, MOBI, and More
 - Engineering Circuit Analysis 6th Edition Solutions Manual Compatibility with Devices
 - Engineering Circuit Analysis 6th Edition Solutions Manual Enhanced eBook Features
7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Engineering Circuit Analysis 6th Edition Solutions Manual
 - Highlighting and Note-Taking Engineering Circuit Analysis 6th Edition Solutions Manual
 - Interactive Elements Engineering Circuit Analysis 6th Edition Solutions Manual
8. Staying Engaged with Engineering Circuit Analysis 6th Edition Solutions Manual
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Engineering Circuit Analysis 6th Edition Solutions Manual
9. Balancing eBooks and Physical Books Engineering Circuit Analysis 6th Edition Solutions Manual
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Engineering Circuit Analysis 6th Edition Solutions Manual
10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
11. Cultivating a Reading Routine Engineering Circuit Analysis 6th Edition Solutions Manual
 - Setting Reading Goals Engineering Circuit Analysis 6th Edition Solutions Manual
 - Carving Out Dedicated Reading Time

12. Sourcing Reliable Information of Engineering Circuit Analysis 6th Edition Solutions Manual
 - Fact-Checking eBook Content of Engineering Circuit Analysis 6th Edition Solutions Manual
 - Distinguishing Credible Sources
13. Promoting Lifelong Learning
 - Utilizing eBooks for Skill Development
 - Exploring Educational eBooks
14. Embracing eBook Trends
 - Integration of Multimedia Elements
 - Interactive and Gamified eBooks

Engineering Circuit Analysis 6th Edition Solutions Manual Introduction

In the digital age, access to information has become easier than ever before. The ability to download Engineering Circuit Analysis 6th Edition Solutions Manual has revolutionized the way we consume written content. Whether you are a student looking for course material, an avid reader searching for your next favorite book, or a professional seeking research papers, the option to download Engineering Circuit Analysis 6th Edition Solutions Manual has opened up a world of possibilities. Downloading Engineering Circuit Analysis 6th Edition Solutions Manual provides numerous advantages over physical copies of books and documents. Firstly, it is incredibly convenient. Gone are the days of carrying around heavy textbooks or bulky folders filled with papers. With the click of a button, you can gain immediate access to valuable resources on any device. This convenience allows for efficient studying, researching, and reading on the go. Moreover, the cost-effective nature of downloading Engineering Circuit Analysis 6th Edition Solutions Manual has democratized knowledge. Traditional books and academic journals can be expensive, making it difficult for individuals with limited financial resources to access information. By offering free PDF downloads, publishers and authors are enabling a wider audience to benefit from their work. This inclusivity promotes equal opportunities for learning and personal growth. There are numerous websites and platforms where individuals can download Engineering Circuit Analysis 6th Edition Solutions Manual. These websites range from academic databases offering research papers and journals to online libraries with an expansive collection of books from various genres. Many authors and publishers also upload their work to specific websites, granting readers access to their content without any charge. These platforms not only provide access to existing literature but also serve as an excellent platform for undiscovered authors to share their work with the world. However, it is essential to be cautious while downloading Engineering Circuit Analysis 6th Edition Solutions Manual. Some websites may offer pirated or illegally obtained copies of copyrighted material. Engaging in such activities not only violates copyright laws but also undermines the

efforts of authors, publishers, and researchers. To ensure ethical downloading, it is advisable to utilize reputable websites that prioritize the legal distribution of content. When downloading Engineering Circuit Analysis 6th Edition Solutions Manual, users should also consider the potential security risks associated with online platforms. Malicious actors may exploit vulnerabilities in unprotected websites to distribute malware or steal personal information. To protect themselves, individuals should ensure their devices have reliable antivirus software installed and validate the legitimacy of the websites they are downloading from. In conclusion, the ability to download Engineering Circuit Analysis 6th Edition Solutions Manual has transformed the way we access information. With the convenience, cost-effectiveness, and accessibility it offers, free PDF downloads have become a popular choice for students, researchers, and book lovers worldwide. However, it is crucial to engage in ethical downloading practices and prioritize personal security when utilizing online platforms. By doing so, individuals can make the most of the vast array of free PDF resources available and embark on a journey of continuous learning and intellectual growth.

FAQs About Engineering Circuit Analysis 6th Edition Solutions Manual Books

How do I know which eBook platform is the best for me? Finding the best eBook platform depends on your reading preferences and device compatibility. Research different platforms, read user reviews, and explore their features before making a choice. Are free eBooks of good quality? Yes, many reputable platforms offer high-quality free eBooks, including classics and public domain works. However, make sure to verify the source to ensure the eBook credibility. Can I read eBooks without an eReader? Absolutely! Most eBook platforms offer web-based readers or mobile apps that allow you to read eBooks on your computer, tablet, or smartphone. How do I avoid digital eye strain while reading eBooks? To prevent digital eye strain, take regular breaks, adjust the font size and background color, and ensure proper lighting while reading eBooks. What the advantage of interactive eBooks? Interactive eBooks incorporate multimedia elements, quizzes, and activities, enhancing the reader engagement and providing a more immersive learning experience. Engineering Circuit Analysis 6th Edition Solutions Manual is one of the best book in our library for free trial. We provide copy of Engineering Circuit Analysis 6th Edition Solutions Manual in digital format, so the resources that you find are reliable. There are also many Ebooks of related with Engineering Circuit Analysis 6th Edition Solutions Manual. Where to download Engineering Circuit Analysis 6th Edition Solutions Manual online for free? Are you looking for Engineering Circuit Analysis 6th Edition Solutions Manual PDF? This is definitely going to save you time and cash in something you should think about.

Find Engineering Circuit Analysis 6th Edition Solutions Manual :

laboratory manual biology sylvia mader

~~lab manual science class 10 cbse science~~

laboratory manual for practical biochemistry

lab rat dissection answers

laboratory manual to accompany electronic

lab manual marieb 11th

laboratory manual student edition glencoe

lab manual physio 31 answer

~~lab manual labpaq bk 101~~

~~lacier de ses yeux~~

lab manual answers for microbiology

~~lake pomme de terre fishing report~~

labour relations n5 exam paper

lagroecologie cours theorie une agriculture biologique artisanale et autonome

lake vermillion walleye guide

Engineering Circuit Analysis 6th Edition Solutions Manual :

sustainable construction and building materials springer - Feb 08 2023

web this book presents select proceedings of the international conference on sustainable construction and building materials icscbm 2018 and examines a range of durable energy efficient and next generation construction and building materials produced from industrial wastes and byproducts

eco material s sustainable green cement is transforming construction - May 11 2023

web nov 13 2023 the green cement part of the business forms eco material s high tech pillar the merger of green cement and boral s north american assets was also partly funded by the issuance of a green bond

the 10 best sustainable building materials cemex ventures - Jul 13 2023

web nov 14 2023 these are the best sustainable materials for construction 1 bamboo did you know that bamboo can grow up to 1 5 inches or 3 8 centimeters a day due to its fast growing properties flexible nature and abundance in nature bamboo is top of our list as one of the most sustainable and economical building materials

eco efficient construction and building materials life cycle - Mar 09 2023

web eco efficient construction and building materials reviews ways of assessing the environmental impact of construction and building materials part one discusses the application of life cycle assessment lca methodology to

efficient construction material an overview sciencedirect topics - Jan 07 2023

web microbial biotechnological products are developing to make new ecologically friendly and economically efficient construction materials low cost sustainable and environmentally friendly microbial cements grouts biopolymers and bioplastics are useful in civil engineering

10 sustainable building materials for eco friendly construction - Oct 16 2023

web 10 sustainable building materials for eco friendly construction bamboo bamboo is an incredibly sustainable building material with many properties pushing it to the forefront of the hempcrete hempcrete is an innovative building material made from the woody inner core of the hemp plant it s

eco efficient construction and building materials sciencedirect - Aug 14 2023

web key features reviews ways of assessing the environmental impact of construction and building materials provides a thorough overview including strengths and shortcomings of the life cycle assessment lca and eco labeling of eco efficient construction and building materials

earth construction lessons from the past for future eco efficient - Apr 10 2023

web apr 1 2012 thormark 59 mentioned that an appropriate choice of construction and building materials can mean a 17 reduction in the energy of a building gonzalez and navarro 60 mentioned a correct choice of building materials can reduce of almost 30 co 2 emissions avoiding the emission of 38 tons of co 2

special issue eco efficient construction and building materials - Jun 12 2023

web apr 20 2023 applied sciences an international peer reviewed open access journal

eco efficient construction and building materials springerlink - Sep 15 2023

web addresses a new vision for construction materials by emphasizing the importance of their environmental impact covers the latest findings in the field especially the toxicity aspects includes research findings that are vital to professionals in the building industry 32k accesses 60 citations

iso 1496 1 2013 series 1 freight containers specification and - Aug 15 2023

web iso 1496 1 2013 specifies the basic specifications and testing requirements for iso series 1 freight containers of the totally enclosed general purpose types and certain specific purpose types closed vented ventilated or open top which are suitable for international exchange and for conveyance by road rail and sea including interchange

international iso standard 9096 - Jan 08 2023

web iso 9096 2017 e foreword iso the international organization for standardization is a worldwide federation of national standards bodies iso member bodies the work of preparing international standards is normally carried out through iso technical committees each member body interested in a subject for which a technical

iso 9096 2017 stationary source emissions manual - Jul 02 2022

web iso 9096 2017 describes a reference method for the measurement of particulate matter dust concentration in waste gases of concentrations from 20 mg m³ to 1 000 mg m³ under standard conditions iso 9096 2017 is applicable to the calibration of automated monitoring systems ams if the emission gas contains unstable reactive or semi

iso 1496 1 2013 en iso international organization for - Sep 16 2023

web iso 1496 1 2013 en series 1 freight containers specification and testing part 1 general cargo containers for general purposes buy follow table of contents foreword introduction 1 scope 2 normative references 3 terms and definitions 4 dimensions and ratings 4 1 external dimensions 4 2 internal dimensions

iso 1161 iso 1496 le specifiche per il container sicurezza - Apr 30 2022

web the iso 1496 standard general cargo containers for general purpose establishes the construction and performance requirements of containers for containers intended for general use called general purpose freight containers the standard establishes the following structural strength for the walls

iso 1496 1 iteh standards - Mar 10 2023

web iso 1496 1 1990 08 15 2006 11 01 series 1 freight containers specification and testing part 1 general cargo containers for general purposes amendment 4 conteneurs de la série 1 spécifications et essais partie 1 conteneurs d usage général pour marchandises diverses amendement 4 reference number

intermodal container wikipedia - Feb 26 2022

web an intermodal container often called a shipping container or iso container is a large standardized container designed and built for intermodal freight transport meaning these containers can be used across different modes of transport from ship to rail to truck without unloading and reloading their cargo 1

iso 1496 1 series 1 freight containers specification and - Jul 14 2023

web iso standard 1496 1 fifth edition 1990 08 15 series 1 freight containers specification and testing part 1 general cargo containers for general purposes conteneurs de la serie 1 spécifications et essais partie 1 conteneurs d usage general pour marchandises diverses reference number iso 1496 1 1990 ie

key iso standards bureau international des containers et du - Jun 01 2022

web iso 1496 1 specification and testing part 1 general cargo container for general purposes except for specialized test part 1 is driven the other part the containers undergo n service under related efforts to their mode of transport maritime railway

road in order to guarantee their reliability in service each new type of container is

standard detay tse - May 12 2023

web 1 1 this part of iso 1496 specifies the basic specifications and testing requirements for iso series 1 freight containers of the totally enclosed general purpose types and certain specific purpose types closed vented ventilated or open top which are suitable for international exchange and for conveyance by road rail and sea including

standard detay tse - Apr 11 2023

web iso 1496 3 1995 uluslararası karşılıklar iso 1496 3 eqv din iso 1496 3 eqv bs iso 1496 3 eqv tercüme edildiği std iso 1496 3 ics kodu 55 180 10 genel amaçlı konteynerler atıf yapılan std ts 1360 1993 iso 668 ts 1357 1993 iso 830 ts 1358 1993 iso 1161 ts 1359 en iso 6346 2002 iso 6346 cen

iso 1496 1 2013 iss rs - Mar 30 2022

web jun 21 2013 iso 1496 1 2013 specifies the basic specifications and testing requirements for iso series 1 freight containers of the totally enclosed general purpose types and certain specific purpose types closed vented ventilated or open top which are suitable for international exchange and for conveyance by road rail and sea including interchange

container specification hapag lloyd - Jun 13 2023

web a container floor is capable of carrying a forklift truck with a maximum axle load of 5 460 kg 12 037 lbs if the contact area per wheel is at least 142 cm² 22 in iso 1496 i whereas the steel floor containers provide a maximum axle load of 9 200 kg 20 282 lbs valid for all commonly available forklifts

iso 1496 3 2019 series 1 freight containers specification and - Feb 09 2023

web this document specifies the basic specifications and testing requirements for iso series 1 tank containers suitable for the carriage of gases liquids and solid substances dry bulk which can be loaded or unloaded as liquids by gravity or pressure discharge for international exchange and for conveyance by road rail and sea including

international iso standard 1496 2 - Sep 04 2022

web iso 1496 2 2018 e 3 3 picture frame opening in one end of a thermal container to accommodate an integral refrigeration unit 3 4 built in front mechanically refrigerating and heated container thermal container with built in recess for a refrigeration and heating unit 3 5

code of practice for flexitanks zim - Jan 28 2022

web tested according to iso 1496 part 1 the following criteria are compulsory for full compliance with this code of practice and have been chosen to maximise safety they represent the minimum criteria and can be supplemented by additional or more stringent criteria at the discretion of the flexitank operator or shipping line

international iso standard 1496 3 saiglobal - Oct 05 2022

web international standard iso 1496 3 fourth edition 1995 03 01 series 1 freight containers specification and testing part 3 tank containers for liquids gases and pressurized dry bulk

iso 1496 4 1991 series 1 freight containers specification and - Dec 07 2022

web specifies the basic specifications and testing requirements for containers of the dry bulk non pressurized type which are suitable for international exchange and for conveyance by road rail and sea annexes f and g are for information only general information status published publication date 1991 12 edition 1 number of pages 31

pdf international container design regulations and iso - Nov 06 2022

web sep 26 2018 iso 1496 allows general purpose containers manufactured since 15 june 2005 iso 1496 1 1990 and 3 2005 and thermal type containers since 15 july 2008 iso 1496 2 2008 to have an allowable

series 1 freight containers specification and testing iteh - Aug 03 2022

web 1 1 this part of iso 1496 specifies the basic specifications and testing requirements for iso series 1 freight containers of the totally enclosed general purpose types and certain specific purpose types

modern logo ideas canva - Jun 04 2022

web get inspired with these modern logo ideas and tips you want your logo design to feel fresh timely and modern and now that you have this modern logo ideas and tips you have all the inspiration you need to bring your modern logo to life

35 creative logo design ideas modern inspiration for 2023 - Mar 13 2023

web nov 22 2022 we've written 35 creative logo design ideas as a guide for new businesses like yours to help you identify best practices when it comes to creating an effective logo and to help you tap into the best creative logo design ideas around today we'll start by discussing seven core inspiring logo design trends

99 best logos for creative inspiration 99designs - Oct 08 2022

web jul 13 2022 the best logomark logos a logomark refers to a specific icon that accompanies the logo's brand name the advantage of a logomark is that it associates an image with your business creating an easily identifiable symbol there are two main types pictorial and abstract

logo ideas see 1000s of cool logos the best designs - Sep 19 2023

web get 100s of cool logo ideas whatever industry you're creating a logo for it helps to start with inspiration below we've curated 2 800 existing logo designs from over 100 popular industries and included design tips for each

35 logo ideas canva - Jan 11 2023

web whether you're thinking of a logo that's simple yet striking decked in vivid colors or enriched with subdued hues heavily typographical or largely symbolic you'll find all these types of designs and more in our collection of logo templates have a look and find what you need to make your brand shine

logo ideas see 100 s of cool logo designs per industry - Mar 01 2022

web tailor brands enables you to make stunning logos designs no matter what type of industry your business is in our online logo maker will create a logo that s a perfect match for your business but if you need some inspiration you can browse through thousands of cool logo ideas from every industry and find the one that speaks to you most

how to design a logo the ultimate guide - Dec 10 2022

web feb 16 2022 don t fret this handy guide will teach you everything you need to know to design the perfect logo for you and your business from defining your brand s identity and understanding what makes a great logo to making the right design choices and navigating the design process read on to learn how to design a logo

professional logo design logo com - Jan 31 2022

web logo design ideas your business needs a visual identity your logo hiring a professional designer to design your logo can be heavy on your pocket logo com uses one of the most advanced machine learning algorithms to generate thousands of professional looking logos in minutes all you have to do is enter your business name and get started

logo ideas 1000 s of the best logo design images - Aug 18 2023

web looking for logo ideas we ve collected 427654 examples of professional logo designs from our global design community use our free logomaker to get started on yours

logo maker create free logos in minutes canva - May 15 2023

web start designing a custom logo with canva s library of customizable logos creating the perfect logo for your business is ridiculously easy create an eye catching logo in just minutes completely free completely online fully customizable

free logo maker create your own logo free logo design - Feb 12 2023

web free logo design is your one stop solution to create a logo and build a brand you love to build the foundation of your company brand image a top quality logo grow your business on all channels with a credible and consistent brand display your logo on your website use it on social media and print it on promotional items

free logo maker design custom logos adobe express - Sep 07 2022

web the adobe express logo maker is an instant intuitive and intelligent free logo design tool use this logo generator to create a wide range of possibilities for your own logo free logo maker the adobe express logo creator lets you instantly generate quality logos that can be shared across all your printed and digital platforms create now

100 logo design ideas for designers who are stuck - Jul 05 2022

web aug 30 2021 100 logo design ideas for designers who are stuck a logo is not just a random symbol it s the very symbol that reminds people who you are what you do and how you can help them here are 100 ideas to inspire your logo design process igor ovsyannykov august 30 2021 6 min read a logo is the best representation of any

logo design inspiration 44 resources to fuel your creativity - Nov 09 2022

web oct 25 2022 1 looka as an ai powered logo and brand generator we live for the latest and greatest in logo and brand design we share trending logos colors typography and branding as well as showcase our customers beautiful logos you ll also find beginner friendly tips on how to design a great logo and resources for your journey as an

logo ideas thousands of creative logos by industry - May 03 2022

web create the perfect logo for your business in minutes brandcrowd s logo maker has over 22 000 premium logo designs created by designers from around the world here s how it works

25 best modern logos with simple designs logo examples - Aug 06 2022

web nov 23 2022 a wonderful mixture of some of the best simple logo trends of 2023 the food photography logo maker template features gorgeous colours an innovative use of photography and fruit as a logo symbol and an elegantly simple logo design idea use it as is or customise it to create your own unique logo design

the best free logo maker create a unique logo looka - Jun 16 2023

web to make a logo with looka start by entering your company name and industry then select logo styles colors and symbols for inspiration within seconds you ll be browsing custom logos generated by our ai powered platform click any logo to tweak colors fonts layouts symbols and more

logo design ideas 2300 inspirations to make your own - Apr 02 2022

web logo design ideas browse thousands of logo examples from a variety of categories to ignite your creativity find professionally designed logos then use logo maker to create your own business logo

logo inspiration ideas canva - Apr 14 2023

web let s take a look at a few logo design ideas to deliver a dose of creative inspiration for your tech business branding and logo design logo design by 99designs designer goopanic having different versions of your logo gives you a level of versatility and adaptability like in this logo design which has a variety of logo types including a

logo ideas the best logo examples for inspiration free - Jul 17 2023

web create a logo for free in less than 3 minutes the freelogodesign logo maker lets you design a logo for your business in just a few clicks no design skills required our online logo generator makes creating a logo easy you simply choose your industry and logo from thousands of templates to start creating your brand