



What does it mean for two objects to compare equal? Kevlin Henney pores over some contracts to find out

# FIRST AMONG EQUALS

**W**HETHER FORMAL OR INFORMAL, A CONTRACT defines an (in principle) enforceable agreement between two or more parties with respect to a specific undertaking. The same is also true in code. The contract metaphor is an effective way of approaching API design and use: "A contract is effectively an agreement on the requirements fulfilled by a component between the user of the component and its supplier".

One way of capturing a functional contract is through the use of pre- and postconditions that state what must be true before an operation is to be called, for it to be called correctly, and what must be true after an operation has returned, for it to be considered correct<sup>1</sup>. To consider contracts only with respect to pre- and postconditions, however, offers a slightly limiting and incomplete – albeit common – view of the contract metaphor, although it clearly offers a great deal of coverage, utility and insight<sup>2</sup>.

Comparing two objects for some kind of equality offers fertile ground for exploring different conventions and contracts<sup>3</sup>.

## Beyond pre- and postconditions

The contract for the `equals` method in Java can be phrased most easily and clearly in terms of named constraints, each one stated as a simple truth:

### reflexive:

```
a.equals(a) == true
```

### symmetric:

```
a.equals(b) == true if and only if b.equals(a)
```

### transitive:

```
a.equals(b) == true && b.equals(c) implies
a.equals(c)
```

### consistent:

```
a.equals(b) returns the same as long as a
and b are unmodified
```

### not `is` inequality:

```
!a.equals(b) does not imply
```

Two objects can be considered equal if they compare neither greater nor less than one another

### hashCode `equality`:

```
a.equals(b) implies a.hashCode() ==
b.hashCode()
```

This contract is binding on any override of the `Object.equals` method. If you try to state this in terms of preconditions – what must be true before a successful call to `equals` – and postconditions – what must be true after a successful call to `equals` – from a strictly object-centric viewpoint you will find a loss of clarity as well as a loss of part of the contract. Assuming that the argument to `equals` is named `other`:

**postcondition where `other == null`:** The result is `false`.

**postcondition where `other == object`:** The result is `true`.

**postcondition otherwise:** The result is the same as the result of `other.equals(this)`, and where `true` then `hashCode() == other.hashCode()`.

As you can see, there is no useful precondition and the postcondition is in part partitioned by the named constraints we had before, but not as clearly. More reading between the lines is needed to get the full sense of the contract. The consistency constraint is a difficult one to express at the best of times, but its temporal nature means that it cannot be properly expressed as the postcondition of an operation, which describes only what is true at the point of completion of the method call, and nothing beyond.

There is also a subtle loop here: if the result of calling `equals` is required to be the same as the result of making the same call but with the argument and receiving object switched round, what is the requirement on that second call? It would be the first call. Any literal implementation of this would find itself caught in infinite recursion.

Although the contract for overriding

## Facts at a glance

- Contracts can be described in many ways, not just functional pre- and postconditions.
- Working out a contract that describes equality directly takes more care than you might first think.
- Working out a contract describing total ordering takes even more.
- Contracts need to strike a balance between strict necessity and unnecessary strictness.

# First Among Equals

**Raffaela Di Napoli**



**First Among Equals:**

Recognizing the quirk ways to get this book **First Among Equals** is additionally useful. You have remained in right site to start getting this info. acquire the First Among Equals partner that we have enough money here and check out the link.

You could buy lead First Among Equals or get it as soon as feasible. You could quickly download this First Among Equals after getting deal. So, as soon as you require the book swiftly, you can straight get it. Its so no question easy and so fats, isnt it? You have to favor to in this melody

[http://www.pet-memorial-markers.com/results/virtual-library/fetch.php/Healing\\_Journeyaudio\\_Cassette.pdf](http://www.pet-memorial-markers.com/results/virtual-library/fetch.php/Healing_Journeyaudio_Cassette.pdf)

## **Table of Contents First Among Equals**

1. Understanding the eBook First Among Equals
  - The Rise of Digital Reading First Among Equals
  - Advantages of eBooks Over Traditional Books
2. Identifying First Among Equals
  - 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 First Among Equals
  - User-Friendly Interface
4. Exploring eBook Recommendations from First Among Equals
  - Personalized Recommendations
  - First Among Equals User Reviews and Ratings
  - First Among Equals and Bestseller Lists
5. Accessing First Among Equals Free and Paid eBooks
  - First Among Equals Public Domain eBooks

- First Among Equals eBook Subscription Services
- First Among Equals Budget-Friendly Options
- 6. Navigating First Among Equals eBook Formats
  - ePub, PDF, MOBI, and More
  - First Among Equals Compatibility with Devices
  - First Among Equals Enhanced eBook Features
- 7. Enhancing Your Reading Experience
  - Adjustable Fonts and Text Sizes of First Among Equals
  - Highlighting and Note-Taking First Among Equals
  - Interactive Elements First Among Equals
- 8. Staying Engaged with First Among Equals
  - Joining Online Reading Communities
  - Participating in Virtual Book Clubs
  - Following Authors and Publishers First Among Equals
- 9. Balancing eBooks and Physical Books First Among Equals
  - Benefits of a Digital Library
  - Creating a Diverse Reading Collection First Among Equals
- 10. Overcoming Reading Challenges
  - Dealing with Digital Eye Strain
  - Minimizing Distractions
  - Managing Screen Time
- 11. Cultivating a Reading Routine First Among Equals
  - Setting Reading Goals First Among Equals
  - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of First Among Equals
  - Fact-Checking eBook Content of First Among Equals
  - 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

### **First Among Equals Introduction**

First Among Equals Offers over 60,000 free eBooks, including many classics that are in the public domain. Open Library: Provides access to over 1 million free eBooks, including classic literature and contemporary works. First Among Equals Offers a vast collection of books, some of which are available for free as PDF downloads, particularly older books in the public domain. First Among Equals : This website hosts a vast collection of scientific articles, books, and textbooks. While it operates in a legal gray area due to copyright issues, its a popular resource for finding various publications. Internet Archive for First Among Equals : Has an extensive collection of digital content, including books, articles, videos, and more. It has a massive library of free downloadable books. Free-eBooks First Among Equals Offers a diverse range of free eBooks across various genres. First Among Equals Focuses mainly on educational books, textbooks, and business books. It offers free PDF downloads for educational purposes. First Among Equals Provides a large selection of free eBooks in different genres, which are available for download in various formats, including PDF. Finding specific First Among Equals, especially related to First Among Equals, might be challenging as theyre often artistic creations rather than practical blueprints. However, you can explore the following steps to search for or create your own Online Searches: Look for websites, forums, or blogs dedicated to First Among Equals, Sometimes enthusiasts share their designs or concepts in PDF format. Books and Magazines Some First Among Equals books or magazines might include. Look for these in online stores or libraries. Remember that while First Among Equals, sharing copyrighted material without permission is not legal. Always ensure youre either creating your own or obtaining them from legitimate sources that allow sharing and downloading. Library Check if your local library offers eBook lending services. Many libraries have digital catalogs where you can borrow First Among Equals eBooks for free, including popular titles. Online Retailers: Websites like Amazon, Google Books, or Apple Books often sell eBooks. Sometimes, authors or publishers offer promotions or free periods for certain books. Authors Website Occasionally, authors provide excerpts or short stories for free on their websites. While this might not be the First Among Equals full book , it can give you a taste of the authors writing style. Subscription Services Platforms like Kindle Unlimited or Scribd offer subscription-based access to a wide range of First Among Equals eBooks, including some popular titles.

## FAQs About First Among Equals Books

**What is a First Among Equals PDF?** A PDF (Portable Document Format) is a file format developed by Adobe that preserves the layout and formatting of a document, regardless of the software, hardware, or operating system used to view or print it. **How do I create a First Among Equals PDF?** There are several ways to create a PDF: Use software like Adobe Acrobat, Microsoft Word, or Google Docs, which often have built-in PDF creation tools. Print to PDF: Many applications and operating systems have a "Print to PDF" option that allows you to save a document as a PDF file instead of printing it on paper. Online converters: There are various online tools that can convert different file types to PDF. **How do I edit a First Among Equals PDF?** Editing a PDF can be done with software like Adobe Acrobat, which allows direct editing of text, images, and other elements within the PDF. Some free tools, like PDFescape or Smallpdf, also offer basic editing capabilities. **How do I convert a First Among Equals PDF to another file format?** There are multiple ways to convert a PDF to another format: Use online converters like Smallpdf, Zamzar, or Adobe Acrobats export feature to convert PDFs to formats like Word, Excel, JPEG, etc. Software like Adobe Acrobat, Microsoft Word, or other PDF editors may have options to export or save PDFs in different formats. **How do I password-protect a First Among Equals PDF?** Most PDF editing software allows you to add password protection. In Adobe Acrobat, for instance, you can go to "File" -> "Properties" -> "Security" to set a password to restrict access or editing capabilities. Are there any free alternatives to Adobe Acrobat for working with PDFs? Yes, there are many free alternatives for working with PDFs, such as: LibreOffice: Offers PDF editing features. PDFsam: Allows splitting, merging, and editing PDFs. Foxit Reader: Provides basic PDF viewing and editing capabilities. How do I compress a PDF file? You can use online tools like Smallpdf, ILovePDF, or desktop software like Adobe Acrobat to compress PDF files without significant quality loss. Compression reduces the file size, making it easier to share and download. Can I fill out forms in a PDF file? Yes, most PDF viewers/editors like Adobe Acrobat, Preview (on Mac), or various online tools allow you to fill out forms in PDF files by selecting text fields and entering information. Are there any restrictions when working with PDFs? Some PDFs might have restrictions set by their creator, such as password protection, editing restrictions, or print restrictions. Breaking these restrictions might require specific software or tools, which may or may not be legal depending on the circumstances and local laws.

## Find First Among Equals :

healing journeyaudio cassette

healing for the soul

~~hb 12 footprints under the window promo~~

~~healing the wounds that divide us seven mysteries of ethical decision~~

**health care delivery in the u. s.**

health and poverty

*hawker hunter a foulis aircraft*

hawk ronnie hawkins and the hawks

**head of the mountain**

~~headquarters in the bush blazers independent union scouts~~

~~head trauma basic preclinical and clinical directions~~

hazards of the halfcourt press

~~headfirst the olympic suceeb story of skeleton~~

hayeks journey the mind of friedrich hayek

~~he was a midwestern boy on his own~~

## **First Among Equals :**

*the greek vegetarian cookbook heather thomas* - May 16 2023

web jun 10 2019 the greek vegetarian cookbook by editor june 10 2019 1814 0 fresh vegetables are an integral part of greek cuisine and the greek vegetarian cookbook

**amazon co uk customer reviews the greek vegetarian cookbook** - May 04 2022

web oct 20 2023 the allrecipes keepers cookbook is available in stores now at a cover price of 39 99 but can also be purchased at magazines com for only 29 95 finally it s time

the greek vegetarian cookbook amazon com - Jul 18 2023

web fresh vegetables are an integral part of greek cuisine and the greek vegetarian cookbook showcases an array of delicious meatless breakfasts soups salads

**the greek vegetarian cookbook by heather thomas goodreads** - Sep 20 2023

web may 29 2019 fresh vegetables are an integral part of greek cuisine and the greek vegetarian cookbook showcases an array of delicious meatless breakfasts soups

**the greek vegetarian cookbook cookbooks food** - Nov 10 2022

web find helpful customer reviews and review ratings for the greek vegetarian cookbook at amazon com read honest and unbiased product reviews from our users

**the greek vegetarian cookbook heather thomas one green** - Apr 03 2022



web may 29 2019 a delicious collection of accessible and tasty greek recipes perfectly matched to the current trend for meat free eating fresh vegetables are an integral part  
*the greek vegetarian cookbook amazon ca* - Sep 27 2021

the greek vegetarian macmillan - Feb 13 2023

web apr 14 2021 vegetarian living this book is packed with fresh nourishing recipes from breakfast and soups to desserts it ll be your new summer go to sainsbury s eat

the greek vegetarian more than 100 recipes - Jun 17 2023

web a delicious collection of accessible and tasty greek recipes perfectly matched to the current trend for meat free eating fresh vegetables are an integral part of greek cuisine

pizza pie and spanakopita three vegetarian greek recipes to - Nov 29 2021

*the greek vegetarian cookbook eat your books* - Jun 05 2022

web oct 11 2023 serves 6 4 zucchinis grated 1 tsp salt 4 tbsp greek style yoghurt 3 eggs 2 spring onions chopped 20g chopped mint 1 cup 60g chopped dill 1 cup 30g chopped

**the greek vegetarian cookbook by heather thomas booktopia** - Jul 06 2022

web feb 1 2020 the cookbook features more than 100 simple and accessible vegetarian greek dishes including soups and salads meatless breakfasts healthy snacks street

**the greek vegetarian cookbook thomas heather** - Oct 09 2022

web fresh vegetables are an integral part of greek cuisine and the greek vegetarian cookbook showcases an array of delicious meatless breakfasts soups salads

the greek vegetarian cookbook vegan magazine - Dec 11 2022

web fresh vegetables are an integral part of greek cuisine and the greek vegetarian cookbook showcases an array of delicious meatless breakfasts soups salads

**finally our best recipes from over 25 years are coming** - Oct 29 2021

**the greek vegetarian cookbook free online library** - Dec 31 2021

the greek vegetarian cookbook hardcover 1 january 2019 - Mar 14 2023

web a delicious collection of accessible and tasty greek recipes perfectly matched to the current trend for meat free eating

fresh vegetables are an integral part of greek cuisine

*4 recipes from the greek vegetarian cookbook life extension* - Feb 01 2022

**amazon com greek vegetarian cookbook** - Mar 02 2022

*the greek vegetarian cookbook heather thomas google books* - Sep 08 2022

web may 29 2019 greek and vegetarian mediterranean cookbook 2 books in 1 120 recipes for healthy food from spain france and greece by maki blanc jun 26

**the greek vegetarian cookbook barnes noble** - Apr 15 2023

web drawing inspiration from all over greece the book simplifies this hugely popular cuisine with easily achievable nourishing recipes so satisfying and tasty that they appeal to

the greek vegetarian cookbook amazon ae - Jan 12 2023

web may 3 2019 a delicious collection of accessible and tasty greek recipes perfectly matched to the current trend for meat free eating fresh vegetables are an integral part

**the greek vegetarian cookbook amazon co uk** - Aug 19 2023

web may 29 2019 overview a delicious collection of accessible and tasty greek recipes perfectly matched to the current trend for meat free eating fresh vegetables are an

*9780714879130 the greek vegetarian cookbook abebooks* - Aug 07 2022

web in the greek vegetarian cookbook author heather thomas blends together the best of both modern and traditional greek cuisine with a focus on simplicity and authenticity

**schulbucher und schulbuchverlage in den besatzung full pdf** - May 17 2022

apr 21 2023 schulbucher und schulbuchverlage in den besatzung 2 7 downloaded from uniport edu ng on april 21 2023 by guest bundesrepublik deutschland und der ddr

*schulbucher und schulbuchverlage in den besatzung* - Nov 10 2021

schulbucher und schulbuchverlage in den besatzung - Feb 11 2022

may 11 2023 is schulbucher und schulbuchverlage in den besatzung below kampf der verdummung deutsche kommunistische partei 1971 geschichtsdidaktische innovation in der

**schulbucher und schulbuchverlage in den besatzung** - Feb 23 2023

schulbucher und schulbuchverlage in den besatzung the economics of publishing educational materials in africa schulbücher

als lehr und lernmaterialien variationen des

**schulbucher und schulbuchverlage in den besatzung** - Jul 19 2022

definition rechtschreibung synonyme und grammatik von schulbuch auf duden online nachschlagen wörterbuch der deutschen sprache

**schulbucher und schulbuchverlage in den besatzung** - Jan 13 2022

sep 28 2023 durch die schulbuchautoren sowie die korrekturen seitens der herausgeber und verlagsredakteure schließt die analyse ebenso ein wie die gutachten und

**schulbucher und schulbuchverlage in den besatzung** - Jul 31 2023

jun 26 2023 this schulbucher und schulbuchverlage in den besatzung as one of the most lively sellers here will completely be in the course of the best options to review verhandlungen

*schulbucher und schulbuchverlage in den besatzung* - Jan 25 2023

ein schulbuchverlag ist ein auf schulbücher und andere bildungsmedien spezialisierter verlag schulbuchverlage in deutschland in der bundesrepublik deutschland gibt es eine große

**schulbuchverlage wiktionary** - Sep 20 2022

aug 25 2023 schulbucher und schulbuchverlage in den besatzung can be taken as capably as picked to act beiträge zur historischen sozialkunde 1994 military government weekly

*schulbucher und schulbuchverlage in den besatzung pdf* - Jun 29 2023

schulbucher und schulbuchverlage in den besatzung downloaded from eagldemo2 eagltechnology com by guest bryan scarlet das kaiserreich 1871 1918

**free schulbucher und schulbuchverlage in den besatzung** - Sep 01 2023

schulbucher und schulbuchverlage in den besatzung die europäische union erfolgreich vermitteln schulbücher und schulbuchverlage in den besatzungszonen deutschlands 1945

**schulbucher und schulbuchverlage in den besatzung pdf** - Aug 20 2022

oct 6 2023 schulbucher und schulbuchverlage in den besatzung 1 6 downloaded from uniport edu ng on october 6 2023 by guest schulbucher und schulbuchverlage in den

*schulbucher und schulbuchverlage in den besatzung neville* - Mar 15 2022

schulbucher und schulbuchverlage in den besatzung feldfortifikatorisches aus alten und neuen tagen jan 20 2022 landau in der pfalz unter französischer besatzung 1945 1949

**schulbucher und schulbuchverlage in den besatzung** - Oct 02 2023

schulbucher und schulbuchverlage in den besatzung prinz eugen von savoyen bd 1708 1718 oct 21 2020 besatzung und

staatsaufbau nach 1945 sep 24 2023 herausgegeben

**schulbuchverlag wikipedia** - Dec 24 2022

alle großen schulbuchverlage geben online einen Überblick über ihre umfangreichen verlagsprogramme auch lassen sich die werke in der regel per mausklick bestellen

**schulbuchverlage in deutschland** - Nov 22 2022

schulbücher und schulbuchverlage in den besatzungszonen deutschlands 1945 bis 1949 elektronische schulbücher potenziale für den einsatz im unterricht digitalisierung künstliche

**schulbücher und schulbuchverlage in den besatzung peter** - Apr 27 2023

schulbücher und schulbuchverlage in den besatzung book review unveiling the power of words in a world driven by information and connectivity the energy of words has be more

*schulbücher und schulbuchverlage in den besatzung* - Oct 22 2022

schulbuchverlage ist eine flektierte form von schulbuchverlag der text ist unter der lizenz creative commons namensnennung weitergabe unter gleichen bedingungen 4 0 unported

schulbücher und schulbuchverlage in den besatzung - May 29 2023

schulbücher und schulbuchverlage in den besatzung this is likewise one of the factors by obtaining the soft documents of this schulbücher und schulbuchverlage in den besatzung

schulbücher und schulbuchverlage in den besatzung - Apr 15 2022

schulbücher und schulbuchverlage in den besatzung getting the books schulbücher und schulbuchverlage in den besatzung now is not type of challenging means you could not

**schulbücher und schulbuchverlage in den besatzung pdf** - Dec 12 2021

this schulbücher und schulbuchverlage in den besatzung can be taken as with ease as picked to act vom patriotismus zum rassenwahn alfred grafe 2002 geschichtsdidaktische

**duden schulbuch rechtschreibung bedeutung definition** - Jun 17 2022

schulbücher und schulbuchverlage in den besatzung 1 schulbücher und schulbuchverlage in den besatzung this is likewise one of the factors by obtaining the soft schulbuchverlage in

**schulbücher und schulbuchverlage in den besatzung 2023** - Mar 27 2023

schulbücher und schulbuchverlage in den besatzung 3 3 sprachliche handeln in mehrsprachigen gesellschaften und ihren institutionen von konrad ehlich und jochen

redcoats on the cape fear the revolutionary war in - Sep 06 2022

web redcoats on the cape fear the revolutionary war in southeastern north carolina revised edition ebook dunkerly robert m

amazon in kindle store

*redcoats on the cape fear the revolutionary war in* - Mar 12 2023

web nestled on the banks of the cape fear river wilmington north carolina remains famous as a blockade running port during the civil war not as renowned is the city s equally

*redcoats on the cape fear the revolutionary war in* - Oct 19 2023

web may 31 2012 nestled on the banks of the cape fear river wilmington north carolina remains famous as a blockade running port during the civil war not as renowned is the city s equally vital role during the revolution

**redcoats on the cape fear the revolutionary war in** - Sep 18 2023

web this is their story chronicles of the cape fear river 1660 1916 feb 19 2022 haunted ft fisher dec 08 2020 this book is a small collection of paranormal photographs taken at

**redcoats on the cape fear the revolutionary war in** - Jul 04 2022

web haunted wilmington and the cape fear coast redcoats on the cape fear the revolutionary war in southeastern north carolina downloaded from

**redcoat facts during the revolutionary war american history** - Jan 30 2022

web the soldiers had to pass inspection each day the soldiers braided their hair and powdered it with white flour the end of the braid was dipped in animal grease yuck shoes were

**redcoats on the cape fear the revolutionary war in** - Apr 13 2023

web jun 12 2012 redcoats on the cape fear the revolutionary war in southeastern north carolina revised edition 1st edition kindle edition by robert m dunkerly

**redcoats on the cape fear the revolutionary war in** - Dec 09 2022

web redcoats on the cape fear the revolutionary war in southeastern north carolina revised edition dunkerly robert m amazon sg books

redcoats on the cape fear mcfarland - Nov 08 2022

web redcoats on the cape fear the revolutionary war in southeastern north carolina revised edition 29 95 in stock

redcoats on the cape fear the revolutionary war in - Oct 07 2022

web redcoats on the cape fear the revolutionary war in southeastern north carolina revised edition robert m dunkerly on amazon com au free shipping on eligible

**redcoat definition meaning synonyms vocabulary com** - Feb 28 2022

web redcoat 1 n british soldier so called because of his red coat especially during the american revolution synonyms lobsterback type of soldier an enlisted man or

*redcoats on the cape fear the revolutionary war in* - Jun 15 2023

web redcoats on the cape fear the revolutionary war in southeastern north carolina revised edition author robert m dunkerly summary nestled on the banks of the cape

*redcoats on the cape fear the revolutionary war in* - Aug 05 2022

web buy redcoats on the cape fear the revolutionary war in southeastern north carolina revised edition by dunkerly robert m online on amazon ae at best prices

**redcoats on the cape fear the revolutionary war in** - Jan 10 2023

web anecdotes of the revolutionary war in america sep 28 2023 alexander garden 1757 1829 was an american revolutionary war soldier and writer from charleston south

the bloody cape the american revolutionary war in north - Feb 11 2023

web in redcoats on the cape fear robert m dunkerly moves the reader s focus away from the larger conflict between great britain and the american colonies in order to tell the

*redcoats on the cape fear the revolutionary war in* - Aug 17 2023

web may 31 2012 nestled on the banks of the cape fear river wilmington north carolina remains famous as a b redcoats on the cape fear the revolutionary war in

**red coats in colonial times american history** - Jun 03 2022

web red coats in colonial times redcoats refer to the military dressing of the british soldiers from 17th century to the 19th century the term is of notable significance in american

**red coats facts british soldiers in the american revolution** - May 02 2022

web the red coats of the revolutionary war was a semi professional force trained only for conventional european warfare the british army was relatively small in stature by

**redcoats on the cape fear the revolutionary war in** - May 14 2023

web redcoats on the cape fear the revolutionary war in southeastern north carolina author robert m dunkerly summary nestled on the banks of the cape fear river

**redcoats on the cape fear the revolutionary war in** - Jul 16 2023

web redcoats on the cape fear the revolutionary war in southeastern north carolina report of the cape fear and deep river navigation company for 1858 aug 05 2022

*redcoat definition meaning merriam webster* - Apr 01 2022

web aug 17 2023 a british soldier especially in america during the revolutionary war examples of redcoat in a sentence recent examples on the web compromise with the

