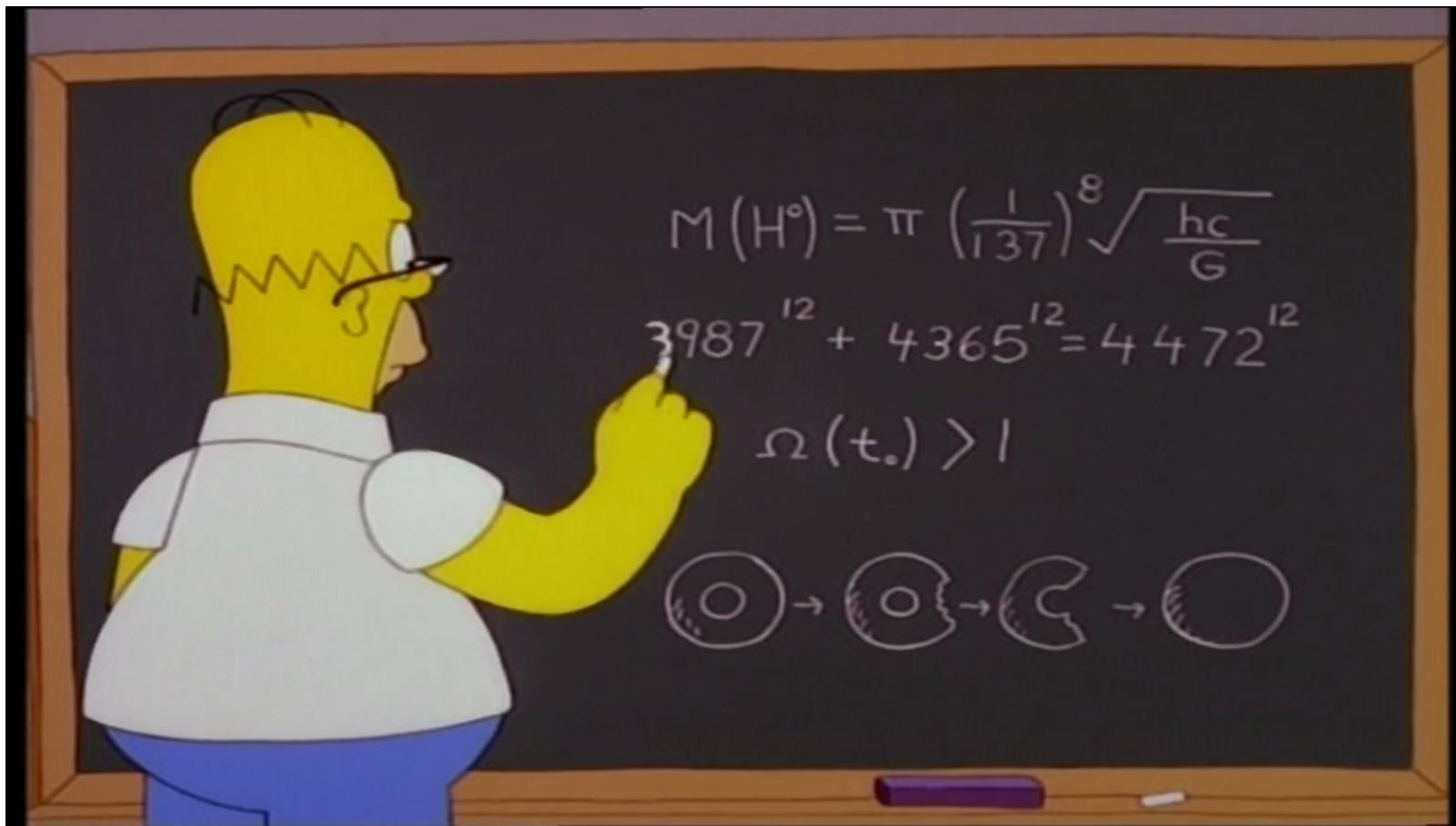


# Finding & using information: for Mathematics students

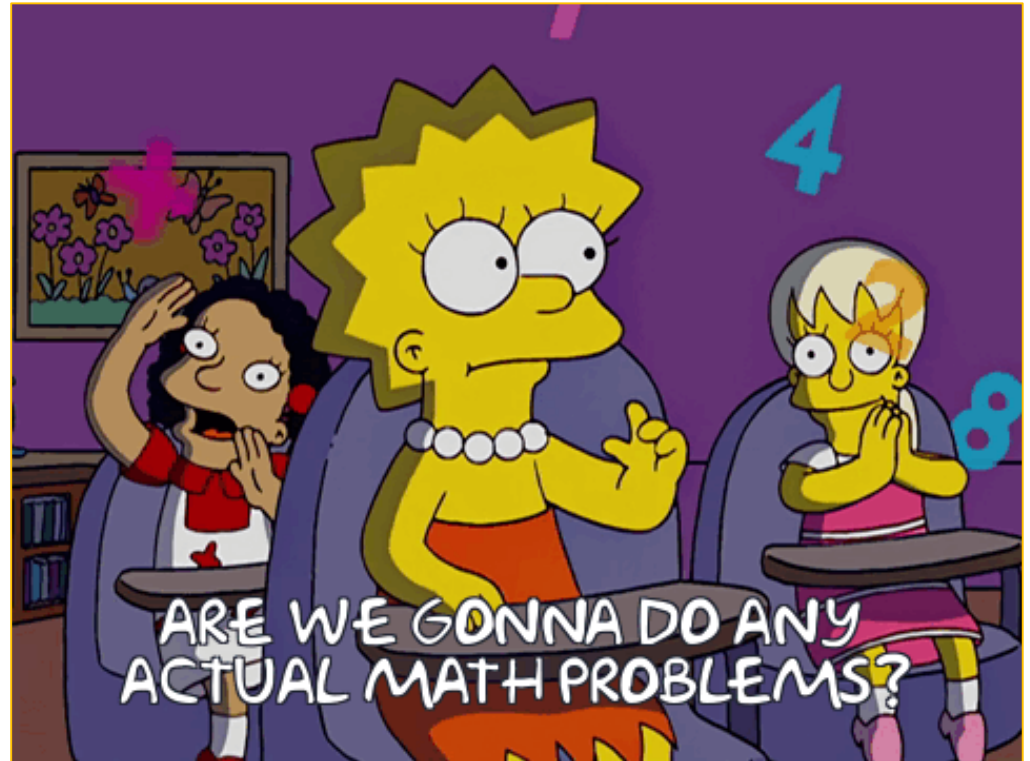


The Simpsons, The Wizard of Evergreen Terrace, 10:35 02/09/2016, Channel 4, 25 mins.  
<https://learningonscreen.ac.uk/ondemand/index.php/prog/000B37A5> (Accessed 02 Feb 2017)

# MA1003: Computing for Mathematics

## Skills that will be practiced and developed:

- Programming
- Group work
- Research
- Presentation



The Simpsons, Girls Just Want to Have Sums, 11:30 01/09/2016, Channel 4, 30 mins.  
<https://learningonscreen.ac.uk/ondemand/index.php/prog/005C0A05> (Accessed 02

Feb 2017)

[gif via Frinkiac.com](http://gif.via.Frinkiac.com)

## By the end of the session you will be able to ...

- **Identify** and **access** good quality information resources to support your research.
- **Avoid** plagiarising in your academic work.
- **Recognise** when to cite and reference and why.
- **Create** and manage BibTeX files.

# Part 1: Finding information for your project

Researching your **idea/product**

**Ask yourselves the question:**

“What has already been done and what do we need to know to build our product”?

# Exercise 1: Google vs Google Scholar

Your worksheet shows the results for a search for *Netflix recommender system* on Google and on Google Scholar.

Working in pairs/groups consider the resources on each list of results.

If you were writing a report on a project based on Netflix recommender system, which resource would you be most likely to use?

Go to [www.menti.com](https://www.menti.com) and enter the code **67 60 69** at the top of the screen and cast your vote.

# How does Google Scholar work?




- Limits results to items in PDF format with a list of references
- Set up Google Scholar to find CU full text **Full Text @ Cardiff** links from own laptop via **Settings – Library links**
- **[PDF]** links also appear – freely available papers

## Use good quality information

- Articles from peer-reviewed journals
- Textbooks (use your library)
- Webpages from reliable sources (check for bias)

# Researching your product

**Journal articles** are where academics, such as your lecturers, publish their research.



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Overview Publications Research Teaching Biography

Type Author Date Selected

### Articles

- Palmer, G. I., Harper, P. R. and Knight, V. A. 2018. [Modelling deadlock in open restricted queueing networks](#). *European Journal of Operational Research* 266(2), pp. 609-621. (10.1016/j.ejor.2017.10.039) [PDF](#)
- Fetta, A. et al. 2018. [Predicting adolescent social networks to stop smoking in secondary schools](#). *European Journal of Operational Research* 265(1), pp. 263-276. (10.1016/j.ejor.2017.07.039) [PDF](#)
- Harper, M. et al. 2017. [Reinforcement learning produces dominant strategies for the Iterated Prisoner's Dilemma](#). *Plos One* 12(12), article number: e0188046. (10.1371/journal.pone.0188046) [PDF](#)
- Knight, V. A., Komenda, I. and Griffiths, J. D. 2017. [Measuring the price of anarchy in critical care unit interactions](#). *Journal of the Operational Research Society* 68(6), pp. 630-642. (10.1057/s41274-016-0100-8) [PDF](#)
- Arzpayma, P. et al. 2017. [Creation and assessment of a computerized modelling tool for optimizing planning of home and hospital-based phototherapy](#). *British Journal of Dermatology* 176(5), pp. 1390-1391. (10.1111/bjd.14994)
- Knight, V. et al. 2016. [An open framework for the reproducible study of the iterated prisoner's dilemma](#). *Journal of Open Research Software* 4(1), article number: e35. (10.5334/jors.125) [PDF](#)
- Vile, J. et al. 2016. [A queueing theoretic approach to set staffing levels in time-dependent dual-class service systems](#). *Decision Sciences* 48(4), pp. 766-794. (10.1111/deci.12236) [PDF](#)



# Researching your product

Other info e.g.  
Year, Volume,  
Issue, Page  
Numbers

Journal  
title

Authors

Article title

Abstract

European Journal of Operational Research 266 (2018) 609–621

Contents lists available at ScienceDirect

**European Journal of Operational Research**

journal homepage: [www.elsevier.com/locate/ejor](http://www.elsevier.com/locate/ejor)

Stochastics and Statistics

**Modelling deadlock in open restricted queueing networks**

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**ARTICLE INFO**

**Article history:**  
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**Keywords:**  
Queueing  
Queueing networks  
Deadlock  
Markov models

**ABSTRACT**

Open restricted queueing networks give rise to the phenomenon of deadlock, whereby some customers may be unable to ever leave a server due to mutual blocking. This paper explores deadlock in queueing networks with limited queueing capacity, presents a method of detecting deadlock in discrete event simulations, and builds Markov chain models of these deadlocking networks. The three networks for which Markov models are given include single and multi-server networks for one and two node systems. The expected times to deadlock of these models are compared to results obtained using a simulation of the stochastic process, together with the developed deadlock detection method. This paper aims to be of value to simulation modellers of queues.

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**1. Introduction**

The study and modelling of queueing networks with blocking is an important tool in many aspects of operational research, both analytically and through simulation. These models have applications in many varied settings such as healthcare, supply chains, manufacturing and communications systems. However, these types

**Definition 1.** When there is a subset of blocked customers who are blocked directly or indirectly by customers in that subset only, then the system is said to be in deadlock.

This implies that a system is in deadlock when at least one service station permanently ceases to begin or finish any more services, due to circular blocking. Fig. 1 shows an open two node

# Where can you find these resources?

**Use databases.** A research database is a collection of electronic information which you can search for journal articles or subject specific information.



WEB OF SCIENCE™

Scopus

AMERICAN MATHEMATICAL SOCIETY  
**MathSciNet**  
Mathematical Reviews



## Intranet > Libraries > Information resources by subject > Mathematics

The screenshot displays the Cardiff University intranet interface. At the top, a dark blue navigation bar contains icons and labels for 'Email', 'SIMS Online', 'Learning Central', 'Directories', 'Libraries' (highlighted with a red rounded rectangle), and 'Applications'. Below this is a horizontal menu with links: 'Study' (underlined), 'Health and wellbeing', 'Living here', 'Money', 'Your future', 'Student voice', 'On campus', 'Technical support', 'News', and 'Events'. The main content area has a dark blue header with 'Students' and 'Study'. Below this, the 'Libraries' section is visible, featuring a search bar labeled 'LibrarySearch' with the placeholder 'Search the library catalogue' and a 'Search' button. To the right of the search bar, a red rounded rectangle highlights a box containing the text 'Information resources by subject', a description 'Browse online resources and database by subject.', and a 'Browse resources' button. At the bottom of the page, there are three links: 'Find a library', 'Using our libraries', and 'Applications'.

Email SIMS Online Learning Central Directories **Libraries** Applications

Study Health and wellbeing Living here Money Your future Student voice On campus Technical support News Events

Students

Study

Libraries

LibrarySearch

Search the library catalogue Search

Information resources by subject

Browse online resources and database by subject.

Browse resources

Find a library Using our libraries Applications

## Search tips

- Don't search in complete sentences.
- Identify keywords
- Use a list or a mindmap to record your keywords and plan your search.

# Search techniques

Phrase searching – enclose your search in double quotation marks to search for the phrase.

E.g. “object orientated programming”

*LibrarySearch* search for object orientated programming  
= 131,059 results

*LibrarySearch* search for “object orientated programming”  
= 231 results

# Search techniques

**Wildcards** can help you refine your search:

- Using an **asterisk \*** after the stem of a word allows you to search for several words at once if relevant.

E.g. comput\* = compute, computer, computing, computational

- Using **?** in a word will allow to you search for variant spellings of a word.

E.g. organi?ation will search for organisation and organization

## Business databases:

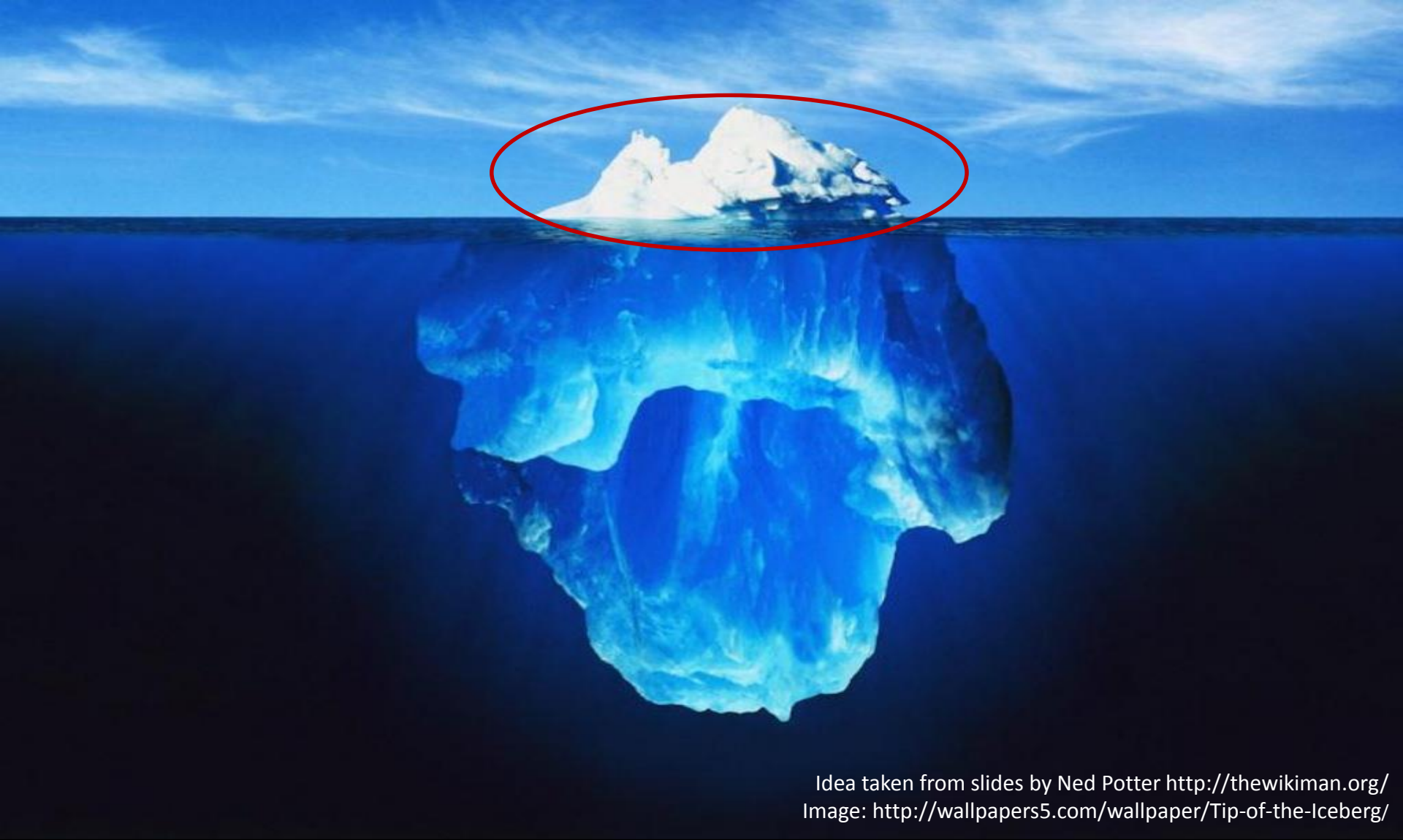
EBSCO Business Source Premier

Mintel

Keynote

Passport

Access via the intranet: [Libraries > Information resources by subject > Business](#)

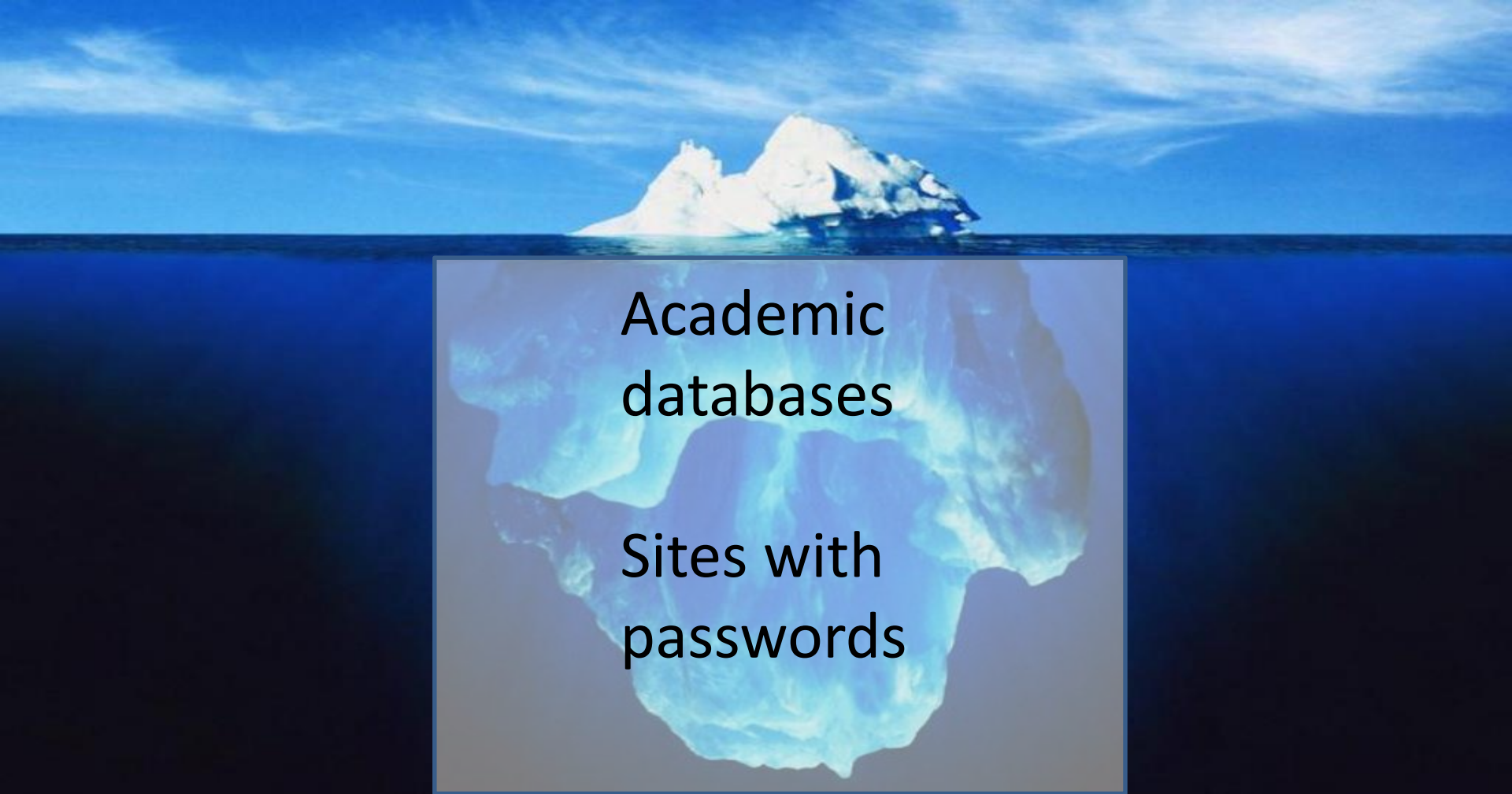


Idea taken from slides by Ned Potter <http://thewikiman.org/>  
Image: <http://wallpapers5.com/wallpaper/Tip-of-the-Iceberg/>

Using Google for  
academic work

...what it finds





Academic  
databases

Sites with  
passwords

Idea taken from slides by Ned Potter <http://thewikiman.org/>  
Image: <http://wallpapers5.com/wallpaper/Tip-of-the-Iceberg/>

Using Google for  
academic work

...what it doesn't  
find

## Part 2: Using information and avoiding plagiarism

How ppl flex on instagram and what  
its really like in real life



O'Neil, L. 2015. People who steal jokes on Twitter – they're coming for you. Available at:  
<http://www.dazeddigital.com/artsandculture/article/25645/1/people-who-steal-jokes-on-twitter-they-re-coming-for-you> [Accessed 14 November 2016].

# Plagiarism: a lecturer perspective



## Exercise 2: Plagiarism quiz

What is plagiarism?

Please open up a browser on your mobile phone and go to <https://kahoot.it>

# Citing and referencing

- **Citing** means referring within your text to sources which you have used in the course of your research.
- A **reference** is a description of a book, paper, article, etc., which is quoted directly or is mentioned in support of a your argument



## ARTICLE INFO

**Article history:**

Received 8 March 2012

Accepted 2 April 2013

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**Keywords:**

## Game theory

### Queueing theory

### Health care

OR in health services

## ABSTRACT

It is well observed that individual behaviour can have an effect on the efficiency of queueing systems. The impact of this behaviour on the economic efficiency of public services is considered in this paper where we present results concerning the congestion related implications of decisions made by individuals when choosing between facilities. The work presented has important managerial implications at a public policy level when considering the effect of allowing individuals to choose between providers. We show that in general the introduction of choice in an already inefficient system will not have a negative effect. Introducing choice in a system that copes with demand will have a negative effect.

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## 1. Introduction

What damage do the selfish choices of some afflict onto the welfare of all? The work presented in this paper answers this question in the context of public service systems.

There is a substantial quantity of literature on the subject of equilibrium behaviour of a queueing system where congestion is a factor influencing behaviour [1,5,12,23,31,35,51]. This can be traced back to a series of short communications between Lee-man [28,29] and Saaty [44]. This paper builds on this literature by considering the problem of public service systems. For most public services, congestion is a negative aspect of service quality. Examples of this are healthcare systems (waiting lists), transports systems (traffic jams) and/or schools (overcrowding of class rooms).

The degree of central control that should be exercised is a very

petition). In this system if we were to start routing individuals so as to optimise overall quality of service, we would (by definition) notice an improvement over a situation where individuals had choice. This impact of choice is the one considered here. The approach proposed is based on a measure called the price of anarchy [2,7,8,10,14,18,20,24,41,43,47,52]. First introduced in [25] (a conference paper), the price of anarchy is the ratio of the cost of a Nash equilibrium to the cost of the socially optimal solution. It can be interpreted as a measure of the efficiency of a system.

The main contribution

- A novel connection is  
vices within the form
- Theoretical results are  
worth of service.

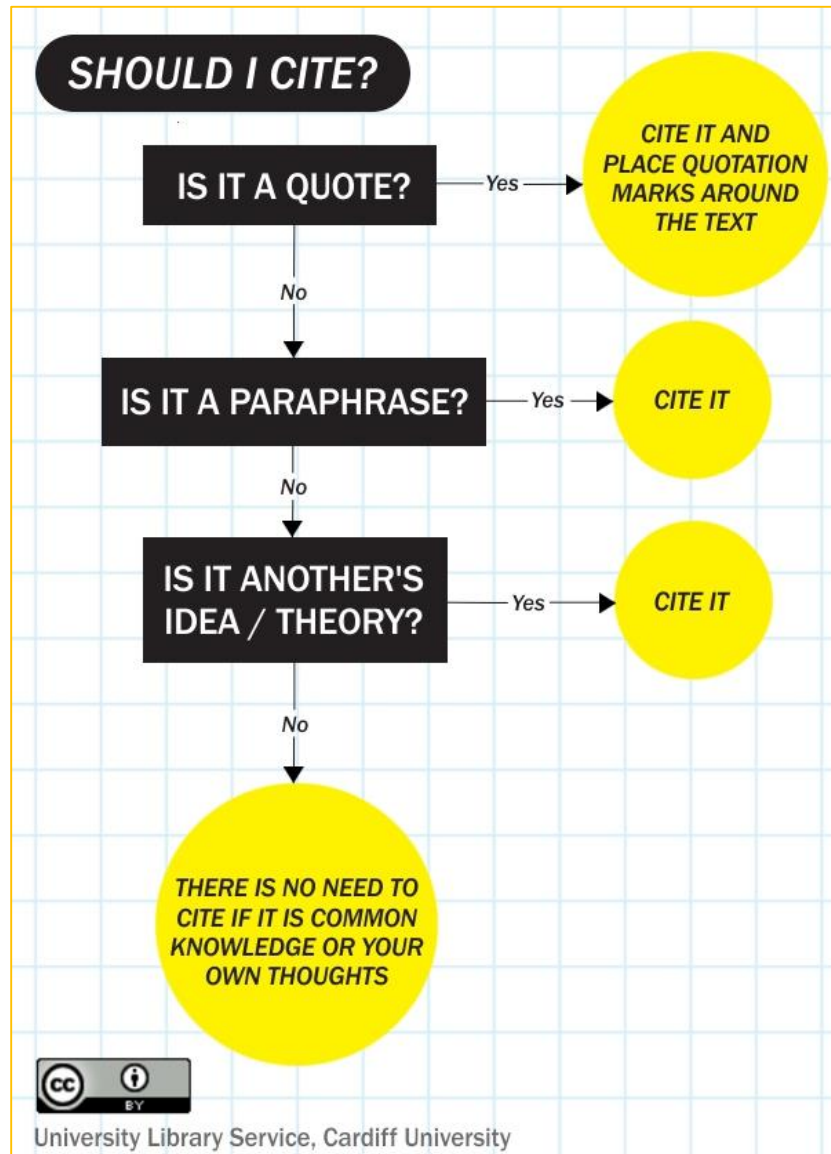
## References

- [1] I. Adler, P. Naor, Social optimization versus selfish optimization in waiting lines, 1969.
- [2] E. Altman, T. Boulogne, R. El-Azouzi, T. Jiménez, L. Wynter, A survey on networking games in telecommunications, *Computers & Operations Research* 33 (2006) 286–311.
- [3] BBC, NHS choice 'not relevant to Wales', 2004.
- [4] J. Beckmann, C. McGuire, C. Winstein, *Studies in the Economics of Transportation*, Technical Report, Yale University Press, New Haven, Conn., 1956.
- [5] C. Bell, S. Stidham, Individual versus social optimization in the allocation of customers to alternative servers, *Management Science* 29 (1983) 831–839.
- [6] O. Boudali, A. Economou, Optimal and equilibrium balking strategies in the single server Markovian queue with catastrophes, *European Journal of Operational Research* 218.3 (2012) 708–715.
- [7] C. Chau, The price of anarchy for non-atomic congestion games with symmetric cost maps and elastic demands, *Operations Research Letters* 31 (2003) 327–334.
- [8] R. Cole, Y. Dodis, T. Roughgarden, How much can taxes help selfish routing?, *Journal of Computer and System Sciences* 72 (2006) 444–467.

# Why should you cite and reference?

- To acknowledge another author's words and ideas  
- **avoid plagiarism!**
- To support your argument / claims
- To enable anybody reading your work to locate your sources easily
- To demonstrate the range of sources you have consulted in your research

# When should you cite and reference?





# Citing and referencing in LaTeX: Using BibTeX

**BibTeX** is a tool that you can use to help you create your bibliography in LaTeX.

Advantages:

- Once stored in a BibTeX file, a reference can be re-used in future documents
- Automatic export from databases – saves time!

# Creating your BibTeX files

Auto-export **not always perfect** – may require you to tidy up the BibTeX file so that your references generate correctly in LaTeX.

# Managing your BibTeX files: Using JabRef

**JabRef** is an open source bibliography reference manager that organises your BibTeX files so they can be easily created and manipulated.

<https://www.fosshub.com/JabRef.html>

# Managing your BibTeX files: Using JabRef

JabRef - H:\My Documents\PSE\Teaching\Citing and referencing\latex\myproject.bib (BibTeX mode)

File Edit Search Groups View BibTeX Quality Tools Options Help

Search...

myproject.bib

| # | entrytype | author/editor     | title   | year | journal/booktitle    | bibtexkey    | ranking |
|---|-----------|-------------------|---|------|----------------------|--------------|---------|
| 1 | Article   | Drogin            | Russians seem to be hacking into Pentagon: Sensitive information t... | 1999 | SFGate. com, ed. ... | Drogin1999   |         |
| 2 | Article   | Mohammadi et al.  | A stochastic micro-machine inspired by bacterial chemotaxis           | 2017 | Journal of Physic... | Mohammadi... |         |
| 3 | Article   | Barnes            | China's Computer hacking worries Pentagon                             | 2008 | Los Angeles Tim...   | Barnes2008   |         |
| 4 | Article   | Griebel and Klitz | CLSVOF as a fast and mass-conserving extension of the level-set ...   | 2017 | Numerical Heat T...  | Griebel2017  |         |
| 5 | Article   | Parris et al.     | Exploring transparency: a new framework for responsible business ...  | 2016 | Management Dec...    | Parris2016   |         |
| 6 | Article   | Arbel et al.      | Giraffes, institutions and neglected firms                            | 1983 | Financial Analyst... | Arbel1983    |         |
| 7 | Article   | Work              | Hackers   |      | Work Culture & ...   | Work2006     |         |

Article X

Required fields Optional fields Deprecated fields Other fields General Abstract Review Related articles {} BibTeX source

```
@Article{Arbel1983,
  author    = {Arbel, A and Carvell, S and Strebel, P},
  title     = {Giraffes, institutions and neglected firms},
  year      = {1983},
  volume    = {39},
  number    = {3},
  pages     = {57--63},
  __markedentry = {[siscjp:]},
  date      = {1983},
  journaltitle = {Financial Analysts Journal},
  publisher = {CFA Institute},
}
```

# Citing and referencing in LaTeX: Using BibTeX

Demo.tex - TeXworks

File Edit Search Format Typeset Scripts Window Help

pdfLaTeX

```

1 \documentclass[a4paper,12pt]{article}
2
3
4 \begin{document}
5 \title{Project title}
6 \author{Group name}
7 \date{\today}
8 \maketitle
9
10 \section{Introduction}
11 \noindent It has been suggested that Maths learning apps can greatly help to enhance students' interest in learning Maths \cite{Chang2016} and game-based
learning (GBL) in a virtual reality environment has also proved effective \cite{Kim2016}.
12 Mintel's consumer research appears to suggest that Android is the better choice for developers given it's wider availability (64\% of mobile users compared to
40\% for IOS and 10\% for Windows) \cite{Ballaben2016}.
13
14 \bibliographystyle{plain}
15 \bibliography{demo}
16
17 \end{document}

```

.bib file should be same name as your .tex file and stored in same folder

# Citing and referencing in LaTeX: Using BibTeX

The screenshot shows the TeXworks interface with a document named 'Demo.tex'. The left pane displays the source code, and the right pane shows the rendered PDF output. A blue arrow points from the source code to the rendered output.

**Source Code (Left Pane):**

```

1 \date{\today}
2 \maketitle
3
4 \section{Introduction}
5 \noindent It has been suggested that Maths learning apps can greatly
6 learning (GBL) in a virtual reality environment has also proved effective
7 Mintel's consumer research appears to suggest that Android is the better
8 40\% for IOS and 10\% for Windows) \cite{Ballaben2016}.
9
10 \bibliographystyle{plain}
11 \bibliography{demo}
12
13 \end{document}

```

**Rendered Output (Right Pane):**

Project title

Group name

January 18, 2017

## 1 Introduction

It has been suggested that Maths learning apps can greatly help to enhance students' interest in learning Maths [2] and game-based learning (GBL) in a virtual reality environment has also proved effective [3]. Mintel's consumer research appears to suggest that Android is the better choice for developers given it's wider availability (64% of mobile users compared to 40% for IOS and 10% for Windows) [1].

## References

- [1] Sarah Ballaben. Mobile device apps - uk - october 2016. Technical report, 2016.
- [2] Rongchi Chan and Chingyu Yan. Developing a mobile app for game-based learning in middle school mathematics course. 2016.
- [3] Heesung Kim and Fengfeng Ke. Effects of game-based learning in an opensim-supported virtual environment on mathematical performance. *Interactive Learning Environments*, pages 1–15, 2016.

## How do I create BibTeX files?

You can automatically generate your .bib files by exporting references from databases and search tools such as LibrarySearch and Google Scholar. Major databases often allow bulk export of selected records in one operation (to see a list of databases you may find useful for your subject, go to *Intranet > Libraries > Information resources by subject > Mathematics*). It is also possible to manually create your .bib file if you have a printed source or no option for auto-export.

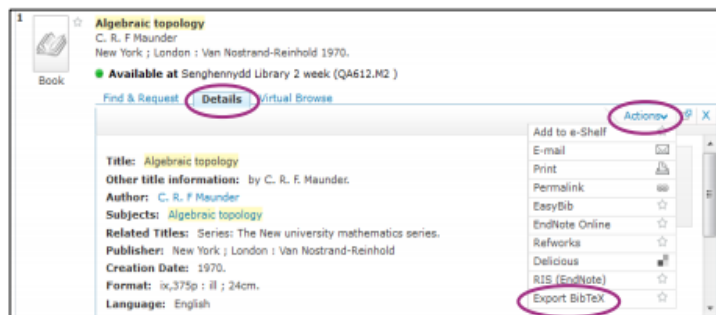
The auto-export process is similar for most databases:

- Select your item(s) for export e.g. via a tick box
- Select the export/download option and choose BibTeX as the output format
- Save the download file (include .bib after the filename if the save option doesn't give this option).

Exporting references from databases will save you a lot of time.

### Example 1: Exporting from LibrarySearch

When you have found a record you would like to create a .bib file for, select the **Details** tab, then **Actions**, then click **Export BibTeX**. In the pop-up window, make sure the encoding is on UTF-8.



### Example 2. Exporting from Google Scholar.

To export a BibTeX file in Google Scholar, click **Cite** under the relevant result. Then select **BibTeX**. The BibTeX information will be displayed in the browser; copy and paste it into your .bib file or into JabRef

Guide provides support:

[bit.ly/latexguide2017](http://bit.ly/latexguide2017)

Print versions in the library

Will also be on Learning Central

# Citing and referencing: marking

- Use of good quality sources
- More than one source type used e.g. not all webpages
- Consistent citing and referencing

Marking guide on page 6 of handout on Learning Central



# Feedback

Please complete an online feedback form to help inform future sessions.

[bit.ly/mathsfeedback2017](https://bit.ly/mathsfeedback2017)



The Simpsons, Brother, Can You Spare Two Dimes?, 10:55  
03/12/2016, Channel 4, 30 mins.  
<https://learningonscreen.ac.uk/ondemand/index.php/prog/0001E426> (Accessed 02 Feb 2017)  
[gif via Frinkiac.com](#)

Good luck in your assessment

Email me: [ParkerCJ@cardiff.ac.uk](mailto:ParkerCJ@cardiff.ac.uk)