How do I do Research?

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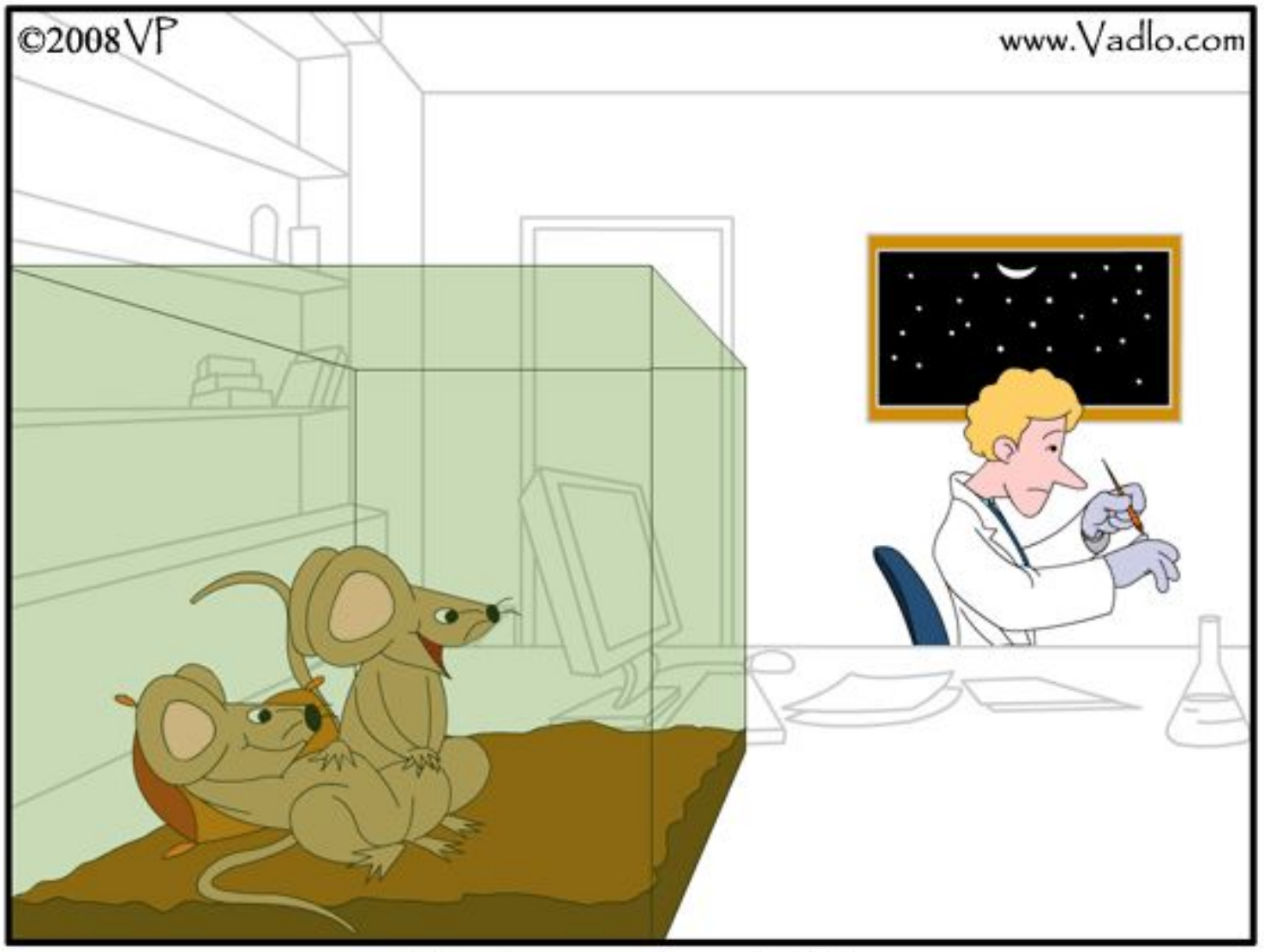

PhD Resolutions

Before joining PhD

I want to win the Nobel Prize.
I want to win the Abel Prize.
I want to win the Fields Medal.
I want to win the Turing Award.

First year of PhD

I want to finish PhD in two years
I want to publish papers only in top tier conferences.
I want to make ground-breaking research.
I want to win the best PhD Thesis award.

Second year of PhD

I want to finish PhD in 5 years.

I want a problem.

Shall I change my advisor?

PhD Resolutions

Third year of PhD

I want a paper; I don't care which conference.

Shall I change my topic?

My industry-friends have two children by now. When will I get married?

Fourth year of PhD

Why did I come here?

Why did I choose this advisor?

Why did I choose this topic?

Fifth year of PhD

Someone give me a degree!

I want to leave this place — for ever.

Let me leave.

Sixth year of PhD

People call me uncle.

She waited and finally married someone else.

I don't want any degree. I just want to live peacefully.

How do I do Research?

Research can be defined as the search for knowledge or as any systematic investigation to establish facts.

The primary purpose for research is discovering, interpreting, and the development of methods and systems for the advancement of human knowledge on a wide variety of scientific matters of our world and the universe. Wikipedia

re·search: NOUN: a detailed study of a subject, especially in order to discover (new) information or reach a (new) understanding.

Cambridge Dictionaries Online

How do I do Research?

The research process should be understood as continuous planning, searching, discovery, reflection, synthesis, revision, and learning

How do I do Research?

Steps in the Research Process

1. Finalize Research Area
2. Identify and Formulate Research Problem
3. Choose Approach
4. Gathering / Analysis of relevant data/ Experiments
5. Assessment, Evaluation and Comparison with standards
6. Conclusions, iterations if necessary

How do I do Research?

Finalize Research Area

We posses little knowledge about several areas of Computer Science, viz. DBMS, OS, Network, AI, Computer Graphics etc.

Now, it's a time to decide one of the areas. Based on your interest and availability of resources you determine the area.

Encyclopedias provide a condensed overview of every branch of a subject.

A Handbook is a short treatise or guide-book to a subject.

Research guides provide an overview of the research process in a given area.

A detailed list of recent encyclopedias, handbooks and research guides is available at Pickler Memorial Library of Truman State University. http://library.truman.edu/guides/computer-science.asp

How do I do Research?

Identify and Formulate Research Problem

Drill Down : Work from General to Specific. Refine your topic.

Know, what others are doing. Explore.

Whatever your idea may be, you would surprise to see lot of people are already working on it.

SEARCH : You need to get hold of quality research papers related to your topic of interest.

Googling is not enough ! To find and access articles in academic journals, or other collections of scientific articles you have to also use academic databases.

Academic Databases maintain index of millions of scholarly research papers. It is authentic, peer reviewed and qualitative.

How do I do Research?

Identify and Formulate Research Problem

SEARCH : Academic Databases for Computer Science Discipline

Arnetminer – Free subscription (http://arnetminer.org)
ACM DL – Paid (http://portal.acm.org/dl.cfm)
CiteSeerX – Free (http://citeseerx.ist.psu.edu)
IEEE Xplore – Paid – (http://ieeexplore.ieee.org)
Inspec – Paid – (http://www.theiet.org/publishing/inspec)
MS Academic Search – Free – (academic.research.microsoft.com)
SCOPUS – Paid – (http://www.scopus.com/home.url)

Fix an appointment with librarian. He/she knows more than you regarding obtaining scholarly documents.

Visit authors website, you may find the paper or you can send a mail to author requesting for the article.

How do I do Research?

Identify and Formulate Research Problem

The research problem statement shall drive your future research.

Identify Objectives. List it out. It shall define your scope of work.

Several resources available on Internet that would help you formulate your Research Problem Statement.

http://explorations.sva.psu.edu/lapland/LitRev/prob1.html
http://deekayen.net/research-problem-statement-template
http://www.professorbwisa.com/new/index.php?option=com_content&view=article&id=81&Itemid=110

Choose Approach

Start working on solving the problems you mentioned in your research problem statements.
Explore various techniques/methods/ways.
Note down your experiences/results with certain methods.

How do I do Research?

Gathering / Analysis of relevant data/ Experiments

Assessment, Evaluation and Comparison with standards

In order to test whether your proposed techniques/algorithms/methods are successful to overcome the issues mentioned in the problem statement; evaluate your experiments with standard datasets.

Computer Science Repositories can be searched to obtain standard data set to assess your results.

CoRR - Computing Research Repository (*arxiv.org/corr/*)
OpenDOAR - Open Access Repositories – (*www.opendoar.org*)
UCI Machine Learning Repository –
Corpora – (corpus.byu.edu)

How do I do Research?

Conclusions

Improve your writing skills.

Write, Write and Write. There is no other way to improve your writing.

Take time. Write your paper in several versions. Refine it version by version.

Avoid common writing mistakes. “Common writing mistake” phrase brings up more than 2 million results.
Common Errors in English Usage, an interesting book available online for free. (Author *Paul Brians)*

Practice to use thesaurus. Make sure you are writing what you mean. Use of appropriate words is desirable.

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Wiki: www1.atwiki.com/atozresearch

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Reference Management Software

A list and Comparison of several such softwares at- http://en.wikipedia.org/wiki/Comparison_of_reference_management_software