A Short Course for PhD Students in Science and Engineering: ”How to Write Papers for JCR Journals”

(Version for Journal Submission)

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Some universities require PhD students to publish one, two, or three papers in JCR journals (SCI, SSCI, and AHCI), before they can graduate. This course teaches PhD students how to write four different types of JCR journal papers:

(A) survey papers,
(B) initial idea analysis papers,
(C) simulation based comparison papers,
(D) research papers.

Related work is given in [Milutinovic2007]. A guide for advisors is given in Appendix. Such an approach is justified by the following notions:

(A) One first has to become aware of all existing research on the problem, which is a prerequisite for being able to introduce his/her own contribution to the field.
(B) Once a good idea (for contribution) is generated, the “time-stamp” has to be obtained. A paper with an idea only, is not possible to publish in a reputable journal. For that to happen, the idea must be accompanied with a “fine-grain” mathematical analysis and/or a “coarse-grain” simulation analysis.
(C) One problem with survey papers is that they compare different approaches under different conditions, because each author analyzed his/her own contribution under a different set of conditions. Therefore, an effort has to be made to create an infrastructure/environment that enables contributions from different authors to be compared under the same conditions. This means building a simulator. Note, however, that comparisons of approaches from original papers compare real approaches, but comparisons of various approaches using a simulator compare assumed approaches, because original papers do not include all details necessary for building a simulator.
(D) Through the survey process and the simulation process, a PhD student has an opportunity to invent a solid improvement, which is to be described in a follow up research paper. Fortunately, if a simulator exists, it is only the relatively small changes that need to be done, in order to make the simulator support also the full set of details of the newly generated idea of the PhD student.

Activities B and C can go in parallel. With all the above in mind, major contributions of the four paper types are as follows:

(A) for a survey paper:

1) A novel classification of existing approaches to the problem, using a well thought set of classification criteria.
2) Presentation of each approach using the same template and the same type of figures, so an easy comparison is possible.
3) Some wisdom related to future research trends.

(B) for an initial idea analysis paper:

1) First presentation of the idea, and obtaining the "time-stamp."
2) Initial analysis, to prove that investing a further effort into the analysis of that idea does make sense.
3) Preliminary expectations, as far as price and performance.

(C) for a simulation based comparison paper:

1) Creation of public domain simulator for anybody to use.
2) Comparison under the same conditions.
3) Introduction of concrete numerics into the analysis

(D) for a research paper:

1) Introduction of a new idea.
2) Comparison of that idea with the best one from the open literature, using the previously built simulator, with appropriate modifications.
3) In addition to a performance oriented comparison, any research paper also has to include a complexity oriented comparison.

After the students are explained all the above, the teaching time to follow is divided into four different units, each one with a related homework assignment attached. This course, in one form or the other, is being taught for over twenty years now. For a number of students, these homework assignments turned into published JCR journal papers. Ten of them, the most successful ones, according to the number of JCR journal citations, are listed among the references of this paper.

2. Survey paper

A survey paper can bring lots of citations, if it is the first one in a newly emerging field, is well written, and is published in a good journal. Consequently, selection of the topic for a survey must satisfy the following requirements:

a) The field is newly emerging.
b) Popularity of the field will grow over time.
c) A critical number of papers with new algorithms/approaches does exist (at least twenty to forty).
d) A survey paper does not exist.
e) The PhD student worked before in a related scientific field.
f) The PhD student is enthusiastic about the particular field of his/her tutorial paper.

After the collected papers with original algorithms/approaches have been read and understood, the next step is to think about appropriate classification criteria. One can opt for binary criteria or for n-ary criteria. For example, the first classification criterion can be: hardware vs. software, the second one can be: application oriented vs. technology oriented, and the third one can be: single uniprocessor vs. multiprocessor.

With the binary (or n-ary) criteria, one can create either a tree-like classification or a cube-like classification, as indicated in Figures 1 and 2 [Vukasinovic2012].

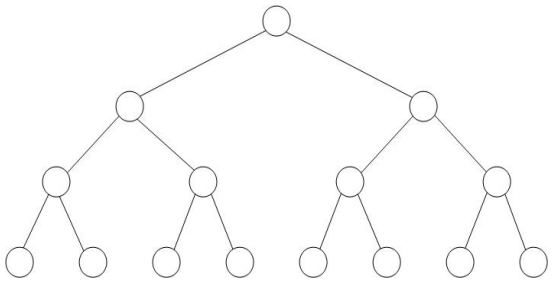


FIGURE 1. A tree-like classification: Classes are only at the leaves of the tree.

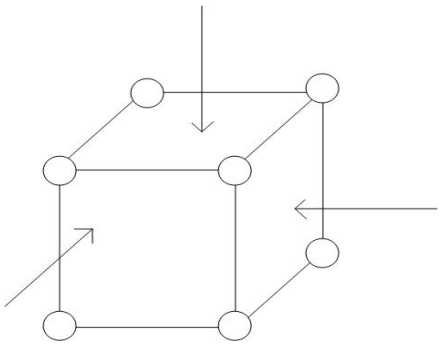


FIGURE 2. A cube-like classification: Classes can exist also at points inside the cube, as pointed to by the three arrows.

With a tree-like classification, one can classify only the approaches that entirely belong to a specific class. With a cube-like classification, one defines a space in which inner points include, to some extent, characteristics of all existing classes.

In some cases, one can opt for indirect classification using a vector of characteristics. This is convenient in cases when the list of characteristics is relatively long and the variations of characteristics from example to example are relatively small.

The final step of the classification process is to assign mnemonics to classes. Mnemonics can be technical (e.g., hardware/application-oriented/uniprocessor) or symbolic (e.g., one can select names of Greek gods, where characteristics of particular gods remind of the patterns form technical mnemonics).

What is useful, is to prepare a figure which includes the following:

a) The classification criteria.
b) The classification.
c) The technical mnemonics.
d) The symbolic mnemonics.
e) The number of selected examples per class.
f) The full list of references of selected examples.
g) The vector of relevant characteristics.

One example of such a figure is given in Figure 3, taken from [Draskovic2012].

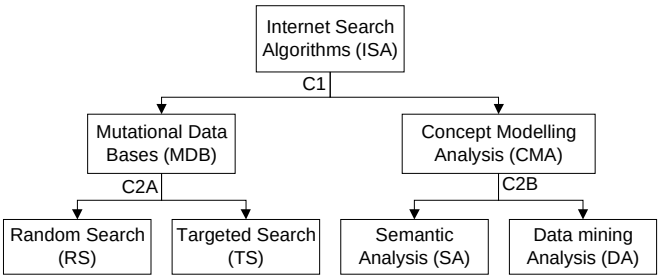


Figure A. Classification of Internet Search Algorithms

Legend: C1 (criterion #1) = retrieval-oriented vs analysis-oriented
C2A (criterion #2, in the MDB path) =
Random Search vs Targeted Search
C2B (criterion #2, in the CMA path) =
Semantics-oriented vs Datamining-oriented

Technical Names	Random Search (RS or RS/MDB)	Targeted Search (TS or TS/MDB)	Semantic Analysis (SA or SA/CMA)	Data-mining Analysis (DA or DA/CMA)
Symbolic Names	Lion	Jaguar	Tiger	Panthera
Number of Surveyed Contributions	4	4	4	4
References	[Nikolic2011a] Nikolic, B., "Expert Systems," WUS Austria Educational Publishing and University of Belgrade, Classroom Textbook, June 2011.	[Milutinovic2000a] Milutinovic, V., Cvetkovic, D., Mirkovic, J., "Genetic Search Based on Multiple Mutation Approaches," IEEE Computer, November 2000, vol. 33, issue: 9, pp. 118-119.	[Nikolic2011b] Furlan, B., Sivacki, V., Jovanovic, D., Nikolic, B., "Comparable Evaluation of Contemporary Corpus-Based and Knowledge-Bases Semantic Similarity Measures of Short Text," JITA, vol. 1, no. 1, pp. 65-72, ISSN: 2232-962, June 2011.	[Milutinovic2000b] Milutinovic, V., Knezevic, P., Radunovic, B., Casselman, S., Schewel, J., "Obelix Searches Internet Using Customer Data," IEEE Computer, July 2000, vol. 33, issue: 7, pp. 104-107.
	[Nick2001]	[Simon2009]	[Gordon2006]	[Al-Dallal2009]
	[ ]	[Mirkovic1999]	[Leroy2003]	[Hu2007]
	[ ]	[Chen1997]	[Wang2006]	[Freitas2001]

TABLE A: SUMMARY OF THE APPROACHES THAT LED TO THE CLASSIFICATION PROPOSED IN THIS PAPER

Legend: Technical names are obtained by combining the names and abbreviations of the applied classification criteria.
Symbolic names have been chosen with characteristics that associate to those of the related classes.
Note: Hybrid approaches are also possible, of both the multidisciplinary type (including characteristics of two or more classes) and the intradisciplinary type (with characteristics between those of two or more classes).
Hybrid approaches open new avenues for future research.

FIGURE 3: (a) Classification Tree and (b) Related Issues [Draskovic2012].
Technical names are typically obtained by combining the names of the criteria used.
Symbolic names are typically taken from a set
whose element characteristics remind of class characteristics;
in this case, names of animals are utilized.
The vector of relevant characteristics has an individual character and is omitted here.

It may happen that a class includes no examples. If that happens, one has to check if the class makes sense. If not, it should be explained why. If yes, one can act like the famous Russian scientist Mendeleyev. This means that one can explain that technology and/or applications are not yet ready for such an approach, and one should encourage the readers of the survey paper to think about this new research direction, which could be potentially useful. If such a scenario occurs, the survey paper obtains an important component.

When presenting each particular example, one can use the template presented next. For short surveys, each template element is a sentence. For long surveys, each template element is a paragraph. For books, each template element can be a page, or more.
An example template follows:

a) Seven Ws about the survey example
   (Who, What, When, Where, Why, for Whom, hoW).
b) Essence
   (it is extremely difficult to give entire essence in only one sentence).
c) Structure (at this place, one can insert a call to a figure,
   like in Figure 4 from [Draskovic2012]).
d) Some relevant details.
e) Example (here one can call a figure that explains an example
   using a pseudo-code, like in Figure 5 [Draskovic2012];
   ideally, the same application case should be used for all surveyed examples).
f) Pros and cons.
g) Author’s opinion of this example and its potentials.

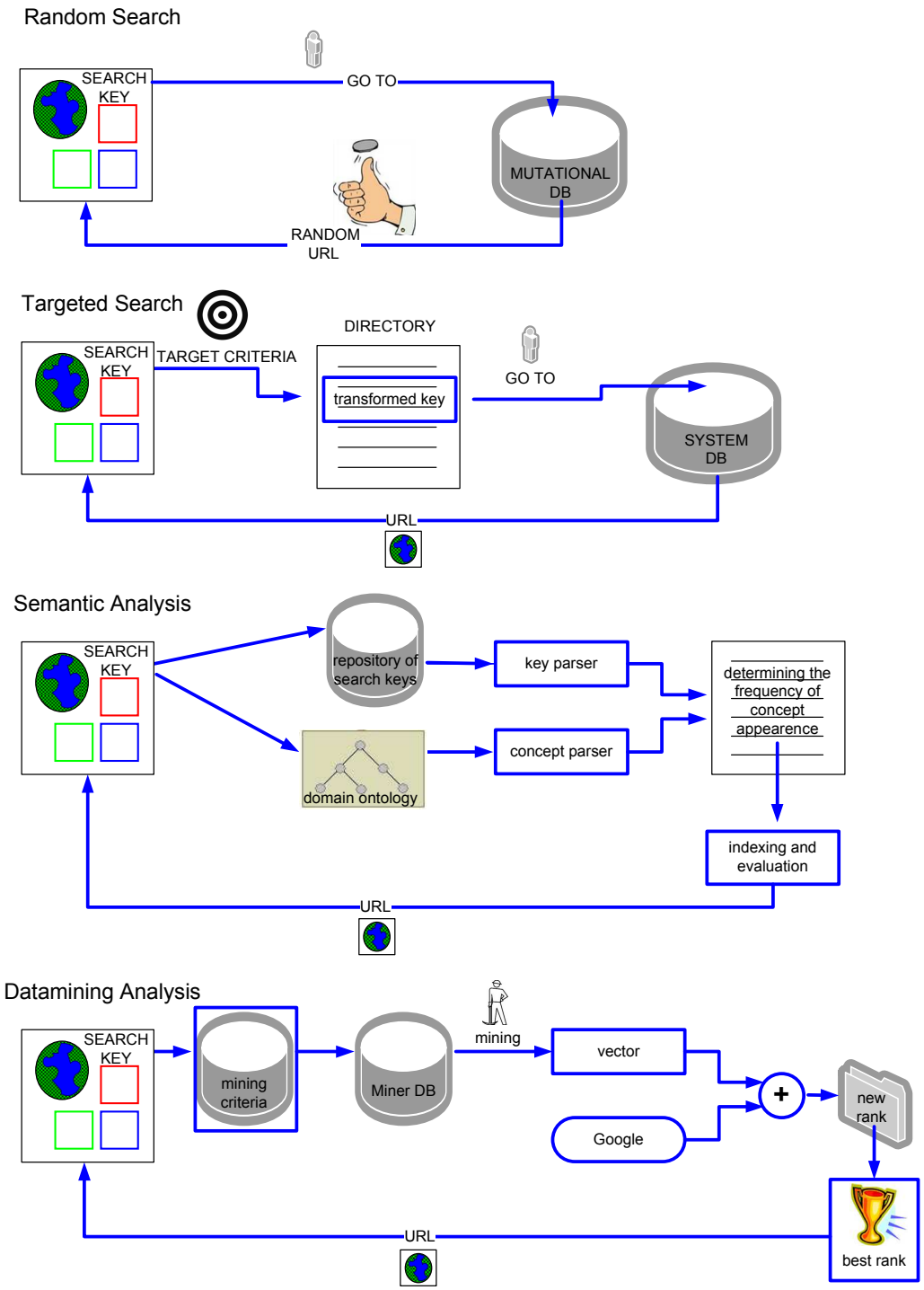


Figure B. Generalized Structure of the four Search Classes
Legend: DB = Database;
URL = type of URI that is used to describe the location of a specific document;

FIGURE 4: An example of the structure-related figure [Draskovic2012];
all the structure related figures must be drawn using the same set of figure elements
(the LEGO approach would fit ideally).

After all the surveyed research efforts are described using the above template or a similar one, the author should come up with an overall opinion about each class and the general opinion about the entire surveyed field.

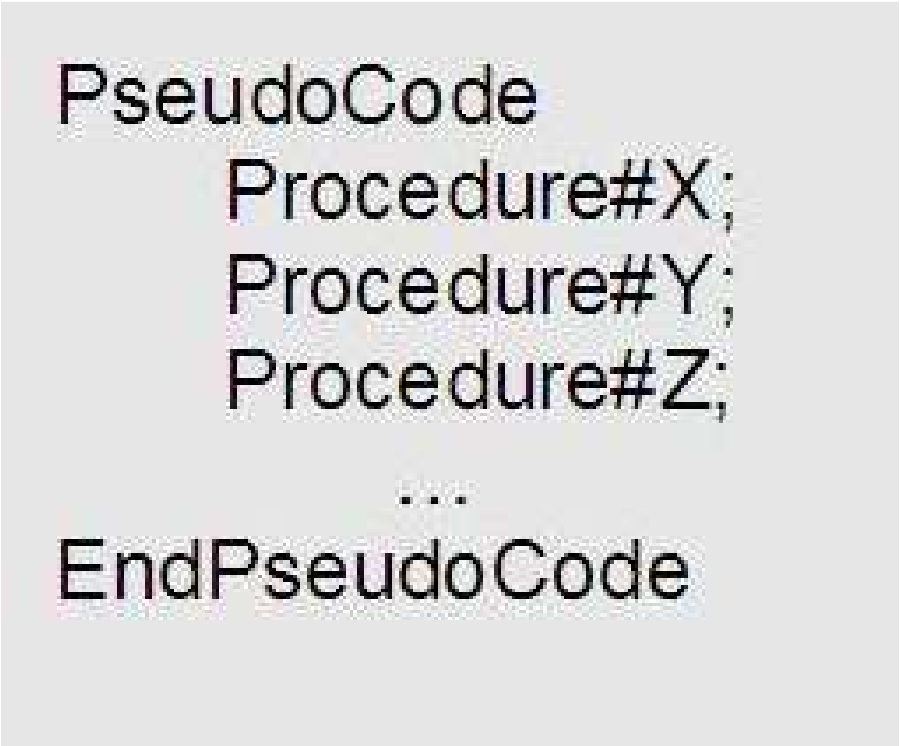


FIGURE 5: PseudoCode that demonstrates behavior of an example, in the case of a specific application; it is advised that the same application is used with all examples.

After all the above is explained to students, each one is asked to come up with a title for a survey. The homework#1 of this class is to write a survey paper. As seen from the references, some students were able to publish their homework in a JCR journal:)

3. Initial idea analysis paper

Note that some authors like to publish the idea and the very early results of the research in a form referred to as *idea paper* or *position paper*. They do that with the following rationales:

a) To get the time-stamp.
b) To give some rough analysis (analytics or simulation or implementation), which shows that the idea (the hypothesis) is worth further analysis.
c) To have a published paper, to put it as an appendix of a research proposals.

These papers are not welcome by most journals, do not generate citations, but do generate good response from colleagues, if given to them for analysis. For an idea paper or a position paper to be published, it has to include not only the idea, but some analysis, as well. Consequently, the lines to follow refer to both the ideas and analyses.

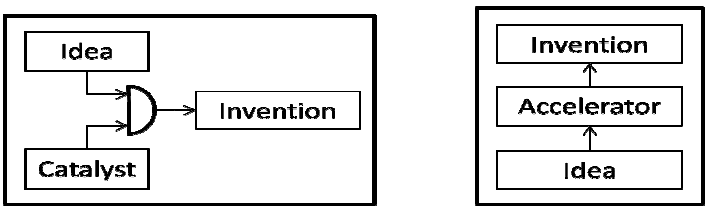
Ideas can be created along a number of different methodologies. Four of them are mentioned here. Homework #2 is to generate eight different ideas along the four methodologies presented next. Figure 6 sheds light on the essence of what follows.

Mendeleyevization: Catalyst versus Accelerator

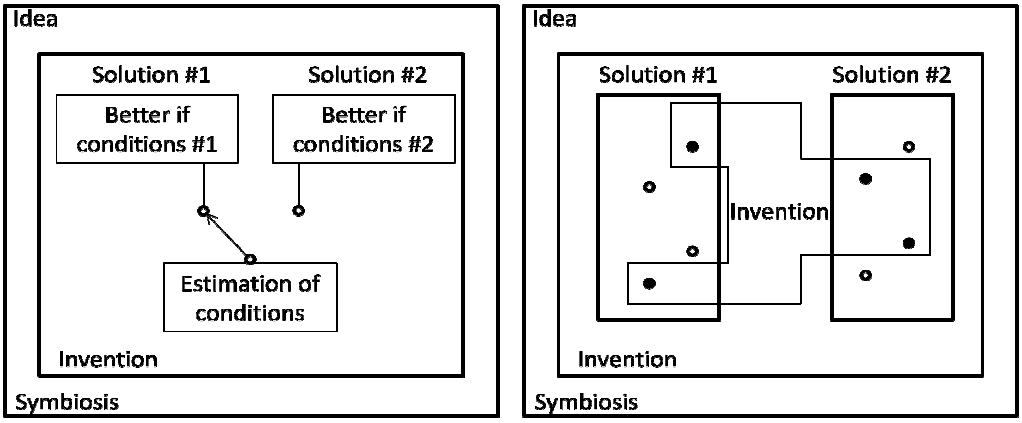
If one of the classification classes includes no examples, it first has to be checked why is that so. If it is so because it makes no sense, an appropriate explanation is in place. If it is so because the technology or the applications are not yet ready for such an approach, one can act in the same way as the famous chemists Mendeleyev: empty positions in any classification are potential avenues leading to new inventions. As indicated in Figure 6A, these inventions sometimes need a catalyst (a resource that makes an invention happen) or an accelerator (a resource that turns a known invention without potentials into an invention with potentials). We refer to such an approach as: Mendeleyevization.

Hybridization: Symbiosis versus Synergy

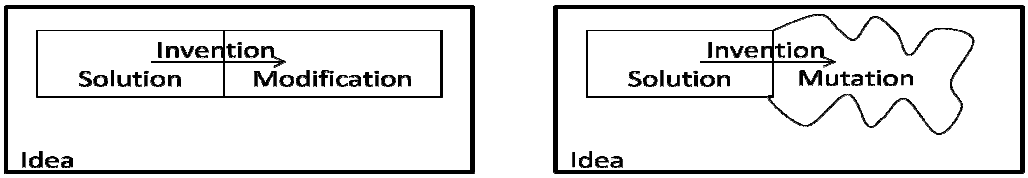
Sometimes two classification classes can be combined, in order to obtain a hybrid solution (hybridization). Hybrid solutions can be symbiotic (measuring the conditions in the environment and switching from one approach to the other, so that each approach is active all the time while the conditions are such that it provides better performance compared to the other approach) or synergistic (creating a new approach, which, for each particular solution element takes the better solution element of two different approaches). This is shown in Figure 6B. The assumption here is that one solution is better under one set of conditions, and the other solution is better under another set of conditions. Another assumption is that solution elements of one solution are better in one domain and that solution elements of another solution are better in another domain.



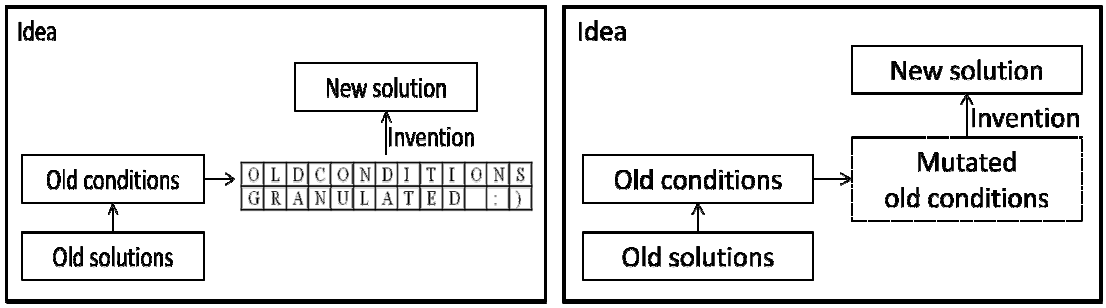
A: Catalyst versus Accelerator (Mendeleyevization)



B: Symbiosis versus Synergy (Hibridization)



C: Modification versus Mutation (Transdisciplinarization)



D: Reparametrization versus Regranularization (Retrajectorization)

Figure 6: Symbolic Representations of Four Idea Generation Methods.
The symbolic explanations are meant to be intuitive.

Transdisciplinarization: Modifications versus Mutations

Often times, good new ideas get generated if algorithms, procedures, ways of thinking, or philosophies of thinking can be ported from one field to another field, along the lines of transdisciplinary research methodologies (transdisciplinarization). As indicated in Figure 6C, for an idea to work better in the new field, either smaller modifications or larger mutations have to be introduced.

Retrajectorization: Reparametrization versus Regranularization

Sometimes it is simply the best to take a research trajectory different (even opposite) compared to what others take (retrajectorization). The different (opposite) research trajectory makes sense either if a more detailed set of parameters is in place (due to technology changes), or because parameters of the environment have changed permanently (due to application changes), as indicated in Figure 6D. The two alternatives are referred to as a reparametrization and regranularization.

4. Simulation based comparison paper

The first step in the process leading to a simulation based comparison paper is to build a simulator that is able to simulate all collected approaches. Therefore the first lecture of this unit explains various approaches for building a simulator.

Since there is no time in a one semester course to build a full blown and scientifically effective simulator, homework#3 is related just to the pseudo-code or the UML description of the simulator that can be built at a later time.

The full blown simulator is built only by those who decide to continue their PhD research with a follow up course oriented to practical work. The follow up course is a project course, not elaborated in this paper.

5. Research paper

The major purpose of the research paper is to describe an innovation and to demonstrate that, under certain conditions, it has a better performance and/or complexity, compared to the best one from the open literature. The major steps in the process are:

a) To create an invention.
b) To perform a rigorous analysis, to demonstrate that the invented solution is better than the best one from the open literature under specific set of conditions, and to show what these conditions are.
c) To write the paper using a methodologically correct template.

The three elements of the process are elaborated next.

As far as the creation of an invention, the course first teaches selected issues from the theory and practice of creativity [Doerfler2008], [Friedman2010], [Paterson2001], [Perl2009]. After that, the third homework is assigned (homework#4), to come up with a PhD-able solution better than the best one from the open literature. When students start complaining that it is not realistic to expect them to create a solution which is better than the one created at a world's major university or in Silicon Valley, I tell them that something like that is possible for the following realistic reasons:

a) Darwin's Selection Theory works better for people from poor countries.
b) Majority of those working at major universities or in Silicon Valley, also come from poor countries.
c) Writing a good research paper paves the way for the author to one day end up at a world's greatest university or in Silicon Valley, which means that motivation of a student from a poor country would be much higher.

Motivation is a major prerequisite for creativity!

Various ideas of students are discussed in front of the entire classroom in two phases:

a) In phase number one, everybody is asked to attack the idea with a goal to prove that it does not represent an improvement.
b) If the idea survives the phase one, phase two is entered in which everybody is supposed to help improve the idea, so it becomes even better.

Of course, the idea that survives the phase one in the classroom, may not survive a rigorous discussion of experts at a world's major conference. However, in the classroom environment, the major issue is that students learn how to think, and not how to advance the world science.

As far as the research methodology, the stress in the classroom is on mathematics based proofs, simulation based proofs, and implementation based proofs. These three approaches are taught using the well established references [Milutinovic1996], [Milutinovic1997], [Milutinovic2007].

It is also underlined that it is not only important that the invention be better, but that it is also less complex to implement. If it is better, but more complex to implement, than the price/performance should be better.

Finally, it is underlined that it is also important to precisely specify the conditions under which the proposed idea is better. Almost any idea is better under some very narrow conditions. On the other hand, it is close to impossible to create an idea which is better under any conditions. So, a genius amongst students can be detected by how wide is the set of conditions under which his/her idea is better, compared to the best solution from the open literature.

As far as the presentation of the research results, the students are told that each research paper should contain the following twelve sections:

1) Introduction:
   The minimum introductory text should contain the following three paragraphs:
   a) About the general field of this research.
   b) About the specific field of this research.
   c) About the viewpoint of this research, as well as the goals of this research.

2) Problem statement:
   The following elements are obligatory:
   a) Problem definition.
   b) Why is the problem important.
   c) Why will the importance of the problem grow over time.

3) Existing solutions and their drawbacks, looking from the viewpoint defined in introduction, and having in mind the goals defined in introduction. Elements of this section are:
   a) A brief classification of the best solution from the open literature.
   b) Short description of each relevant solution.
   d) A detailed criticism of each presented solution, especially in domains in which the proposed solution is expected to be better.

4) The proposed solution and its essence, and why is it supposed to be better compared to the best solution from the open literature; elements of this section are:
   a) Philosophical essence of the proposed solution.
   b) Why the proposed solution is without drawbacks noticed in existing solution(s).
   c) What is the best methodology to prove the superiority of the proposed solution, and under what conditions that holds.

5) Details:
   This section should contain details of the best one among the existing approaches and of the proposed solution. The relevant details should be grouped into categories. For example:
   a) Hardware details.
   b) System software details
   c) Application software details.

6) Axioms, conditions, and assumptions of the analysis to follow:
    a) Axioms refer to axiomatic standpoints.
    b) Conditions refer to realistic specifiers of the environment.
    c) Assumptions refer to simplifications that make the analysis easier, without jeopardizing on the quality of the final result.

7) Mathematical analysis:
    a) Axioms, conditions, and assumptions are described mathematically.
    b) Closed or open form formulae are derived for the major performance measures.
    c) Closed or open form formulae are derived for the major complexity measures.

8) Simulation analysis to show performance:
    a) Simulator, logical structure and user interface are described.
    b) Simulation experiments are described.
    c) Simulation results are discussed.

9) Implementation analysis to show complexity:
    a) Implementation strategy is discussed for the chosen technology.
    b) Implementation details and complexity are presented.
    c) If a prototype is implemented, show some characteristic measurement. If a prototype is not implemented, give some implementational guidelines.

10) Conclusion:
    a) Summary of what was done and to what extent are the initial goals achieved.
    b) To whom is that of benefit.
    c) Newly open problem for further research.

11) Acknowledgments:
    a) To all those who patiently listened to your ideas and especially to those who volunteered to share with you some of their own ideas for further benefit of your research. Also, it is obligatory to cite the relevant work of all those who volunteered the improvement ideas.
    b) To all those who helped provide the infrastructure for your research. If this is related to one or more research project, list them.
    c) To all those who suffered by taking everyday life responsibilities from you, so you could dedicate more of your time to research.

12) Annotated references:
    The references are more useful if listed in groups. Each topic requires different grouping. The grouping that seems most appropriate for this paper includes:
    a) References related to methodology.
    b) References related to examples.
    c) References related to success of past students.

In this paper, the last group of references includes the ten most cited papers generated in the past out of the course described here. Since older papers collect more references, most of the listed references are from the initial offerings of the course, although some of the latest papers may generate more citations throughout their life time.

6. Analysis of the past

In early 90's, students would typically select papers related to shared memory multiprocessing, distributed shared memory, and heterogeneous computing [Protic1996], [Ekmecic1996], [Tartalja1996], [Tomasevic1995].

In late 90's, students would typically choose topics on software agents, Internet search, and system engineering [Kovacevic2002], [Milanovic2006], [Markovic1995], [Milenkovic1996].

In early 2000's, the students would typically select data mining, semantic web, and concept modeling, Internet search, or system support for all these problems [Horvat2000], [Jovanovic1999].

In late 2000's, the students would typically select papers in WSN (Wireless Sensor Networks), embedded processing, and the IoT (Internet of Things) [Babovic2012], [Rakocevic2012].

Only the students with the best grade were allowed to submit their paper to a journal. Figure 7 sheds more light on the success rate of the submissions over the years. Figure 8 shows the overall number of references per year, for papers published in different years. Figure 9 gives some indications on the impact of prior publications. Figure 10 sheds light on the debate: What papers generate more citations, research papers or survey papers?

INSERT FIG 7

Figure 7: Success rates of paper submissions: (A) Normalized percentage of class with permission to submit. (B) Normalized paper acceptance rate of those permitted to submit. (C) Among the student with accepted papers, how many enrolled a PhD program later. Explanation: Curve A is almost monotonically decreasing due to the fact that the class was not formal in the beginning and only the best students opted to take informal lectures. After the class became formal, the student body became larger, and consequently, not all of them were extraordinary. Curve B had ups and downs, with peeks separated about twelve years apart, which could be a consequence of the motivation ups and downs of the teacher. Curve C is at hundred percent, except in years characterized with an industry boom.

INSERT FIG 8

Figure 8: Citation analysis for the ten most referenced papers. Explanation: It is clear that in some years the production was of a higher quality; that seems to be coinciding with years in which the world's top industry was giving donations to the department. The Y axis refers to the total number of citations for the top 10 papers.

INSERT FIG 9

Figure 9: Impact of the existence of another survey paper. Explanation: This figure gives a result which was absolutely unexpected. The expectation was that existence of a survey would decrease citations of our survey, but it happened absolutely the opposite. This means that the quality is more important than the pre-existence of another survey paper on the same subject. The paper with 2 preceded survey papers was the paper by Protic at al [Protic 1996]. The paper with one preceded survey was the paper by Tomasevic at al [Tomasevic1993]. The paper with no preceded survey was the paper by Jovanovic at al [Jovanovic1999].

INSERT FIG 10

Figure 10: Survey papers versus research papers, what generates more citations? Explanation: Surveys generate more, unless an extraordinary research paper is generated in a popular field.

7. Acknowledgments

The author are thankful to professors Jelica Protic, Igor Tartalja, Bosko Nikolic, and Milos Cvetanovic, undergraduate student Ivan Vukasinovic, as well as the PhD students Zivojin Sustran, Drazen Draskovic, Goran Rakocevic, and Zoran Babovic, for initial feedback on the text of this paper. Initial idea for this paper came through cooperation with Professors Antognetti [Antognetti1991], Gimarc [Gimarc1987], and Fura [Milutinovic1986].

8. References

7.1. Scientific Methodology

[Doerfler2008], Doerfler, V., “Inventivity and Creativity, ” IPSI 2008.

[Friedman2010], Friedman, J., “Inventivity, ” IPSI 2010.

[Paterson2001], “How to have a bad career in research and academia, ”
U.C. Berkeley, November 2001.

[Perl2009], Perl, M., “Creativity,” IPSI 2009.

7.2. Examples

[Vukasinovic], ”A Survey on the Use of Mobile Agents in WSNs, ”
Vukasinovic, I., Bachelor Thesis at the University of Belgrade, Serbia, 2012.

[Babovic2011], “A Novel Approach to WSNs,”
Babovic, Z., M. Sc. Thesis at University of Belgrade, 2011.

[Rakocevic2011] “A Novel Approach to Data Mining,”
Rakocevic, G., PhD Thesis at the University of Belgrade, 2011.

[Milutionovic2007] “How to ruin the career of a PhD student”
Milutinovic, V., Tomazic, S., IPSI Transactions, July 2007.

[Tartalja1998] PhD Thesis, 1998.

[Protic1998] PhD Thesis, 1998.

[Nikolic1998] PhD Thesis, 1998.

[Draskovic2012] “A Classification of Mutational Approaches to Genetic Search,”
IEEE ICIT, Kos, Greece, March 19-21,
2012.

7.3. Past Top 10 Papers (with the Number of Google Scholar Citations)

[Protic1996], “Distributed Shared Memory: Concepts and Systems,”
Protic, J., Tomasevic, M., Milutinovic, V.,
IEEE Parallel and Distributed Technologies, 1996. (#273)

[Markovic1995], “The Split Temporal/Spatial Cache,”
Markovic, B., Tomasevic, M., Milutinovic, V.,
Proceedings of the IEEE SCI22L-5, 1995. (#80)

[Milanovic2004], “Routing and security in mobile ad hoc networks,“
Milanovic, N., Malek, M., Davidson, A., Milutinovic, V.,
IEEE Computer, 2004. (#72)

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7.4. Past Papers of Importance for the Presented Methodology

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[Tartalja1996],“A Survey of Software Solutions to Cache Coherence Maintenace,”
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IEEE Software, 1996. (#4)

9. Appendix

One possible research plan based on the methodology presented in this paper is elaborated here, week by week (between two logical weeks, one can have one or more physical weeks):

SURVEY PAPER:

1. Read about the general subject, to worm up.

2. Collect 20 to 40 papers,
   on various approaches from the open literature.

3. For each example (covered by one or more papers),
   write the main 7 sentences, as explained in this paper.
   Explain why the chosen template enables easy comparison,
   and therefore represents a contribution to science.

4. Decide about classification criteria generate a classification,
   sort the found examples by classes,
   and form Figure #1, as explained in this paper.
   Explain why the proposed classification represents a contribution to science.

5. For each example, generate two figures
   (for example, one block scheme of the structure,
   and one pseudo code presentation of the algorithm).
   Choose the presentation form which indicates
   the essence of the class that the example belongs to.

6. If the generated classification
   includes a class without examples
   (which is highly desirable,
   since that points to possible new research avenues),
   define the research strategy of interest for those
   who decide to take that avenue.
   Form a section with appropriate discussions.

7. Define the research strategy for those
   who decide to analyze the hybrid approaches
   (those consisting of elements of two different classes).
   Hybrid approaches can be either a symbiosis
   (the two solutions used interchangeably, as the conditions dictate),
   or a synergy (the two solutions combined into one).
   Discuss possible new solutions or both types (symbiosis and synergy).
   Discuss other possible avenues leading to new inventions
   (transdisciplinarization and retrajectorization).

8. Add the preamble and the postambule,
   and create the list of annotated references.
   Form the final text of the paper.
   Generate a pearl of wisdom that sheds light
   on the essence of the paper,
   and increases the probability that the paper be referenced a lot.

9. Ask peers to review your paper,
   while you look for a suitable journal to publish it.

10. Submit the paper to a journal.

SIMULATION-BASED COMPARISON PAPER:

1. Create a simulator that encompasses all examples of interest.

2. Create the set of test vectors (benchmarks, etc...).

3. Create the simulation environment.

4. Create the list of simulation experiments to run.

5. Create the list of conditions of the simulation analysis.

6. Create the list of assumptions of the simulation analysis.

7. Run the simulation experiments.
   For each example, if an important fact is missing,
   introduce an assumption,
   and specify, make it clear,
   that you are not comparing the actual systems,
   but the actual-like systems.

8. Present and discuss the results of simulation.
   Form the final text of the paper.

9. Ask peers to review your paper,
   and think about the journal to submit it.

10. Submit the paper.

INITIAL IDEA ANALYSIS PAPER:

1. Extract the best ideas from the discussion part of the survey paper.

2. Explain the ideas and the evaluation methodology to be used.
   Try to do some analytical proof that it makes sense to invest
   effort, time, and money,
   into the analysis of the idea under consideration.
   A simple simulation or implementation analysis
   is also a possibility.

3. Write the paper, bounce it off the peers, and submit it.

RESEARCH PAPER:

1. For the best subset of ideas from the position paper,
   make appropriate simulator changes,
   and run the newly generated original solutions,
   comparatively with the best solution from the open literature.
   Create the tables and figures with results.

2. Write the paper.

3. Bounce the paper off the peers, and submit it to a journal.