

Project & Literature Survey Requirements

January, 2001

Georgia Tech • CS/ME 6754, COA 8676E • Spring 2001

Key Dates

These are the dates when items are due. See descriptions below regarding required content for each item.

- Feb 22, 2001 Proposals due
(one document that includes both the literature survey proposal and the IS project proposal).
- April 3, 2001 Progress report due.
- April 24, 2001 Projects due.

Literature Survey Requirements

For your literature survey you are to select a relevant topic (see below), review information from various sources (books, journals, conference proceedings, web sites, product literature, etc.), and formulate a coherent report about that topic.

Write the report from the viewpoint that you are going to form a dot com startup company dealing with that topic, and want you and your colleagues to know what the current state-of-the-art and state-of-practice are. Or if you feel more academic than entrepreneurial, write it as if it is a survey you want to submit to a prestigious journal for publication (and maybe we can after the semester is done ☺).

Candidate topics include the following (with a focus on their design and engineering applications). The majority of your survey should cover recent work (within the last 4 years). You should cover recent existing systems and/or emerging research. You can propose other current topics relevant to design and engineering information technology if you wish.

- 1) STEP implementations in industrial practice (or advanced research). Of particular interest are STEP-based repositories (environments where applications interact with the database(s) via fine-grained dynamic data sharing (e.g., via APIs like ODBC and JDBC) rather than batch-oriented file exchange). See www.steptools.com as a starting point.
- 2) Information systems role in integrating design and engineering supply chains.
- 3) OO information modeling techniques (e.g., UML)
- 4) Data mining
- 5) XML
- 6) Middleware (CORBA, DCOM, JINI, SOAP ...)
- 7) ERP systems
- 8) PDM systems
- 9) Engineering & design related ASPs **
Examples: alibre.com, e-vis.com, e-engineering.com, web4engineers.com, mySmarTeam.com
- 10) Toolkits for creating web-based engineering services (e.g., EAI)
- 11) Design & analysis integration (e.g., see www.eislab.gatech.edu/research/dai/ as a starting point)
- 12) Collaborative engineering environments and research initiatives (e.g., NASA ISE, Boeing PSI, ...)
- 13) IT initiatives in engineering research and education (at NSF, DARPA, at Georgia Tech COE and other universities, etc.)
- 14) Usage of <IT area x> in <product domain y> (e.g., usage of STEP in the design and manufacture of machined parts)

The main requirements are:

- 1) Include discourse on the following content:
 - a) What the topic is
 - b) What problems it addresses
 - c) What the overall benefits and issues are
 - d) What the different technical approaches are, and a comparison of their specific benefits and issues
 - e) Where the topic is heading (future advances expected, ...)
 - f) Your overall impression and assessment of the topic
- 2) Do not cut and paste extended text from the web. Direct quotes should be identified and cited as such, and generally they should not be longer than a few sentences.
- 3) Any pictures, tables, or other elements you include directly in your document should be accompanied by a citation of their source.
- 4) Include citations for ideas and descriptions in the text of your document. Each entry in your references sections should be cited somewhere in the text. You should have at least 10 references.
- 5) The report length should be approximately 15-20 pages total (including references and figures) with single spaced lines and 12 point font.

Proposal Content:

- You should spend an hour or so browsing web pages and/or journals/books at the library to help you select a topic and get a feel for it.
- Turn in one paragraph or so that specifies what topic you have selected and what aspects you will investigate.

Status Report Content:

- Turn in an outline of your report. List a few bullet items under each major section that capture your observations so far (based on the reading you have done to that date).

IS Project Requirements

The information system project basically involves creating information models for an engineering or design domain of your choice and implementing those model(s) in a computing system. Thus it is similar to what you have done in HW1-HW6.

The main requirements are:

- 1) Description of functional requirements, data requirements, and representative instances for your selected domain and scope (this content is like the text descriptions and figures in HW1-6). Include references to books, etc. about your product domain and enough description for people new to that domain.
- 2) Process model
- 3) Information model
- 4) Implementation model(s) (high level and tool level).
- 5) Population of several main instances (along with supporting instances)
- 6) Interesting queries and operations (with results) on those instances (i.e., not just `select * from truss`)
- 7) A report that:
 - a) describes what you did
 - b) includes the above as appendices
 - c) includes your observations (including strengths and weaknesses)
- 8) The complexity of your models, instances, queries, etc. should be at least as great for HW1-3.

- 9) You cannot select trusses or PWA/B as your domain unless you do something significantly different than the class/HW examples.
- 10) If you choose the traditional project route per the table below, the "team size" is one person (just you). The alternative projects will likely be more interesting (but probably more challenging since you may not have used the tools before and I cannot guarantee how much help I can provide). Thus you can work in teams of two people on these. *You will need to select a consistent set of modeling and implementation methods (e.g., Express and Part 21 go together).* If there are other alternative modeling techniques and implementation tools you would like to try, that will generally be fine -- discuss with me beforehand.

Table 1 - Techniques and Tools for Project Development and Implementation

	Traditional Project	Alternative Projects
Team Size	1	2
Content Aspect		
Process model	IDEF0	UML
Information model (conceptual)	EER	UML, EXPRESS-G
Implementation model: high level	relational model (like Fig. 7.7)	UML, EXPRESS
Implementation model: tool level	SQL in Oracle	EXPRESS in ST-Developer; Java classes
Instances population	SQL in Oracle	Part 21, Java instances
Queries and operations	SQL in Oracle	ST-Developer Viewer operations, Java operations

Other alternatives include:

- Metaphase PDM
(see links from <http://www.cad.gatech.edu/courses/me6754.html>)
- XML and related tools
- Constrained objects
(see slides at <http://www.eislab.gatech.edu/pubs/conferences/2000-nasa-step-workshop-peak/>)

Proposal Content:

- Turn in one paragraph or so that specifies what domain you have selected and which approach you will take (traditional or alternative). In either case, include a table like the above that specifies the modeling techniques and implementation tools you will use.

Status Report Content:

- Turn in an outline of your report. List a few bullet items under each major section that capture your observations so far (based on your information modeling and implementation so far). You should include a draft of your conceptual information model and a list of the remaining steps you have to do.