DESIGN CHALLENGE
LIBRARY RESEARCH

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Ask Us! Getting Help from the Library

■ Chat

■ Schedule Research Consultation: wpi.libcal.com/appointments/

■ Librarian Walk-In Hours:
  - *(Rooms 202A-C):*
  - *Mon-Fri 8AM-5PM*
  - *Saturday 1-5PM*
Library Class Resources

Library Course Guide:
http://libguides.wpi.edu/ece2799
Research is a process

1. Research Question
2. Gather Background Information
3. Conduct Literature Search
4. Manage Information Gathered
5. Synthesize Information Gathered

The process involves asking a research question, gathering background information, conducting a literature search, managing the information gathered, and synthesizing the gathered information.
Research is iterative

- Develop Keyword List
- Select Search Platforms
- Evaluate Search Results
- Revise/Refine Search
Research is an iterative process

- Research Question
- Gather Background Information
- Conduct Literature Search
- Manage Information Gathered
- Synthesize Information Gathered
- Develop Key Word List
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- Revise/Refine Search
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I-RED: Information-Rich Engineering Design

- Informed, well research approach → best possible design
- Different types of information needed at different stages

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<tr>
<th>Design Activity</th>
<th>Information Needed</th>
<th>Questions to Consider</th>
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<tbody>
<tr>
<td>Organize Team</td>
<td>Knowledge Management Strategy</td>
<td>How will you find/organize/ manage/share information for this project?</td>
</tr>
<tr>
<td>Clarify the Task</td>
<td>Context</td>
<td>What do the stakeholders want and what are the constraints? Who are your stakeholders?</td>
</tr>
<tr>
<td>Synthesize Possible Solutions</td>
<td>Prior Work</td>
<td>What has already been done in similar/comparable situations?</td>
</tr>
<tr>
<td>Select the Best Solution</td>
<td>Technologies/Methods</td>
<td>How does it work? How do you evaluate?</td>
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<tr>
<td>Refine the Preferred Solution</td>
<td>Detailed Technical Information</td>
<td>What specific technical information is available/needed?</td>
</tr>
<tr>
<td>Communicate to Inform/Persuade</td>
<td>Summarize/Translate Project</td>
<td>How do you talk to non-designers about how it works?</td>
</tr>
<tr>
<td></td>
<td>Knowledge</td>
<td>What information is needed to get buy-in?</td>
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Keywords are...well key

- Successful searching comes down to figuring out the “right” keywords – which can differ depending on where you are searching

- Keep a list of all potential keywords, including similar/related terms

- Keep notes on which terms worked well, in what combination and which search engine/database
Not all information can be found in one place

- Rule of thumb: use at least 3 search tools
  - Google Scholar
  - WPI Library Search (library homepage)
  - Research databases

- Look for multiple types of information to get different perspectives on your topic.
  - Technical handbooks
  - Journal articles
  - Product websites
  - Patents
Background Info: Technical Handbooks

- Use to find technical information like equations, substance information, measurements, procedures and protocols

- How Find?
  - WPI Library Search: Add the word “handbook” to your search terms.
  - Database ➔ By Type ➔ Technical Handbooks ➔ Select either Knovel or CRC NetBase ➔ Searches take you directly to the relevant chapter of the handbook.
Google Well – Using Your Time Effectively

- Domain searching: site:.gov, .org, .edu
- Add “association” with basic topic search phrase to find any trade/professional organizations on your topic
- Copyright free image search with Advance Image Search
- Google Scholar – click Cited link
  - use “FullTextFinder@WPI” to get access
Library Research Databases

- Library databases = searchable collections of published works, mostly scholarly, but can include non-scholarly sources
- Provides citation information (author, title, publisher, date, etc.)
- Often but not always provides full-text access to sources → Look for Fulltext Finder link
- Many are discipline specific – determine which to use based on what perspective looking for (engineering, business, etc)
Search Activity

- Each team member select a different database from the list below to find information for your project:
  - Engineering Village or IEEEXplore (engineering databases)
  - Business Source Elite (business database)
  - ERIC (education) or JSTOR (social science)

- Explore your database. Try some searches. Try different search filters.

- What do you like about the database? What do you dislike?

- Share your findings with your teammates.

- Be prepared to present your database to the class.
Why Search Patents?

- Patents contain a wealth of specific technical detail
- Understand product design features & specifications
- Track innovations
- Competitive market analysis
- Compare your own ideas to existing inventions
Patent Criteria

To be patentable, the following three criteria must be met:

1. **Novelty**: unique & new, must not have been described before
2. **Utility**: invention is useful and functions according to intended purpose
3. **Nonobviousness**: does just build on prior invention as a logical extension
When Searching/Reading Patents

- **Assignee**: Owner of the patent (not always the inventor)
- **Claims**: What makes the patent novel
- **Description**: Detailed description of invention and prior art (related earlier products, concepts, or inventions)
- **Drawings**: Show the main components of the inventions
- Other important features for patent searching: cited/citing patents, legal status, classification codes, related documents
Patent Activity

- Sample Patent: Device and method for an electronic tag game
- As a team, consider the following questions when examining this patent. (Question 4 on your worksheet.)
  - Who is the inventor?
  - Who owns the patent?
  - How long is the patent protected?
  - Where on the patent can you find out what this invention does, and how it is different from what’s already out there on the market?
Other Useful Guides:

- Electrical Engineering Databases
  http://libguides.wpi.edu/databases/bysubject/ece
- Business Databases at Gordon Library:
  http://libguides.wpi.edu/businessmanagement
- Citations: https://libguides.wpi.edu/citingsources
- Patents: http://libguides.wpi.edu/patent