

I308 INFORMATION REPRESENTATION

DEPARTMENT OF HUMAN-CENTERED COMPUTING
INDIANA UNIVERSITY SCHOOL OF INFORMATICS AND COMPUTING, INDIANAPOLIS
SPRING 2017

Section No.: 27656 *Credit Hours:* 3
Time: 03:00P-05:40P T
Location: IT 271

Instructor: Travis Faas, M.S.
Office Hours: Monday, 9AM-Noon, or by Appointment

Office: IT 461

Email: tfaas@iupui.edu

COURSE DESCRIPTION

The basic structure of information representation in digital information systems. It covers three modules: web development, relational databases, and XML technologies. Through this course, students are able to develop web pages that are able to interact with the backend servers; represent relational databases in the ER model, query the data using the formal query language SQL; and use XML technologies to store and display data.

Required Text:

Client-Side Data Storage: Keeping It Local
Ben Forta
ISBN: 1491935111

Principles of Undergraduate Learning (PUL):

Learning outcomes are assessed in the following areas:

1. Critical thinking
2. Integration and application of knowledge

Learning Outcomes:

Upon completion of this course, the student will	PUL	Assessment
1. Design and diagram a database with at least one HABTM relationship	1	Project 1
2. Query a sql database for a range of entries within a date range	1	Exercise 7
3. Create an application that updates it local database with server-provided information on a set interval	2	Project 2
4. Write the statements to create and setup a database with object id indexing	2	Exercise 4

Software used:

PhpStorm, available for free here: <https://www.jetbrains.com/student/>

EXPECTATIONS, GUIDELINES, AND POLICIES

Attendance:

A basic requirement of this course is that you will participate in all class meetings, whether online or face-to-face, and conscientiously complete all required course activities and assignments. Class attendance is required for classroom-based courses. It entails being present and attentive for the entire class period. Attendance shall be taken in every class. If you do not sign the attendance sheet while in class, you shall be marked absent. Signing the attendance sheet for another student is prohibited. The instructor is required to submit to the Registrar a record of student attendance, and action shall be taken if the record conveys a trend of absenteeism.

Only the following are acceptable excuses for absences: death in the immediate family (e.g. mother, father, spouse, child, or sibling), hospitalization or serious illness; jury duty; court

ordered summons; religious holiday; university/school coordinated athletic or scholastic activities; an unanticipated event that would cause attendance to result in substantial hardship to one's self or immediate family. Absences must be explained with the submission of appropriate documentation to the satisfaction of the instructor, who will decide whether missed work may be made up. Absences that do not satisfy the above criteria are considered unexcused. To protect your privacy, doctor's excuses should exclude the nature of the condition and focus instead on how the condition impacts your attendance and academic performance.

Missing class reduces your grade through the following grade reduction policy: You are allowed two excused or unexcused absences. Each additional absence, unless excused, results in a 10% reduction in your final course grade. More than six absences result in an F in the course. Missing class may also reduce your grade by eliminating opportunities for class participation. For all absences, the student is responsible for all covered materials and assignments.

Incomplete:

The instructor may assign an Incomplete (I) grade only if at least 75% of the required coursework has been completed at passing quality and holding you to previously established time limits would result in unjust hardship to you. All unfinished work must be completed by the date set by the instructor. Left unchanged, an Incomplete automatically becomes an F after one year. <http://registrar.iupui.edu/incomp.html>

Deliverables:

You are responsible for completing each deliverable (e.g., assignment, quiz) by its deadline and submitting it by the specified method. Deadlines are outlined in the syllabus or in supplementary documents accessible through Canvas. Should you miss a class, you are still responsible for completing the deliverable and for finding out what was covered in class, including any new or modified deliverable.

No work accepted after due date.

Class assignments:

There will be a number assignments given to you to be completed outside of class. They will be designed to get you to apply your new skills with a challenging application. You are expected to work alone on these assignments.

Grading Information:

Class assignments	30%
Project 1	15%
Project 2	30%
Project 3	25%

WEEKLY SCHEDULE

Week 1

Lecture Introduction to the course

Assignment Install phpstorm on your computer, install git on your computer, and install node.js on your computer (if they were not already).

Outcome Installation of software and development of the necessary skills to begin to complete the work for the semester

Week 2

Lecture Writing JSON, using Ajax, displaying data

Assignment Create a list of character info in JSON, display that list on a page using Javascript

Outcome Demonstrate ability to hard code data structures, and use that data to display information to a user

Week 3

Lecture Creating and using nested data structures in JSON

Assignment Implement user inventory data structure in JSON. Code a Javascript implementation that allows one to look through different inventories

Outcome Become familiar with creating deep data structures and targeting data in a nested data structure.

Week 4

Lecture Relational Data Structures in JSON

Assignment Design and implement a vehicle database that stores information about the vehicles, owners, and bases of the vehicles.

Project 1

Outcome Understand the use of IDs to identify unique entries in the db and how they can be used to link data together.

Week 5

Lecture Introduction to indexedDB

Assignment A basic CRUD application in indexedDB – getting users information, validating it, and storing it in the database on the client

Outcome Understand how indexedDB stores and retrieves its data

Week 6

Lecture Frontend Framework Setup

Assignment Set up a simple paged based application using a frontend framework

Outcome Develop capability in a data driven framework that can be used as a base throughout the rest of the semester

Week 7

Lecture Gathering and Displaying Data With Templates

Assignment Using JSON, create an application that displays time and temperature for the upcoming week

Outcome Understand how visual templates can be applied to a list of data.

Week 8

Lecture Creating and managing data relationships in indexedDB

Assignment Implement a CRUD application that stores merit badges (in image form) earned by different users of this application

Project 2

Outcome Be able to manage relationships in sets of data in an indexedDB application.

Week 9

Lecture Working with many to many relationships in indexedDB

Assignment Implementation of a “locals hotspots” application. Give the ability to associate many locals with different hotspots throughout the region.

Outcome Demonstrate ability to create forms and data structures that links many objects to one another without resorting to data duplication.

Week 10

Lecture Aggregating data results

Assignment Using a prepopulated dataset, add in the ability to create new entries to a list of popular songs. Write a set of scripts that can return the average popularity, based on genre.

Outcome Be able to apply algorithms to datasets to come up with insights from the gathered data.

Week 11

Lecture Data Synchronization

Assignment Establish a server that sends flash card data to a device when its connected to the internet, and updates the data the next time the device connects.

Outcome Develop the ability to keep databases in sync, even when devices might lose connection to the web

Week 12

Lecture Visualization of Data

Assignment Drawing from a prepopulated dataset, use a charting framework to show averages from sets of data about preferred foods in America.

Project 3

Outcome Develop a foundational ability to visualize numeric data for easier digestion by users

Week 13

Lecture Geospatial Data

Assignment Using a mapping API, create an indexedDB database of user-submitted ghost sightings. Allow querying of the data to pull information about a circular region's sighting information.

Outcome Understand how map positions may be stored, queried, and retrieved

Week 14

Lecture WebSQL Basics

Assignment Write the code to setup a webSQL database and insert a simple row of data

Outcome Understand the difference between indexedDB and SQL databases. Develop familiarity with WebSQL syntax and practices

Week 15

Lecture WebSQL queries and joins

Assignment Using a scaffolded dataset, create a set of pages that pull multiple relationships from a dataset about spaceports and spaceships.

Outcome Develop further strength in the SQL syntax, be able to pull in data from multiple tables via joins.

Week 16

Lecture Predicted: Project production

Assignment

Outcome

Grading Scale:

A+	100%	Professional level work, showing highest level of achievement
A	93–99%	Extraordinarily high achievement, quality of work; shows command of the subject matter
A–	90–92%	Excellent and thorough knowledge of the subject matter
B+	87–89%	Above average understanding of material and quality of work
B	83–86%	Mastery and fulfillment of all course requirements; good, acceptable work
B–	80–82%	Satisfactory quality of work
C+	77–79%	Modestly acceptable performance and quality of work
C	73–76%	Minimally acceptable performance and quality of work
C–	70–72%	Unacceptable work (Core course must be repeated for credit)
D+	67–69%	Unacceptable work (Course must be repeated for credit)
D	63–66%	Unacceptable work
D–	60–62%	Unacceptable work
F	Below 60	Unacceptable work

No credits toward major, minor, or certificate requirements are granted for a grade below C. No credits toward general education or elective requirements are granted for a grade below C–.

CODE OF CONDUCT

All students should aspire to the highest standards of academic integrity. Using another student's work on an assignment, cheating on a test, not quoting or citing references correctly, or any other form of dishonesty or plagiarism shall result in a grade of zero on the item and possibly an F in the course. Incidences of academic misconduct shall be referred to the Department Chair and repeated violations shall result in dismissal from the program.

All students are responsible for reading, understanding, and applying the *Code of Student Rights, Responsibilities and Conduct* and in particular the section on academic misconduct. Refer to *The Code > Responsibilities > Academic Misconduct* at <http://www.indiana.edu/~code/>. All students must also successfully complete the Indiana University Department of Education "How to Recognize Plagiarism" Tutorial and Test. <https://www.indiana.edu/~istd> You must document the difference between your writing and that of others. Use quotation marks in addition to a citation, page number, and reference whenever writing someone else's words (e.g., following the *Publication Manual of the American Psychological Association*). To detect plagiarism instructors apply a range of methods, including Turnitin.com. <http://www.ulib.iupui.edu/libinfo/turnitin>

Academic Misconduct:

1. **Cheating:** Cheating is considered to be an attempt to use or provide unauthorized assistance, materials, information, or study aids in any form and in any academic exercise or environment.
 - a. A student must not use external assistance on any "in-class" or "take-home" examination, unless the instructor specifically has authorized external assistance. This prohibition includes, but is not limited to, the use of tutors, books, notes, calculators, computers, and wireless communication devices.
 - b. A student must not use another person as a substitute in the taking of an examination or quiz, nor allow other persons to conduct research or to prepare work, without advanced authorization from the instructor to whom the work is being submitted.

- c. A student must not use materials from a commercial term paper company, files of papers prepared by other persons, or submit documents found on the Internet.
 - d. A student must not collaborate with other persons on a particular project and submit a copy of a written report that is represented explicitly or implicitly as the student's individual work.
 - e. A student must not use any unauthorized assistance in a laboratory, at a computer terminal, or on fieldwork.
 - f. A student must not steal examinations or other course materials, including but not limited to, physical copies and photographic or electronic images.
 - g. A student must not submit substantial portions of the same academic work for credit or honors more than once without permission of the instructor or program to whom the work is being submitted.
 - h. A student must not, without authorization, alter a grade or score in any way, nor alter answers on a returned exam or assignment for credit.
2. **Fabrication:** A student must not falsify or invent any information or data in an academic exercise including, but not limited to, records or reports, laboratory results, and citation to the sources of information.
3. **Plagiarism:** Plagiarism is defined as presenting someone else's work, including the work of other students, as one's own. Any ideas or materials taken from another source for either written or oral use must be fully acknowledged, unless the information is common knowledge. What is considered "common knowledge" may differ from course to course.
- a. A student must not adopt or reproduce ideas, opinions, theories, formulas, graphics, or pictures of another person without acknowledgment.
 - b. A student must give credit to the originality of others and acknowledge indebtedness whenever:
 - 1. directly quoting another person's actual words, whether oral or written;
 - 2. using another person's ideas, opinions, or theories;
 - 3. paraphrasing the words, ideas, opinions, or theories of others, whether oral or written;
 - 4. borrowing facts, statistics, or illustrative material; or
 - 5. offering materials assembled or collected by others in the form of projects or collections without acknowledgment
4. **Interference:** A student must not steal, change, destroy, or impede another

student's work, nor should the student unjustly attempt, through a bribe, a promise of favors or threats, to affect any student's grade or the evaluation of academic performance. Impeding another student's work includes, but is not limited to, the theft, defacement, or mutilation of resources so as to deprive others of the information they contain.

5. **Violation of Course Rules:** A student must not violate course rules established by a department, the course syllabus, verbal or written instructions, or the course materials that are rationally related to the content of the course or to the enhancement of the learning process in the course.
6. **Facilitating Academic Dishonesty:** A student must not intentionally or knowingly help or attempt to help another student to commit an act of academic misconduct, nor allow another student to use his or her work or resources to commit an act of misconduct.

OTHER POLICIES

1. **Right to revise:** The instructor reserves the right to make changes to this syllabus as necessary and, in such an event, will notify students of the changes immediately.
2. **Grade freeze:** One week after a grade has been assigned it will not be changed.
3. **24 hours no-questions:** One day before a project is due, no questions will be answered on the material.
4. **IUPUI course policies:** A number of campus policies governing IUPUI courses may be found at the following link: http://registrar.iupui.edu/course_policies.html
5. **Classroom civility:** To maintain an effective and inclusive learning environment, it is important to be an attentive and respectful participant in lectures, discussions, group work, and other classroom exercises. Thus, unnecessary disruptions should be avoided, such as ringing cell phones engagement in private conversations and other unrelated activities. Cell phones, media players, or any noisy devices should be turned off during a class. Texting, surfing the Internet, and posting to Facebook or Twitter during class are generally not permitted. Laptop use may be permitted if it is used for taking notes or conducting class activities. Students should check with the instructor about permissible devices in class. IUPUI nurtures and promotes "a campus climate that seeks, values, and cultivates diversity in all of its forms and that provides conditions necessary for all campus community members to feel welcomed, supported, included, and valued" (IUPUI

Strategic Initiative 9). IUPUI prohibits “discrimination against anyone for reasons of race, color, religion, national origin, sex, sexual orientation, marital status, age, disability, or [veteran] status” (Office of Equal Opportunity). Profanity or derogatory comments about the instructor, fellow students, invited speakers or other classroom visitors, or any members of the campus community shall not be tolerated. A violation of this rule shall result in a warning and, if the offense continues, possible disciplinary action.

6. **Bringing children to class:** To ensure an effective learning environment, children are not permitted to attend class with their parents, guardians, or childcare providers.
7. **Communication:** The instructor should respond to emails within 48 hours, excluding weekends and holidays, and announce periods of extended absence in advance. The instructor should provide weekly office hours or accept appointments for face-to-face, telephone, or teleconferenced meetings.
8. **Email:** Indiana University uses your IU email account as an official means of communication, and students should check it daily for pertinent information. Although you may have your IU email forwarded to an outside email account, please email faculty and staff from your IU email account.
9. **Disabilities Policy:** In compliance with the Americans with Disabilities Act (ADA), all qualified students enrolled in this course are entitled to reasonable accommodations. Please notify the instructor during the first week of class of accommodations needed for the course. Students requiring accommodations because of a disability must register with Adaptive Educational Services (AES) and complete the appropriate AES-issued before receiving accommodations. The AES office is located at UC 100, Taylor Hall (Email: aes@iupui.edu, Tel. 317 274-3241). Visit <http://aes.iupui.edu> for more information.
10. **Administrative Withdrawal:** A basic requirement of this course is that students participate in all class discussions and conscientiously complete all required course activities and/or assignments. If a student is unable to attend, participate in, or complete an assignment on time, it is the student’s responsibility to inform the instructor. If a student misses more than half of the required activities within the first 25% of the course without contacting the instructor, the student may be administratively withdrawn from this course. Administrative withdrawal may have academic, financial, and financial aid implications. Administrative withdrawal will take place after the full refund period, and a student who has been administratively withdrawn from a course is ineligible for a tuition refund. Contact the instructor with questions concerning administrative withdrawal.

11. **Emergency Preparedness:** Safety on campus is everyone’s responsibility. Know what to do in an emergency so that you can protect yourself and others. For specific information, visit the emergency management website. <http://protect.iu.edu/emergency>

MISSION STATEMENT

The Mission of IUPUI is to provide for its constituents excellence in

- Teaching and Learning;
- Research, Scholarship, and Creative Activity; and
- Civic Engagement.

With each of these core activities characterized by

- Collaboration within and across disciplines and with the community;
- A commitment to ensuring diversity; and
- Pursuit of best practices.

IUPUI’s mission is derived from and aligned with the principal components—Communities of Learning, Responsibilities of Excellence, Accountability and Best Practices—of Indiana University’s Strategic Directions Charter.

STATEMENT OF VALUES

IUPUI values the commitment of students to learning; of faculty to the highest standards of teaching, scholarship, and service; and of staff to the highest standards of service. IUPUI recognizes students as partners in learning. IUPUI values the opportunities afforded by its location in Indiana’s capital city and is committed to serving the needs of its community. Thus, IUPUI students, faculty, and staff are involved in the community, both to provide educational programs and patient care and to apply learning to community needs through service. As a leader in fostering collaborative relationships, IUPUI values collegiality, cooperation, creativity, innovation, and entrepreneurship as well as honesty, integrity, and support for open inquiry and dissemination of findings. IUPUI is committed to the personal and professional development of its students, faculty, and staff and to continuous improvement of its programs and services.