Web Technology

Assignments week 1

Before you start with the assignments please download the template folder from Blackboard. Read all the assignment before you start.

Assignment 1 – Default HTML lay-out

1. Create a standard HTML5 document lay-out.

   You can use the following link to do so:
   https://www.w3schools.com/html/html_intro.asp

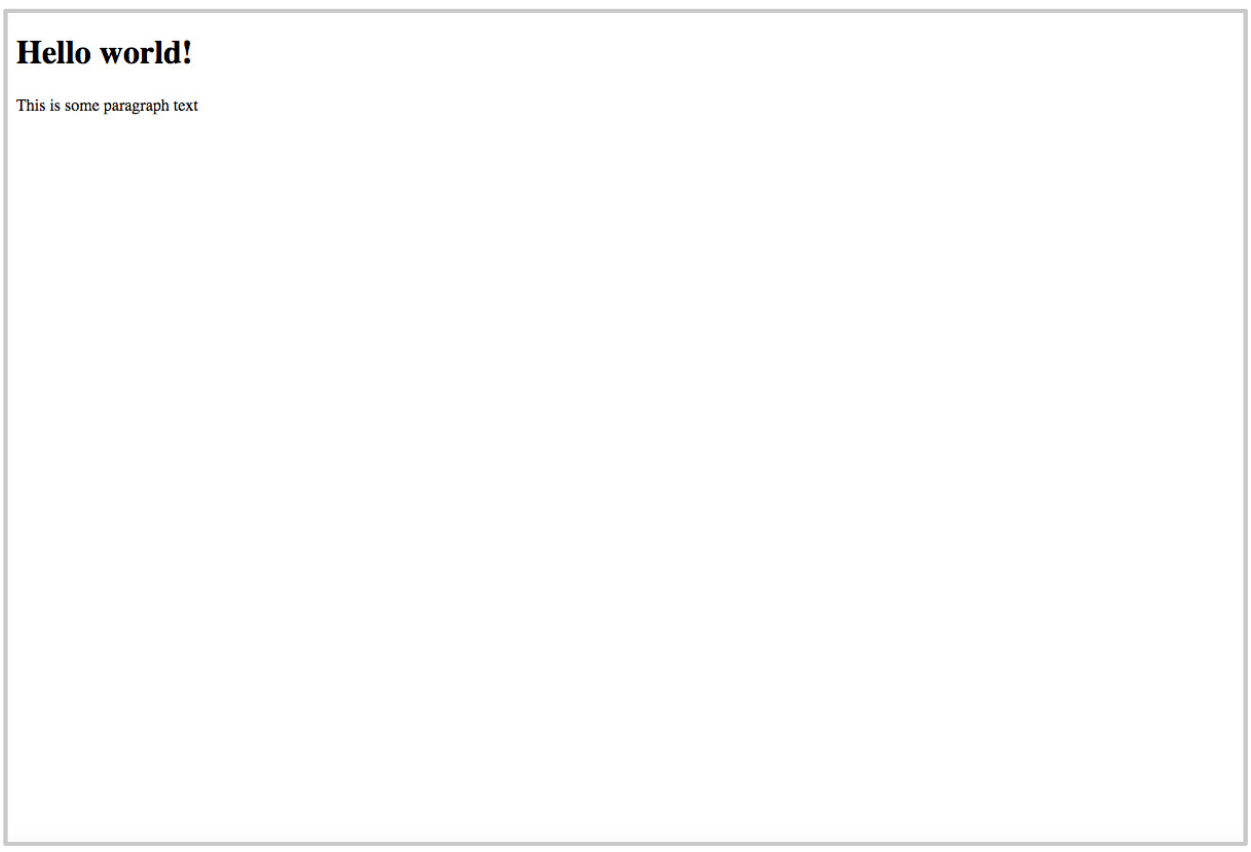
2. Open the document in your browser and add the text 'Hello World!' as shown below.

3. Before continuing make sure your document is correct so that you can use it in the subsequent assignments.

Assignment 2 – Heading and paragraph

1. Use your standard template to create a document with one heading and paragraph.

   You can use the following links to do so:
   https://www.w3schools.com/html/html_headings.asp
   https://www.w3schools.com/html/html_paragraphs.asp



Assignment 3 – Unordered list

1. Again use your template to create a unordered list as shown below.

   You can use the following link to do so:
   https://www.w3schools.com/html/html_lists.asp

- One
- Two
- Three
- Four
- Five

Assignment 4 – Image

1. Create a HTML document with one image in it.

   You can use the following link to do so:
   https://www.w3schools.com/html/html_images.asp

Assignment 5 – Links

1. Create a document with three links.

   For the links:
   1. Point it to an external website. If you click on it the website should open in the same tab.
   2. Point it to an external website. If you click on it the link should open in a new tab.

   You can use the following links to do so:
   https://www.w3schools.com/html/html_links.asp

This link goes to nu.nl and it opens in the samen window
This link goes to nu.nl but opens in a different window

Assignment 6 – Figure and Figcaption

The next four assignments focus on semantics and document structure. More information about these elements can be found here:

https://www.w3schools.com/html/html5_semantic_elements.asp

1. Again create a document with image. This time however use it in combination <figure> and <figcaption>.

   You can use the following link to do so:
   https://www.w3schools.com/tags/tag_figure.asp
   https://www.w3schools.com/tags/tag_figcaption.asp

Kaneda on his Bike - Akira (アキラ) 1988

Assignment 7 – HTML exercise 1

1. Recreate the document shown below.

   Hereby:
   1. Wrap all the content in an *article* element.
   2. Place the title in a *heading* element.
   3. Use the *paragraph* element for all the other text.
   4. Place the title, introduction text and author in a *header* element
   5. Use *figure* elements for the images.
   6. Use a *blockquote* for the quotation at the end of the page.
   7. Place the 'continue reading' text in a *footer* element.

When done the document outlines should look like this:

1. Brain Pickings – An inventory of the meaningful life.
   1. Hannah Arendt on Love and How to Live with the Fundamental Fear of Loss

Hannah Arendt on Love and How to Live with the Fundamental Fear of Loss

"Fearlessness is what love seeks… Such fearlessness exists only in the complete calm that can no longer be shaken by events expected of the future…Hence the only valid tense is the present, the Now."

By Maria Popova

"Love, but be careful what you love," the Roman African philosopher Saint Augustine wrote in the final years of the fourth century. We are, in some deep sense, what we love — we become it as much as it becomes us, beckoned from our myriad conscious and unconscious longings, despairs, and patterned desires. And yet there is something profoundly paradoxical about such an appeal to reason in the notion that we can exercise prudence in matters of love — to have loved is to have known the straitjacket of irrationality that slips over even the most willful mind when the heart takes over with its delicious carelessness.

How to heed Augustine's caution, not by subjugating but by better understanding our experience of love, is what Hannah Arendt (October 14, 1906–December 4, 1975) explores in her least known but in many ways most beautiful work, Love and Saint Augustine (public library) — Arendt's first book-length manuscript and the last to be published in English, posthumously salvaged from her papers by political scientist Joanna Vecchiarelli Scott and philosopher Judith Chelius Stark.

Hannah Arendt (photograph by Fred Stein, 1944); Saint Augustine (painting by Gerard Seghers, circa 1600-1650.)

For half a century after she wrote it as her doctoral thesis in 1929 — a time when this apostle of reason, who would become one of the twentieth century's keenest and most coolly analytical minds, was composing her fiery love letters to Martin Heidegger — Arendt obsessively revised and annotated the manuscript. Against Augustine's whetstone, she came to hone her core philosophical ideas — chiefly the troublesome disconnect she saw between philosophy and politics as evidenced by the rise of ideologies like totalitarianism, the origins of which she so memorably and incisively examined. It was from Augustine that she borrowed the phrase amor mundi — "love of the world" — which would become a defining feature of her philosophy. Occupied by questions of why we succumb to and normalize evil, Arendt identified as the root of tyranny the act of making other human beings irrelevant. Again and again, she returned to Augustine for the antidote: love.

But while this ancient notion of neighborly love, which would come to inspire Martin Luther King, was central to Arendt's philosophical concern and her interest in Augustine, its political significance is inseparable from the deepest wellspring of love: the personal. For all of the political and philosophical wisdom she draws from it, Augustine's Confessions is animated by his experience of personal love — that eternal force that governs the Sun and the Moon and the stars of our interior lives, reflected and codified in our cultural and social structures.

Illustration from An ABZ of Love, Kurt Vonnegut's favorite vintage Danish guide to sexuality

With an eye to Augustine's conception of love as "a kind of craving" — the Latin appetitus, from which the word appetite is derived — and his assertion that "to love is indeed nothing else than to crave something for its own sake," Arendt considers this directional desire propelling love:

> Every craving is tied to a definite object, and it takes this object to spark the craving itself, thus providing an aim for it. Craving is determined by the definitely given thing it seeks, just as a movement is set by the goal toward which it moves. For, as Augustine writes, love is "a kind of motion, and all motion is toward something." What determines the motion of desire is always previously given. Our craving aims at a world we know; it does not discover anything new. The thing we know and desire is a "good," otherwise we would not seek it for its own sake. All the goods we desire in our questing love are independent objects, unrelated to other objects. Each of them represents nothing but its isolated goodness. The distinctive trait of this good that we desire is that we do not have it. Once we have the object our desire ends, unless we are threatened with its loss. In that case the desire to have turns into a fear of losing. As a quest for the particular good rather than for things at random, desire is a combination of "aiming at" and "referring back to." It refers back to the individual who knows the world's good and evil and seeks to live happily. It is because we know happiness that we want to be happy, and since nothing is more certain than our wanting to be happy, our notion of happiness guides us in determining the respective goods that then became objects of our desires. Craving, or love, is a human being's possibility of gaining possession of the good that will make him happy, that is, of gaining possession of what is most his own.

Continue reading on https://www.brainpickings.org/

Assignment 8 – HTML exercise 2

1. Recreate the document shown below.

   Hereby:
   1. Wrap all the content in an *article* element.
   2. Place the date and title in a *header* element
   3. Use both an *ordered* and *unordered list* for the lists.
   4. Use *heading 1* and *heading 2* elements to emphasis the importance of headings in de document.
   5. Use the *paragraph* element for all the other text.
   6. Place the post date and the tags in a *footer* element.
   7. Make sure the special characters are readable. To do this you should tell the browser to use a Unicode character set:

      https://www.w3schools.com/tags/att_meta_charset.asp

When done the document outlines should look like this:

1. The Mathematicians Blog
   1. Consistency, validity, soundness and completeness
      1. Consistency
      2. Validity and soundness
      3. Completeness

Monday, September 23, 2013

Consistency, validity, soundness and completeness

Logical and mathematical systems and theories rest on four great pillars: completeness, soundness, validity and consistency. I have stated them when talking about Gödel's completeness and incompleteness theorems, and I will state them again:

- Consistency: we say that a logical system is consistent if we do not have P and ¬P as theorems.
- Validity: one cannot arrive at false statements from true statements by applying theorems we know to be true (including axioms that are taken as true).
- Soundness: every statement that's proven is true. Converse of completeness.
- Completeness: every true statement can be proven.

Let's talk about them.

Consistency

The basic villain of all formal systems, we're always looking for ways to prove that a new system doesn't have this property. Basically, consistency is the property that a formal system cannot, for any formula P, have P and ¬P be true.

And why is that so bad? Simply because from an inconsistent system everything follows.

Huh?

Suppose there is some statement P such that P and ¬P, and take whatever Q you like. We need to be reminded of something: $P \rightarrow (Q \rightarrow P)$ for any P and Q. That's because $Q \rightarrow P$ means that if Q is true then P must be true, and if P is false then Q must be false. But if P is true, it doesn't matter whether Q is true or false, $Q \rightarrow P$ will still be true. All you gotta do is remind yourself of the basic rules of propositional calculus and see that the truth table for $Q \rightarrow P$ is the same as that of $\neg Q \vee P$.

Now look at the following derivation:

1. $P \wedge \neg P$ [Hypothesis]
2. P [From 1.]
3. $\neg Q \rightarrow P$ [From 2.]
4. $\neg P \rightarrow Q$ [Contraposition, from 3.]
5. ¬P [From 1.]
6. Q [From 4. and 5.]

Therefore, for whichever proposition Q, we have that $(P \wedge \neg P) \rightarrow Q$. And that's why inconsistency is bad: an inconsistent system can prove anything, and therefore can tell you nothing. If I can prove literally anything at all, then I don't know what really follows from my axioms.

And that's why a second way of asserting that a system is consistent is to say that there is at least one sentence Q that is provably unprovable. If there is at least one Q that I provably cannot prove from my axioms, it follows that they must not be inconsistent, because if they were I'd be able to prove Q.

And Gödel's second incompleteness theorem states that it's impossible for a formal system to affirm its own consistency. If a system says it's consistent, then it's lying and it becomes inconsistent. The statement of consistency is undecidable in any system. Therefore, it is impossible to directly prove that any statement is unprovable.

Validity and soundness

Validity is the property of truth-preserving. This is to say that if all your premises are taken to be true, then your conclusions will be likewise true. Or, in other words, a statement is said to be valid if it indeed follows from your axioms.

Soundness is an extension of validity to a whole formal system. Soundness is the conjunction of the fact that every step in a proof is valid (that is, applying rules and theorems is truth-preserving) and that your axioms are all true. But of course, this concept of soundness only has a semantic relation with reality: if you take your axioms as referring to the world, then your system is sound.

I could add to the theory S of Peano Arithmetic, for instance, the axiom $\Box(0 = 1)$, getting a new theory S'. What this axiom says is that "'0 = 1' is provable." Now, if we actually arrive at this sentence from simple PA, we'd be in trouble because then that'd mean PA is inconsistent. However, because of the above discussion on consistency, we will never be able to prove that $\neg\Box(0 = 1)$. Therefore, since the statement $\Box(0 = 1)$ is, by Gödel's second incompleteness theorem, undecidable, we can add it as an axiom without losing consistency. And what happens, then?

Then we lose soundness, but validity stays. Furthermore, with this addition we'd be able to prove PA's Gödel statement and the statement IncPA (that is, PA is inconsistent), without ever actually being inconsistent. This new bizarre theory S' says that it can prove PA's inconsistency without actually being inconsistent because the proof will be mysteriously missing. Cool, huh?

Completeness

A theory is complete if every true statement in it can be proven. That is to say that in all models of that theory, if a statement is semantically implied by the axioms, then it is syntactically implied by them. In symbolic terms, that is to say that if $\models B$ then $\vdash B$.

Hmmm… except not quite. This is what's called semantic completeness. Semantic completeness is that which states that $\models B$ implies $\vdash B$, and Gödel's completeness theorem states that every model of first-order logic is semantically complete.

The other kind of completeness, syntactic completeness, states that for every formula P, either P or ¬P is provable. That is to say, there is no sentence that's undecidable. And then Gödel's first incompleteness theorem showed that no formal system as strong as basic arithmetic can be both syntactically complete and consistent. Not only that, it also showed that second-order arithmetic isn't even semantically complete. That's because while in first-order arithmetic the sentence G is merely undecidable and by the completeness theorem neither true nor false of all models, in second-order arithmetic it is true (semantically) of the standard model of PA and undecidable, and therefore second-order arithmetic isn't any kind of complete.

So these are the four pillars on which logic rests, plus some interesting trivia about them. Seeya next time!

Posted at 8:09 PM 6 notes Permalink ∞

Tags: mathematical logic mathema maths mathematics math intuitive

Assignment 9 – HTML exercise 3

1. Recreate the document shown below.

   Hereby:
   1. Wrap all the content in an *article* element.
   2. Place the title and subtitle (from Wiki..) in a *header* element
   3. Use an *unordered list* for the list.
   4. Use *heading 1*, *heading 2* and *heading 3* elements to emphasis the importance of headings in de document.
   5. Use the *paragraph* element for all the other text.
   6. Use *figure* and *figcaption* elements for the images.
   7. Use the *definition* element for the four assumptions (e.g. The biological assumption).

When done the document outlines should look like this:

1. Wikipedia - Hubert Dreyfus's
   1. Hubert Dreyfus's views on artificial intelligence
      1. Dreyfus' critique
         1. The grandiose promises of artificial intelligence
         2. Dreyfus' four assumptions of artificial intelligence research
         3. Knowing-how vs. knowing-that: the primacy of intuition

Hubert Dreyfus's views on artificial intelligence

From Wikipedia, the free encyclopedia

Hubert Dreyfus has been a critic of artificial intelligence research since the 1960s. In a series of papers and books, including Alchemy and AI (1965), What Computers Can't Do (1972; 1979; 1992) and Mind over Machine (1986), he presented a pessimistic assessment of AI's progress and a critique of the philosophical foundations of the field. Dreyfus' objections are discussed in most introductions to the philosophy of artificial intelligence, including Russell & Norvig (2003), the standard AI textbook, and in Fearn (2007), a survey of contemporary philosophy.

Dreyfus argued that human intelligence and expertise depend primarily on unconscious instincts rather than conscious symbolic manipulation, and that these unconscious skills could never be captured in formal rules. His critique was based on the insights of modern continental philosophers such as Merleau-Ponty and Heidegger, and was directed at the first wave of AI research which used high level formal symbols to represent reality and tried to reduce intelligence to symbol manipulation.

When Dreyfus' ideas were first introduced in the mid-1960s, they were met with ridicule and outright hostility. By the 1980s, however, many of his perspectives were rediscovered by researchers working in robotics and the new field of connectionism—approaches now called "sub-symbolic" because they eschew early AI research's emphasis on high level symbols. Historian and AI researcher Daniel Crevier writes: "time has proven the accuracy and perceptiveness of some of Dreyfus's comments." Dreyfus said in 2007 "I figure I won and it's over—they've given up."

Dreyfus' critique

The grandiose promises of artificial intelligence

In Alchemy and AI (1965) and What Computers Can't Do (1972), Dreyfus summarized the history of artificial intelligence and ridiculed the unbridled optimism that permeated the field. For example, Herbert A. Simon, following the success of his program General Problem Solver (1957), predicted that by 1967:

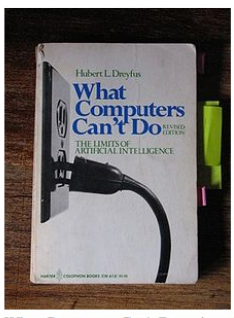
- A computer would be world champion in chess.
- A computer would discover and prove an important new mathematical theorem.
- Most theories in psychology will take the form of computer programs.

The press reported these predictions in glowing reports of the imminent arrival of machine intelligence.

Dreyfus felt that this optimism was totally unwarranted. He believed that they were based on false assumptions about the nature of human intelligence. Pamela McCorduck explains Dreyfus position:

“A great misunderstanding accounts for public confusion about thinking machines, a misunderstanding perpetrated by the unrealistic claims researchers in AI have been making, claims that thinking machines are already here, or at any rate, just around the corner.”

These predictions were based on the success of an "information processing" model of the mind, articulated by Newell and Simon in their physical symbol systems hypothesis, and later expanded into a philosophical position known as computationalism by philosophers such as Jerry Fodor and Hilary Putnam. Believing that they had successfully simulated the essential process of human thought with simple programs, it seemed a short step to producing fully intelligent machines. However, Dreyfus argued that philosophy, especially 20th-century philosophy, had discovered serious problems with this information processing viewpoint. The mind, according to modern philosophy, is nothing like a computer.



What Computers Can't Do written by Hubert L Dreyfus

Dreyfus' four assumptions of artificial intelligence research

In Alchemy and AI and What Computers Can't Do, Dreyfus identified four philosophical assumptions that supported the faith of early AI researchers that human intelligence depended on the manipulation of symbols.[9] "In each case," Dreyfus writes, "the assumption is taken by workers in [AI] as an axiom, guaranteeing results, whereas it is, in fact, one hypothesis among others, to be tested by the success of such work."

The biological assumption The brain processes information in discrete operations by way of some biological equivalent of on/off switches.

In the early days of research into neurology, scientists realized that neurons fire in all-or-nothing pulses. Several researchers, such as Walter Pitts and Warren McCulloch, argued that neurons functioned similar to the way Boolean logic gates operate, and so could be imitated by electronic circuitry at the level of the neuron. When digital computers became widely used in the early 50s, this argument was extended to suggest that the brain was a vast physical symbol system, manipulating the binary symbols of zero and one. Dreyfus was able to refute the biological assumption by citing research in neurology that suggested that the action and timing of neuron firing had analog components. To be fair, however, Daniel Crevier observes that "few still held that belief in the early 1970s, and nobody argued against Dreyfus" about the biological assumption.

The psychological assumption The mind can be viewed as a device operating on bits of information according to formal rules.

He refuted this assumption by showing that much of what we "know" about the world consists of complex attitudes or tendencies that make us lean towards one interpretation over another. He argued that, even when we use explicit symbols, we are using them against an unconscious background of commonsense knowledge and that without this background our symbols cease to mean anything. This background, in Dreyfus' view, was not implemented in individual brains as explicit individual symbols with explicit individual meanings.

The epistemological assumption All knowledge can be formalized.

This concerns the philosophical issue of epistemology, or the study of knowledge. Even if we agree that the psychological assumption is false, AI researchers could still argue (as AI founder John McCarthy has) that it was possible for a symbol processing machine to represent all knowledge, regardless of whether human beings represented knowledge the same way. Dreyfus argued that there was no justification for this assumption, since so much of human knowledge was not symbolic.

The ontological assumption The world consists of independent facts that can be represented by independent symbols

Dreyfus also identified a subtler assumption about the world. AI researchers (and futurists and science fiction writers) often assume that there is no limit to formal, scientific knowledge, because they assume that any phenomenon in the universe can be described by symbols or scientific theories. This assumes that everything that exists can be understood as objects, properties of objects, classes of objects, relations of objects, and so on: precisely those things that can be described by logic, language and mathematics. The question of what exists is called ontology, and so Dreyfus calls this the ontological assumption. If this is false, then it raises doubts about what we can ultimately know and what intelligent machines will ultimately be able to help us to do.

Knowing-how vs. knowing-that: the primacy of intuition

In Mind Over Machine (1986), written during the heyday of expert systems, Dreyfus analyzed the difference between human expertise and the programs that claimed to capture it. This expanded on ideas from What Computers Can't Do, where he had made a similar argument criticizing the "cognitive simulation" school of AI research practiced by Allen Newell and Herbert A. Simon in the 1960s.

Dreyfus argued that human problem solving and expertise depend on our background sense of the context, of what is important and interesting given the situation, rather than on the process of searching through combinations of possibilities to find what we need. Dreyfus would describe it in 1986 as the difference between "knowing-that" and "knowing-how", based on Heidegger's distinction of present-at-hand and ready-to-hand.[14]

Knowing-that is our conscious, step-by-step problem solving abilities. We use these skills when we encounter a difficult problem that requires us to stop, step back and search through ideas one at time. At moments like this, the ideas become very precise and simple: they become context free symbols, which we manipulate using logic and language. These are the skills that Newell and Simon had demonstrated with both psychological experiments and computer programs. Dreyfus agreed that their programs adequately imitated the skills he calls "knowing-that."

Knowing-how, on the other hand, is the way we deal with things normally. We take actions without using conscious symbolic reasoning at all, as when we recognize a face, drive ourselves to work or find the right thing to say. We seem to simply jump to the appropriate response, without considering any alternatives. This is the essence of expertise, Dreyfus argued: when our intuitions have been trained to the point that we forget the rules and simply "size up the situation" and react.

The human sense of the situation, according to Dreyfus, is based on our goals, our bodies and our culture—all of our unconscious intuitions, attitudes and knowledge about the world. This “context” or "background" (related to Heidegger's Dasein) is a form of knowledge that is not stored in our brains symbolically, but intuitively in some way. It affects what we notice and what we don't notice, what we expect and what possibilities we don't consider: we discriminate between what is essential and inessential. The things that are inessential are relegated to our "fringe consciousness" (borrowing a phrase from William James): the millions of things we're aware of, but we're not really thinking about right now.

Dreyfus do not believe that AI programs, as they were implemented in the 70s and 80s, could capture this "background" or do the kind of fast problem solving that it allows. He argued that our unconscious knowledge could never be captured symbolically. If AI could not find a way to address these issues, then it was doomed to failure, an exercise in "tree climbing with one's eyes on the moon."


Hubert Dreyfus in 2011