Sotirios D. Kotsopoulos
Massachusetts Institute of Technology
Department of Architecture
77 Massachusetts Avenue, 10-482M, Cambridge, MA 02139
skots@mit.edu
The Chinese Room paradox is about the role of intentionality and consciousness in human decision making. Here I reflect on the possibilities opened up by this paradox in the world of design and its continuous computerization.
I. INTRODUCTION

Traditionally, the process of design is conceived as an exclusively human activity. The common belief is that design is associated with purpose, intention, or aim and so it can only arise from the mind of a conscious designer. Terms such as preference, decision, action, or, even more mundane ones, such as, choice, assumption, mistake, or appearance, all involve an elementary level of consciousness which only human beings can possess. The Chinese room paradox, posed by Searle in his paper “Minds, Brains, and Programs” [1], is an argument about intentionality, understanding, and conscious experience. It suggests a table in a room with cards depicting Chinese symbols and a set of rules on how to place them. A non-Chinese speaker enters the room and arranges the cards. Then a Chinese-speaker enters the room looks at the card arrangement and claims that it is a delightful poem. Of course, the first person did not have the faintest idea of what he or she was doing and the effect that it would have. According to Searle, only humans possess the causal powers that give them intentionality, a necessary condition of thinking; else it is only a metaphorical attribution.

One of the intrinsic characteristics of the practice of design is its reliance on ideas that are conceived, generated, or formed within the mind of a lead designer that are then propagated down the corporate structure to be implemented, executed, or constructed by members of the design office. A human designer is always exclusively responsible for the conceptualization, creation, and control of ideas and in some design fields, such as architecture, this mental process is regarded as a particular, irreplaceable, and almost “sacred” privilege of the human mind that identifies, distinguishes, and celebrates the uniqueness of certain individuals. It is about the ability of certain architects to resolve programmatic complexity while addressing aesthetical, structural, sustainable, social, or even psychological issues all at the same time. Such an extraordinary ability is perceived by many as a supernatural one that leads occasionally to a mystifying admiration and celebrity status. Yet, it should be mentioned here that such supernatural abilities are witnessed and assumed only on the basis of the resulting products, i.e. the finished buildings and little if any is being reported, recorded, or revealed and therefore are known about the process itself. Most of the evidence is based on retrospective monographs, metaphors, recollections, or sketches, the value, accuracy, or relevance of which can be questionable. Nevertheless, it is clear that architectural design offices do not work alone in confronting complexity but rather cooperatively with multiple engineers, scientists, sociologists, and other expert consultants and the resulting buildings is hardly the work of one individual but rather the accomplishment of a team.
2. THE IDEA OF A GENIUS

The idea of a “genius” originated as a humanistic attempt to explain remarkable creative and original work on the basis of an exceptional natural intellectual capacity possessed by certain “gifted” individuals. It is an idea rooted into the Enlightenment that meant to point out, exert, and elevate human individuality and originality. Specifically, Schopenhauer’s or Kant’s definitions of a genius [2,3] are both based on the notion of originality, i.e. one’s ability to think unlike any of the other fellow peers. It can be argued therefore that the notion of being a genius, apart from a mental state can be also seen as a social construct. The ability of an individual to solve complex problems or to be creative can be based (apart from personal ability) on various other external factors such as accident, luck, coincidence, or publicity. This possibility opens up a more interesting potential than has been previously possible under the humanistic definition. Rather than assuming that a genius-individual is unique and therefore irreplaceable, it may also be appropriate to consider the process followed by a genius. Of course, this assumes that the process is traceable, identifiable, repeatable, and therefore independent of the particular agent that carries it out. In other words, a genius-like system would be able to re-enact the steps that a genius would have taken in order to solve/address the problem.

As discussed earlier in the Chinese room paradox, the problem of re-enacting, simulating, or replicating human thought is impossible by any agent that lacks consciousness. Consciousness is a necessary condition for human thought or, according to Searle, any kind of thought. The presence of consciousness is a presupposition for intentionality, i.e. the deliberate relationship between mental acts and the external world. Every mental phenomenon has some content and is directed to an object, the intentional object. So, for instance, “belief” as a mental state is related to the object “believed” for without that relationship there would be no mental phenomenon. However, this train of thoughts, albeit self-consistent, is also circular by definition: intentionality is that which defines the mental and mental is that which is intentional. So, a question arises necessarily on whether something is thinkable because we can think of it or we can think of something because it is thinkable. The answer to this question can be viewed in at least two possible ways: either that thinking is a humanly initiated mechanism that requires for its validity consciousness or that thinking is simply the result of a mechanism, regardless of how or who produced it. The second option, (a behaviorist one) implies that if something acts as if it is thinking, then it is thinking (until proof of the opposite). In such a case, the Turing test would be one way of distinguishing and defining such a thinking process not from its appearance or its intrinsic qualities but rather from its resulting behavior. So, in that sense, a genius will be defined as a genius not because it is human but rather because it behaves like a genius.
3. THE COMPUTER IS NOT A GENIUS

A computer is not human and therefore cannot think, let alone be a genius. Computer programs are sequences of instructions to be executed by a computer. The instructions are conceived by a human programmer and they abide to a series of grammatical and syntactical constraints also defined by other human programmers. The languages used by programmers are also defined by human programmers and engineers. In itself a computer program is simply a flow of electrons that is initiated, controlled, and interpreted by human beings. There is no consciousness or intentionality intricate or superimposed on or in a computer which also is a machine constructed by human engineers. Intentionality, as defined by observing human behavior, is not only absent but also, by definition, impossible to exist within a computer. Any mechanism capable of producing intentionality must have causal relationships equal to those of the human brain. Instantiating a computer program is never by itself a sufficient condition of intentionality. Nevertheless, computer programs can be regarded as extension to the human mind and as such they can inform, reveal, or extend the awareness of a human mind affecting the consciousness of humans. By taking advantage of the speed, efficiency, and quantity of logico-arithmetic operations possibilities can be explored that are incapable or unpredictable to the human mind’s intellectual ability.

Through the use of computation, knowledge can be acquired that is impossible or foreign to the human mind. There are two terms that need to be defined here first: impossible and foreign. Impossible refers to the inability to predict a result due to a large number of calculations. Foreign refers to the inability to comprehend the results of such calculations. For example, the solution or visualization of a recursive equation, e.g. a quadratic polynomial, may reveal behaviors unpredictable and often unexplainable, yet true. The assertion of truth is based on the rational structure of computational schemes and their consequent characteristic of being coherent, traceable, and consistent. It is assumed here that intelligence, as a rational process of problem solving, is not an exclusive privilege of the human mind but rather can be abstracted as a generalized process, codified in the form of rules, and then re-implemented into another medium, i.e. binary, chemical, biological etc. In other words, human intelligence is a biological instantiation of a more general structure that manifests itself in what we define as “intelligence”. Further, the implementation into an alternative medium takes advantage of the properties of that medium rendering results much faster, accurate, or complex. Most importantly, a human is able to compare one’s own process with that of another’s non-human as to detect similarities or differences in performance, but also to engage in mutual or parallel synergy as to share, complement, and enhance either process.
While the computational mechanisms themselves are not conscious of the operations performed within their domain, yet the resulting computations reveal often schemes that are neither predictable nor understood by the humans who initiated them. Nonetheless, these schemes while intellectual are not dependent on human interpretation. For instance, recursive polynomial functions are the mathematical basis of fractal schemes, the behavior of which is revealed through computational operations. Yet, these fractals schemes are not dependent on human interpretations but rather are mechanisms implemented and observed in nature. The paradox here is that human consciousness is affected by intellectual schemes developed by machines that possess no consciousness. In contrast to material patterns formed by mechanical tools that function as extensions to the human body, computational patterns have built into them logical and arithmetic structures neither of which are human inventions but rather discoveries of preexisting mechanisms.

In the field of design, computational tools have been used quite extensively mainly as means for facilitating tedious graphical tasks but also as means for exploring formal patterns and behaviors. Various tasks in the design process have been replaced by computational tools liberating the designer from lengthly, repetitive, or difficult matters. Some of these tools are associated with the computer screen and its ability to temporarily shift or alter visual appearances. The illusion of motion, for instance, can be addressed by toggling consequent pixels producing visual phenomena observed as “dragging” or “rubberbanding”. Such alterations of pixel-based displays have an enormous effect and affect in the presentation, organization, but most importantly in the conceptualization of design. The interaction of the designer with the phenomena produced on their computer screens has become a main topic of interest in the recent literature surrounding computer-aided design. While this interaction does have a profound effect on the designer’s consciousness, the role of the computer is identified merely as that of an aid, assistant, or medium even though the processes followed by the computer may be identical to those of a human except for the computer’s lack of consciousness and intentionality.

4. IS DESIGN A CONSCIOUS ACT?

The idea of design as deriving from the mind of a conscious designer has been affected significantly by the computational tools occasionally blurring the distinction between what the designer originally wanted and what the designer eventually did. It is quite common for designers to end up with formal solutions that are not only entirely different to hand-drawn ones but also stylistically similar when using the same software. It can be argued that no matter how creative one can be, the use of any CAD modeling program will significantly reduce the possible solutions, expressions, and presentations that one can have and therefore result in a “tool mannerism”.
Yet, this discrepancy between what was intended and what was produced is not compatible to mechanical means and their effect on design conceptualization. There, mechanical forces produce material patterns that have an affect on the designer’s interpretation. For instance, pen-paper physical interaction, color filters on a camera or yellow trace layering are mechanical actions with material effects that get interpreted by humans in various ways. The difference between such effects and those produced by a computer is in the intellectual nature of the second. The term intellectual is used here, rather narrowly, as the capacity for rational or intelligent activity intrinsic to the agent that displays it. In contrast to a mechanical behavior, which is determined mainly by physical or chemical interactions, a computational event involves logical and arithmetic operations that are intrinsic to the behavior exhibited. In other words, a mechanical tool is a physical entity with a behavior dependent on the user’s will whereas a computational tool is the result of a logical process that determines its behavior. For example, a pen is a physical entity with a behavior dependent on the writer’s will whereas a pixel leaving a trace on a computer screen is the result of a logical process that involves logical interactions between neighboring pixels placed on a grid. Ultimately, both tools are developed by human tool-makers and both events are interpreted by the human designer who gets ideas based on one’s conscious observations.

The problem with consciousness when it is applied to the process of design is in the interdependency of their definitions. If a design is the result of a conscious decision then, of course, consciousness is a necessary condition for design. In that sense, by definition anything non-conscious cannot design. However, the problem here is that both definitions are taken from the human’s viewpoint, that is, design and conscious are seen as verbs not nouns. As verbs both terms are immediately associated with action and therefore with intentionality. But if they are seen as nouns then their value lies within their own existence and the observer’s role is to confirm their value not to determine it. The possibility of such a distinction opens up a more intricate relationship for viewing design than has been previously possible. Rather than assuming the presence of a conscious designer, instead design can be seen as a phenomenon regardless of its creator. In that context, the terms “conscious” and “design” need to be re-identified, distinguished, and perhaps redefined in the light of their own existence.

5. CONSCIOUSNESS VERSUS RANDOMNESS

Consciousness and intentionality are two terms that can be contrasted to those of randomness and contradiction. A conscious person cannot be random even if one intends to be so because that would contradict the very premise upon which consciousness is based: controlled thought. Randomness by definition is connected to the lack of control over the outcome of a process. While apprehension of randomness as an external
phenomenon is possible by a conscious observer the mere inability to predict the outcome defines it as random by that same observer. Similarly, contradiction is by definition antithetical to intentionality. One cannot be intentionally contradictory because that would negate the very nature of intentionality which is consistency. Of course, one can say so i.e. that “I intend to be contradictory” but that is just a phrase, a series of words in a sentence, not a consistent argument.

The explanatory power of rational thinking relies on the principles of consistency, coherency, and predictability, principles often considered antithetical to those of contradiction, paradox, or randomness. While the former principles have an established value within the Western philosophical tradition as being the only means by which truth can be explored, extracted, and established, the latter principles are also widely used except not scientifically but rather in the form of poetry, myth, or story-telling. In those cases, consistency is not the main focus as there is no outcome that needs to be proven but rather the text itself serves as a platform for the reader to interpret the meanings presented to without any definite, traceable, or provable purpose. Nevertheless, there is a great difference between nonsense and contradiction: just because a thought may contain two antithetical notions that does not render it also as incomprehensible. In fact, the very notion of antithesis itself involves the coexistence of contrasting notions not in the sense of comparison to a perfect reference but rather as a balance between forces, the nature of which may not even be known.

The difference between consistency and contradiction is not only in the methods but also in the premises of the argument: namely its definition. A definition is a point of reference, a starting point. The clarity of a definition is an essential part of a proof, for it is impossible to prove something when one does not know what it is. However, the problem of a definition is that it is based on existing knowledge, that is, on information upon which there is common agreement. The problem with this definition of definition is that not all things can be described accurately in order to convey their fundamental meaning. Most importantly, a definition is a human construction made to serve the means of communication and common agreement in order to establish a basis for consistency and it is not indicative of the nature of the term. In other words, a definition is intrinsically associated with the people who agree with it. If there is no one to articulate a definition of something and no one to agree with it then there is no definition. Yet, that does not mean that this something does not exist. In fact, almost anything existed before it was defined. A definition serves only the purpose of human communication and is in no way an ontological establishment.

A computer program that uses randomness as a means to address a problem is very different from a computer program that follows the
instructions of a programmer to address the same program. In the second case, the program is a mirror of the thoughts and intentions of the programmer, whereas in the first case the programmer is unaware of the solution strategy despite his or her intentional typing up, initiating, or running the program on a machine that is also constructed by humans. Randomness, as established earlier, is a disassociation of one's intentions and therefore does not follow the principles of rational human thinking i.e. consistency, coherency, and predictability. Nevertheless, the results of a random process may be revealing of a way that things work and therefore can be used by the user to address the problem. The gap between what a programmer intended to do and what actually did is indeed a human interpretation but the gap itself is not. The gap itself is a glimpse into a possibility unknown to us through a process also unknown to us. After the fact, a definition may be established that will add to human knowledge and become a point of reference or a definition for agreement among humans in the future.

6. WHO IS THE GENIUS?

In the world of design, computer programs have taken over many traditionally human intellectual tasks leaving less and less tasks for traditional designers to do. From photoshop filters to modeling applications and from simulation programs to virtual reality animation and even more mundane tasks that used to need a certain talent to take on such as rendering, paper cutting, or 3D printing/sculpting the list of tasks diminishes day by day to be replaced by their computational counterparts. What used to be a basis to judge somebody as a talent or a genius is no more applicable. Dexterity, adeptness, memorization, fast calculation, or aptitude are not anymore skills to seek for in a designer or reasons to admire in a designer as to be called a genius. The focus has shifted far away from what it used to be towards new territories. In the process many take advantage of the ephemeral awe that the new computational tools bring to design by using them as means to establish a new concept or form only to be revealed later that their power was based on the tool they used and not their own intellectual ability. After all, the tool was developed by somebody else, the programmer who discovered the tool’s mechanism, and should, perhaps, be considered instead the innovator.

As a result of the use and abuse of design tools, many have started to worry about the direction that design will take in the next years. As one-by-one all design tasks are becoming computational, some regard this as a danger, misfortune, or innapropriation of what design should be and others as a liberation, freedom, and power towards what design should be: i.e. conceptualization. According to the latter, the designer does not need to worry anymore about the construction documents, schedules, databases, modeling, rendering, animation, etc. and can now concentrate on what is most important: the concept. But what if that is also replaced? What if one
day a new piece of software appears that allows one to input the building program and then produces valid designs, i.e. plan, elevation, sections that work. And, worse, what if they are better than the designer would ever do by himself or herself? (Even though most designers would never admit publicly that something is better than what they would design, yet what if deep inside them they admit the opposite). What then? Are we still going to continue daemonizing the computer and seeking to promote geniuses when they really don’t exist?

If that ever happens, then obviously the focus of design will not be in the process itself since that can be replaced but rather in the replacement operation itself. The new designer will construct the tool that will enable one to design in an indirect meta-design way. As the current condition indicates, the original design is laid out in the computer program that addresses the issues not in the mind of the user. If the tool maker and the tool user is the same person then intentionality and randomness can coexist within the same system and the gap can be bridged. Maybe then the solution to the Chinese room paradox is not inside or outside the room but rather in the passage that connects the two.

References
1. Searle, J., Minds, Brains and Programs, Behavioral and Brain Sciences, 1980, 3, 417-57

Responses
‘Letters to the Editor’ and responses and reactions to ‘Letters to the Editor’ of up to 1000 words can be uploaded to the IJAC paper submission system at http://architecturalcomputing.org/openconf/openconf.php
Begin the title of the document with the word ‘Letter’

Kostas Terzidis
Harvard University
Graduate School of Design
48 Quincy Street Cambridge MA 02138
kostas@gsd.harvard.edu
Announcements
**eCAADe 2008: 26th Annual Conference**

Theme: Architecture 'in computero': practice, methods and techniques  
Dates: 17th to 20th September 2008  
Host: The Higher Institute of Architectural Sciences, Henry van de Velde of The College of Design Sciences, University College of Antwerp, Belgium

Outline:
In education, which by definition should prepare students for the future, the constantly evolving CAAD metaphor is provoking a challenge. It is not surprising that this challenge has lead to differing opinions as to how CAAD should be taught. Questions such as how advanced research results can be incorporated in teaching, or if the Internet is provoking self-education by students, are in striking contrast with the more fundamental issues such as the discussion on analogue versus digital design methods. Is CAAD a part of design teaching or is it its logical successor in a global E-topia? The integration of CAAD education in the wider field of research and design topics will make it at least greater than the sum of its parts and could be the key to boosting this technology for the future.

**Web Site:** [http://www.ecaade08.be/welcome.html](http://www.ecaade08.be/welcome.html)  
**Contact:** ecaade08@ha.be

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**ACADIA 2008**

Theme: Silicon and Skin - Biological Processes and Computation  
Dates: 16th to 19th October 2008  
Host: Digital Design Consortium in the School of Architecture and Computer Science at the University of Minnesota

Outline:
The upcoming conference entitled Silicon + Skin: Biological Processes and Computation fosters design work and research from the worlds of practice and academia which lie at the intersection between design, biology, and computation. More specifically, this conference seeks to identify and examine current trends in digital design technologies developed and applied in the framework of biologically inspired processes and digitally assisted sustainable design.

**Contact:** conference@acadia.org
SiGraDi 2008

Theme: Digital Graphics - Integration and Development
Dates: Notification of Acceptance 11th August 2008
Conference held 1st to 5th December, 2008
Host: Havana, Cuba - Instituto Superior Politécnico “José Antonio echeverría”

Outline:
The 2008 SiGraDi conference will be held in the Palacio de las Convenciones in La Habana, Cuba

Web Site and contact: http://sigradi.uchilefau.cl/

CAADRIA 2009: 14th Annual Conference

Theme: Between Man and Machine - Integration, Intuition, Intelligence
Dates: 22–24 April, 2009
Location: Yunlin, Taiwan, ROC.

Web Site and contact: http://www.caadria2009.org/main.html

CAADfutures 2009

Location: Montreal, Canada
Dates: 17–19 June 2009, preceded by 2 days of Ideation and Digital Creativity workshops
Deadline for abstracts: 10 November 2008
Draft papers: 15 January 2009
Final papers: 20 April 2009
Location: Montreal, Canada

Outline:
Recently declared a UNESCO City of Design, Montreal will be proud to offer its hospitality to the CAAD Futures09 conference, which will surely contribute to its already known reputation as a city of new technology.
Taking advantage the fact the Faculty is hosting this international event, the themes and subjects will be open for different disciplines: from design to architecture; from interaction design to built heritage reconstruction and conservation.

Web Site: www.2009.caadfutures.org
Contact: temy.tidafi@umontreal.ca