

Engaging First Year Students with Intellectual Property

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Abstract

Since intellectual property is so important to engineers, creating enthusiasm from the beginning of their engineering studies is imperative. Since first year students have not learned how to apply technological concepts to real life, demonstrating intellectual property could be a challenge. To engage first year engineering students in the concept and the value of intellectual property, students were introduced to basic concepts and applications. Different concepts were applied to real life examples allowing them to interface with technology from an intellectual property perspective. This paper highlights not only patents, but also trademarks and trade secrets.

1. Introduction

Intellectual Property is important to future engineers because they will not only be the Creators, Designers, and Developers of Intellectual Property, but also the Managers and Users of Intellectual Property. Not only will they need to conceptualize what intellectual property is, but they will need to become familiar with their rights in regard to intellectual property. In fact, in their future careers, engineers may be confronted with contracts that have intellectual property specific agreements. For example, a company may want to retain intellectual property rights and require an engineer to sign over the intellectual property rights of their discoveries and inventions. Additionally, future engineers need to be aware that when they sign a Non-Disclosure Agreement, those Trade Secrets should not be shared. With intellectual property knowledge, the engineer will know how to protect both their own work and the property of their future employers. Intellectual property is often developed within a large plan or development. A discovery or invention may be broken into several parts, improved on over time, hidden by use of trade secrets, or marketed by means of trademarks.

Engineering instructors include instruction about patents in their classes, but said instruction is often limited to upper level classes [1,2,3,4] or held across multiple sessions [1,2,3,4,5,6,7]. (In the current case, the lecture was limited to 50 minutes and delivered to first year students with little technical knowledge.) One can, however, glean some teaching principles from these authors. Van Treuren, Jean, and Fry [7] view teaching patents as a method “to introduce students to the role of patents in the day to day life of an engineer and to give them an appreciation for economic value of the intellectual property produced by engineers.” Petroski [8] presented patents to illustrate the design process. He presented students with paper clip patents from the twentieth century and had them redesign the paper clip and write a technical report about the process. Although this involved presenting patents in an interactive manner, it required several sessions. Like Petroski, Brown [5] used a simple design—barbed wire—in order to convey the complexities of inventions and patents. During Brown’s two to three hour workshop he demonstrated the need for prior art and introduced patent searching. He drew his students in by having them design barbed wire using pipe cleaners. Because of the simple design of the invention, it was easy for all students to understand, even without a technical background. Schaefer and Panchal [4] advocate using patents as a method to engage students in ‘deep learning.’ So, it is useful to draw students in by (1) introducing the role of patent in day to day life; (2) using simple design to convey complexities; (3) using patents to engage students in ‘deep learning.’ According to Bentz [9], ‘deep learning’ is “at once emotional and intellectual,

mental and physical, social and personal, totally unique yet freely shared.” While ‘deep learning’ utilizing balance, inclusion, and connection [10] can be the ideal, on the practical level, active learning was employed in this session.

Garris [1] outlines four propositions for integrating patents into the undergraduate curriculum. These include 1) “Optimal Design is an Integrative Process,” 2) “Ethics of Design in Competitive Industry are Intricate,” 3) “Innovation in a Litigious Environment can be Dangerous,” and 4) “Patent Rights are Valuable Assets.”

From this prior art we see that in order to draw students into the complexity of intellectual property we should use three principles: 1) introduce the importance of intellectual property in the daily life of the engineer; 2) use simple design to convey complexities of the patent system; 3) use patents to engage students in active learning (instead of the idealized ‘deep learning’). Teaching intellectual property (following Garris’ [1] suggestions) should convey, A) “Optimal Design is an Integrative Process,” B) “Ethics of Design in Competitive Industry are Intricate,” C) “Innovation in a Litigious Environment can be Dangerous,” and D) “Patent Rights are Valuable Assets.” I add here, E) Patents are a part of a portfolio of intellectual property rights. These five themes are summarized in Table 1.

Table 1. Key Themes in Teaching Intellectual Property

Corresponding Letter	Theme	Covered in Example
A	Optimal Design is an Integrative Process	3, 4, 5, 6, 7
B	Ethics of Design in Competitive Industry are Intricate	4, 6
C	Innovation in a Litigious Environment can be Dangerous	5, 7
D	Patent Rights are Valuable Assets	1, 7
E	Patents are a part of a portfolio of intellectual property rights	1, 2, 3, 4, 5, 7

2. Methodology

At the beginning of the lecture, the importance of intellectual property in the daily life of the engineer along with the introduction of intellectual property. This principle was further advanced with the example of WD-40 which most engineering students probably have used but not thought about the intellectual property complexity. This example begins to pique their interest. As they delve into the examples and physically touch the inventions, the students are drawn into deep learning and thought about the complexity of intellectual property.

Simple examples were then introduced to convey various aspects of intellectual property learning. The previous studies only covered patents but this lecture covered not only patents but

also trademarks and trade secrets, because products should be designed with consideration of not only the invention, but also its marketability using trademarks, and deciding what should be held back as a trade secret.

Since freshmen engineers have little technical experience, diving into disclosures or even patent classifications would be challenging for them. A lecture which strictly presents intellectual property as a theory would not necessarily convey a deep understanding of patents. Instead, finding inventions that tie into a simple understanding of the world around them and examples that illustrate concepts of product development enables the students to understand underlying principles of product design and development. In order to cultivate students' engagement in the subject, active learning techniques are used. McKeachie [11] defines active learning: "We assume that the more a student is meaningfully engaged in the task, the more she or he will learn. Our conceptualization of student involvement in self-regulated learning assumes that the student is an active learner. Self-regulated learning is a combination of cognitive and metacognitive involvement with a task as well as motivated involvement with a task." Additionally, Bonwell and Eisen [12] propose this definition of active learning: "active learning be defined as anything that involves students in doing things and thinking about the things they are doing." Prince [13] further defines active learning "as any instructional method that engages students in the learning process. In short, active learning requires students to do meaningful learning activities and think about what they are doing."

Active learning must be preceded by the introduction of basic concepts which can then be incorporated into the active learning. Therefore, this active learning activity about intellectual property was preceded by a lecture introducing intellectual property within the context of an engineer's utilization of and creation of it. The active learning was set up in a way to convey not only the basic concepts of intellectual property but also the methods by which the inventions could be applied to product design, as well as introducing industrial niches. Inventions were chosen that could be easily understood.

2.1. Review of Intellectual Property Example

A lecture introducing and conceptualizing intellectual property was followed by a brief in-class exercise testing the students' knowledge. Trademarks of a well-known product were shown and the students were asked to define what the pictures represented; namely, trademarks of WD-40. Then a disclaimer from the WD-40 website was shown, discussing what was not in the product; this demonstrated a trade secret (as the formula WD-40 is a trade secret.) Finally, a design patent was shown and a can of WD-40 with its EZ-Reach® patented design was passed around the classroom.

Review of IP



Figure 1. Review of IP using trademarks, trade secret, and patent.

The following exercises involved showing selected images on the screen and passing around patent and trademark documents as well as the actual inventions.

2.2. Example 1: Cotton Candy Grapes

The beginning example was of a plant patent. A discussion about how plants and fruit could be patented ensued. The patent for Cotton Candy grapes was shown. It is notable that the name “cotton candy” does not display on the patent. Since, after 20 years, anyone could grow these grapes, how could they be protected? (Many producers now grow the “Honeycrisp” apple because its patent has expired.) To address this problem, inventors have now begun trademarking the names of their new plants. Then, the trademark for “Cotton Candy” grapes was introduced. How long does that trademark last? Indefinitely, as long as the trademark is renewed. This example conveyed principles D and E.

Cotton Candy Grapes

United States Plant Patent
Cane

(10) Patent No.: **US PP23,399 P2**
(11) Date of Patent: **Feb. 15, 2012**

(50) CLAIMS

(51) Int. Cl. (2006.01): **A01H 05/00**

(52) U.S. Class: **201/207**

(54) Title of Invention: **Cotton Candy Grape**

(56) References Cited

(71) Applicant: **David Cane, Inc.**

(72) Inventor: **David Cane, Inc.**

(73) Assignee: **David Cane, Inc.**

(74) Attorney: **David Cane, Inc.**

(75) Filing Date: **Aug. 24, 2010**

(76) Priority Date: **Aug. 24, 2010**

(77) Foreign Patent No.: **None**

(78) Foreign Application No.: **None**

(81) International Class: **A01H 05/00**

(82) International Class: **A01H 05/00**

(83) International Class: **A01H 05/00**

(84) International Class: **A01H 05/00**

(85) International Class: **A01H 05/00**

(86) International Class: **A01H 05/00**

(87) International Class: **A01H 05/00**

(88) International Class: **A01H 05/00**

(89) International Class: **A01H 05/00**

(90) International Class: **A01H 05/00**

(91) International Class: **A01H 05/00**

(92) International Class: **A01H 05/00**

(93) International Class: **A01H 05/00**

(94) International Class: **A01H 05/00**

(95) International Class: **A01H 05/00**


(96) International Class: **A01H 05/00**

(97) International Class: **A01H 05/00**

(98) International Class: **A01H 05/00**

(99) International Class: **A01H 05/00**

(100) International Class: **A01H 05/00**



COTTON CANDY

Word Mark
Goods and Services: **COTTON CANDY**
Standard Characters Claimed: **IC 031, US 01 045, G & S:**
Mark Drawing Code: **(4) STANDARD CHARACTERS**
Serial Number: **05110179**
Filing Date: **August 29, 2010**
Current Basis: **1A**
Original Filing Basis: **1B**
Published for Opposition: **August 30, 2011**
Registration Number: **419891**
International Registration Number: **1091450**
Registration Date: **March 6, 2012**
Owner: **(REGISTRANT) International CALIFORNIA 93375656**
Type of Mark: **TRADEMARK**
Register: **PRINCIPAL**
Affiliate Text: **SECT 15, SECT 6 (5-YR)**
Live/Dead Indicator: **LIVE**

Figure 2. Cotton Candy Grape patent and trademark. US PP23, 399 and Reg.1436702.

2.3. Example 2: WD-40

The next example was again of WD-40. This time the students were shown several trademark documents as well as a copy of the design patent, as an actual can of WD-40 with the design was passed around. This conveyed principle E.

WD40

WD-40

WD-40 EZ-REACH

United States Design Patent
 (11) Patent No.: US D723,368 S
 (12) Date of Patent: Mar. 3, 2015

Word Mark WD-40
Goods and Services IC 082, US 086 011 016, G & S: Protective protective coatings for metal and other surf
 FIRST USE IN COMMERCE: 1963/731
 IC 064, US 081 066 015, G & S: All purpose
 FIRST USE IN COMMERCE: 1963/731

Mark Drawing Code (3) DESIGN PLUS WORDS, LETTERS, A
Design Search Code 25.01.03 - Shields or crests with letters, pe
Serial Number 85646731
Filing Date February 12, 2013
Classified Basis 1A
Original Filing Basis 1A
Published for Opposition July 30, 2013
Registration Number 4417715
Registration Date October 15, 2013
Owner (REGISTRANT) WD-40 Manufacturing Company CORPORATION 9115
 BUSINESSPARK AVENUE, San Diego CALIFORNIA 92131
Attorney of Record Kathleen A. Brown
Also 0676603,3010487,3416712
Registration 0676603,3010487,3416712
Description of Mark The color(s) blue and yellow is/are claimed as a feature of the mark. The mark consists of A yellow
 shield with blue letters inside "WD-40".
Type of Mark TRADEMARK
Register PRINCIPAL
Mark Text SECT 15 SECT 8 (5-YR)
Live/Dead Indicator LIVE

Word Mark WD-40 EZ-REACH
Goods and Services IC 062, US 086 011 016, G & S: Protective coatings for surf prevent
 FIRST USE: 2015/0710, FIRST USE IN COMMERCE: 2015/0710
 IC 064, US 081 066 015, G & S: All purpose penetrating and lubricat
 lubricant and penetrant, namely, a flexible wand sold as a complete
 lubricant and penetrant, FIRST USE: 2015/0710, FIRST USE IN COM
Standard Characters Claimed
Mark Drawing Code (4) STANDARD CHARACTER MARK
Serial Number 87698736
Filing Date November 27, 2017
Classified Basis 1A
Original Filing Basis 1A
Published for Opposition September 4, 2018
Registration Number 5609944
Registration Date November 29, 2018
Owner (REGISTRANT) WD-40 Manufacturing Company CORPORATION C
 CALIFORNIA 92131
Attorney of Record Kathleen A. Brown
Also 0676603,3010487,3402661,AND OTHERS
Registration 0676603,3010487,3402661,AND OTHERS
Type of Mark TRADEMARK
Register PRINCIPAL
Live/Dead Indicator LIVE

Figure 3. WD40 Trademarks and patent. Reg.4417715, 5609944, Patent US D723,368.

2.4. Example 3: Solar Lights--Katsaros

The next example was of a solar light by the inventor Katsaros and the company Nokero. It was discussed how this inventor intended his patent for areas in Africa where households seldom had electricity for lights in the evening. The invention was passed around with the trademark and various patents for different designs. This was followed by a short discussion about the evolution of invention designs. This example conveyed principles A and E.

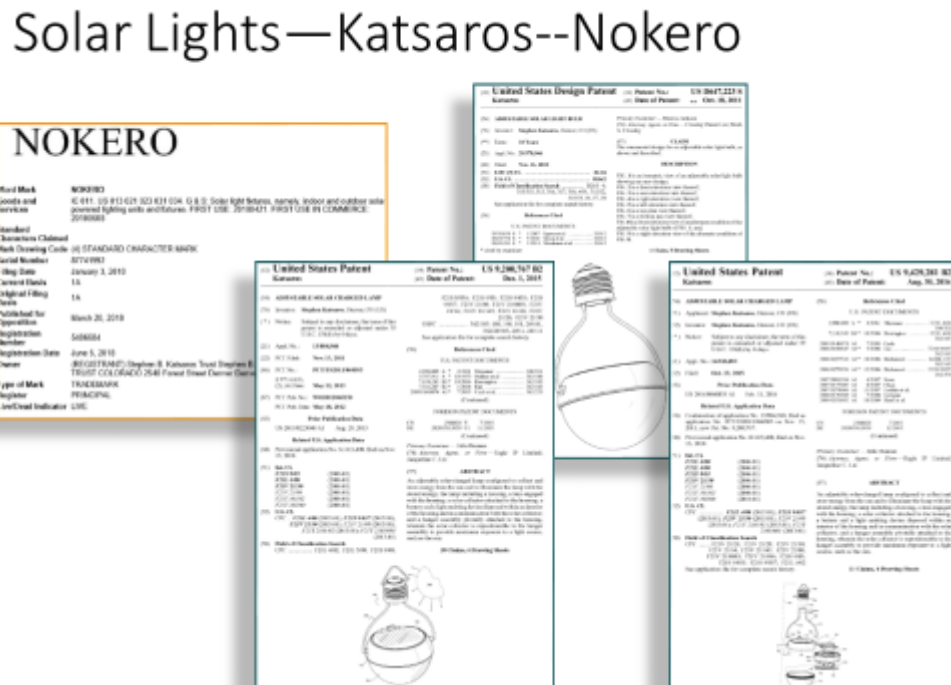
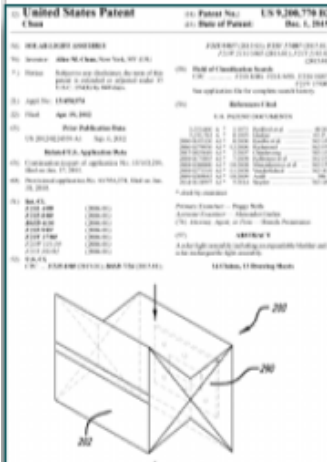
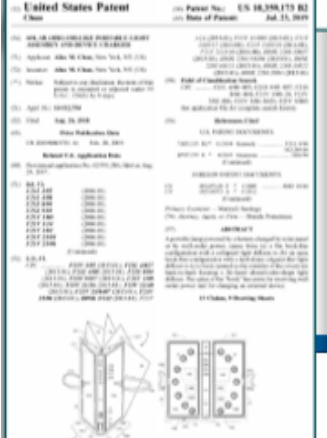


Figure 4. Solar Lights—Katsaros—Nokero. Trademark and patents. Reg. 5486684, Patents US 9,200,767, US D647,223, US9,429,281.


2.5. Example 4: Solar Lights—Alice Chun

The next example was of a solar light designed by Alice Chun called Solight. A model of the light was passed around with the trademark and patents. Her development and marketing of her product was also discussed. Her product was developed to send to areas who had had their electricity disrupted through natural disasters. The collapsibility allowed for many to be shipped in a small container. Additionally, the air inside the box, once expanded, would allow the light to float. Her invention was contrasted with the previous example. It was discussed how products could exist within the same segment and how trademarks help distinguish similar goods from others. Principles A, B, and E were highlighted.

Solar Lights—Alice Chun: Solight

<https://solight-design.com/>



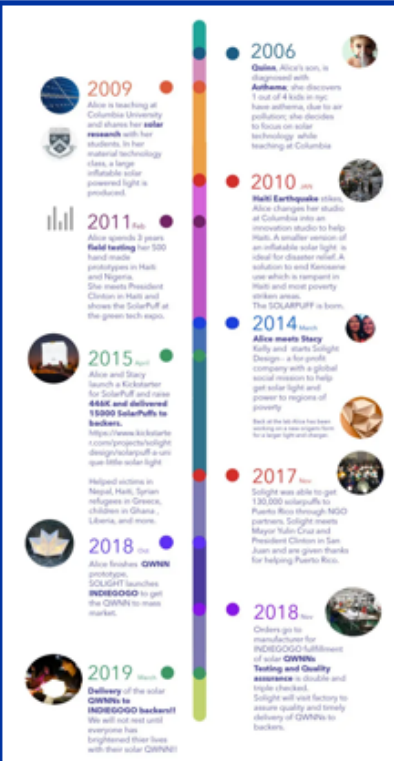


Figure 5. Solar Lights—Alice Chun: Solight. Patents, trademark, and timeline. Patents US 9,200,770, US 10,359,173. Reg.5119821.

2.6. Example 5: Freshpaper

The next example was of Freshpaper developed by Kavita Shukla (who was inspired by her grandmother). It was discussed how although the idea came from her grandmother, the inventor had to work for years to develop just the right paper. She also registered her trademark to prevent counterfeits. However, if one searches Amazon.com one can find her product as well as counterfeits. The invention as well as the patent and trademark were distributed. This example conveys principles A, C, and E.

Freshpaper: Skukla

<https://www.freshglow.co/>


United States Patent Shukla		(40) Patent No.: US 6,372,220 B1 (45) Date of Patent: Apr. 16, 2002	
54) FENUGREEK IMPREGNATED MATERIAL FOR THE PRESERVATION OF PERISHABLE SUBSTANCES 76) Inventor: Kavita Shukla , 10423 Popkins Ct., Woodstock, MD (US) 21153 *) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days. 21) Appl. No.: 09/776,149 22) Filed: Feb. 5, 2001 51) Int. Cl. ⁷ A61K 35/78 52) U.S. Cl. 424/195.1, 424/725, 424/773, 424/774, 424/775, 424/776, 424/777 58) Field of Search 424/725, 773, 424/774, 775, 776, 777, 778, 779 56) References Cited U.S. PATENT DOCUMENTS 3,648,428 A * 3/1972 Colburn 5,895,295 A * 1/1999 Bailey et al. 5,997,877 A * 12/1999 Cheng 6,001,390 A * 12/1999 Byer et al. 6,013,394 A * 1/2000 Todd FOREIGN PATENT DOCUMENTS AU 1992/407965 * 10/1992 JP 307 130 136 A * 10/1982	JP 400 280 299 A * 10/1998 OTHER PUBLICATIONS Prasad et al., "Effect of spices on the growth of red halophilic cocci isolated from salt cured fish and solar salt", Food Research International, 2000, vol.33, No.9, pp. 782-788,* * cited by examiner Primary Examiner—Leon B. Lankford, Jr. Assistant Examiner—Ruth A. Davis ABSTRACT (57) The present invention to a material that is coated with or soaked in a suspension of a botanical extract such that particles of said natural botanical extract are in contact with, embedded on, or embedded within the material. The present invention can be used to preserve perishable substances such as edible substances or foods by extending their freshness, shelf life or suitability for consumption by living organisms. Botanical extracts suitable for the present invention include botanical extracts that have anti-bacterial, anti-fungal, antiviral or other preventative or curative properties. The botanical extract coated material described in the present invention is suitable for applications such as the packaging and preservation of perishable substances such as fruits and vegetables, meat products, dairy products, edible substances, non-edible substances and other perishable substances. Specifically, the material is impregnated with an extract of Fenugreek (<i>Trigonella foenum-graecum</i>). 24 Claims, 2 Drawing Sheets		
		FRESHPAPER Word Mark FRESHPAPER Goods and Services IC 016, US 002 805 822 023 026 037 038 058, G & S Food wraps Standard Specifically papers, namely, vegetable parchment, for use in food use Characters Claimed Mark Drawing (4) STANDARD CHARACTER MARK Code Serial Number 58162135 Filing Date October 15, 2015 Current Basis 1A Original Filing Basis 1A Published for Opposition July 16, 2016 Opposition Number 5871489 Registration Date October 1, 2019 Owner (REGISTRANT) Freshglow, LLC DBA THE FRESHGLOW Co. LIME Type of Mark TRADemark Registrar PRINCIPAL Live/Dead Indicator LIVE	

Figure 6. Freshpaper: Shukla. Patent US 6,372,220 and Trademark Reg.5871489.

2.7. Example 6: Coffee Cup Holders

The next example was of cup holders for coffee. Cupholders were passed around. Most students were familiar with Panera or Starbucks coffee holders. The first patent for the Panera coffee holder was passed around. Then, noting that the Starbucks' cupholder had a different patent number printed on it, a second patent was passed around. That second patent was discussed as it covered not the holder itself but the technology for mass producing cupholders. This example conveyed principles A and B.

Coffee Cup Holders

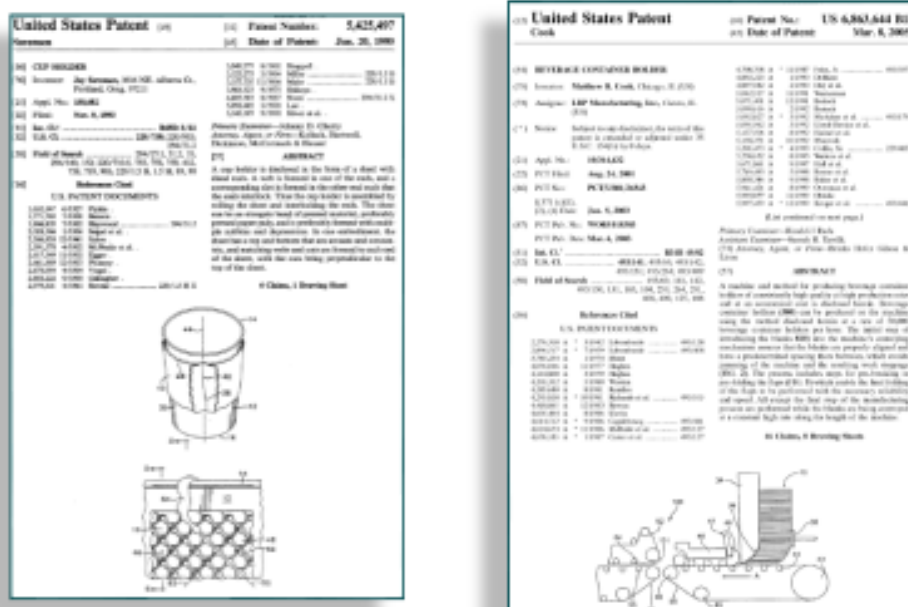


Figure 7. Coffee Cup Holders. Patents, US 5,425,497, US 6,863,644.

2.8. Example 7: Brochure for Apple v. Samsung Decision

The final example was a brochure that had been created for the Apple v. Samsung decision. This brochure allowed us to have a discussion about not only iPhone patents but also of the strategy behind developing a technology. It is obvious from the patents in the decision that many different patents went into the iPhone: the shape, the design, the software, the arrangement of icons (and many more not in the litigation). This example conveyed principles A, C, D, and E. Notably missing was B, because Samsung was found to have copied rather than creating a design-around.


Patent No.	Claim Infringed	Description
7,469,381	19	"bounce back effect"
		"pinch to zoom" & scrolling (on screen navigation)
7,844,915	8	
7,864,163	50	"tap to zoom"
D618,677		iPhone design
D593,087		iPhone design
D604,305		icon arrangement on iPhone & iPad
D504,889	no infringement	iPad

United States Patent
7,469,381 B2
Date of Patent: Dec. 13, 2011

Abstract
A method for zooming in on a graphical user interface (GUI) of a device. The method includes receiving a first touch input on a GUI element, determining a zoom factor based on the first touch input, and zooming in on the GUI element based on the zoom factor.

United States Design Patent
D618,677
Date of Patent: May 26, 2010

Abstract
A design for a handheld electronic device, including a front face with a display area and a home button, and a back face with a camera lens and a microphone.




United States Patent
7,844,915 B2
Date of Patent: Dec. 13, 2011

Abstract
A method for zooming in on a graphical user interface (GUI) of a device. The method includes receiving a first touch input on a GUI element, determining a zoom factor based on the first touch input, and zooming in on the GUI element based on the zoom factor.

United States Patent
7,864,163 B2
Date of Patent: Dec. 13, 2011

Abstract
A method for zooming in on a graphical user interface (GUI) of a device. The method includes receiving a first touch input on a GUI element, determining a zoom factor based on the first touch input, and zooming in on the GUI element based on the zoom factor.



United States Patent
7,864,163 B2
Date of Patent: Dec. 13, 2011

Abstract
A method for zooming in on a graphical user interface (GUI) of a device. The method includes receiving a first touch input on a GUI element, determining a zoom factor based on the first touch input, and zooming in on the GUI element based on the zoom factor.

United States Design Patent
D593,087
Date of Patent: May 26, 2010

Abstract
A design for a handheld electronic device, including a front face with a display area and a home button, and a back face with a camera lens and a microphone.



Figure 7. Excerpt from handout: “Apple v. Samsung 24Aug12. Explore the Patents involved in that decision.”

3. Conclusion

Students can be engaged with intellectual property and the ideas of patents, trademarks, and trade secrets. If the examples begin with a simple design that ties into day to day life, students can realize the economic value of intellectual property. Core principles can be conveyed to students using these building blocks.

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