ARE SOFTWARE PATENTS “BAD”?

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IT DEPENDS…

• Likely to think yes if you are
  – A free or open source SW developer
  – A small startup with limited resources
  – A target of a patent troll “extortion” effort
• Likely to think no if you are
  – A big firm with a portfolio you license widely
  – A startup seeking VC $ that has a key patent
  – An investor in issued patents looking for license fees (aka a “troll”)

May 22, 2013 ICSE Keynote
WHERE I STAND

• *Benson Revisited* article (1990) argued vs. patentability of program-related inventions
• Conducted 2 surveys at ACM conferences asking what programmers thought about SW patents (mostly vs)
• *Manifesto* article (1994, with Mitch Kapor) argued vs
• Recent work with Stu Graham, Rob Merges, & Ted Sichelman reporting on survey results as to roles of IP in high tech start-ups
  – 2/3 SW starts have no patents; those that do rate patents as least important means of competitive advantage
• Amicus brief to SCT on behalf of some entrepreneurs & Kaufmann Foundation in *Bilski* to narrow patent SM
AMERICAN PERSPECTIVE

• I confess upfront that this talk will focus on U.S. developments
• This is what I know best
• But parallel developments have occurred in other nations, such as
  – Recent New Zealand bill vs. SW patents under consideration
  – German Parliament voted resolution against SW patents
OVERVIEW OF TALK

• 1960s-mid-1980s: why did most think software patents were or would be “bad”?  
• Mid-1980s-2006: why did tide shift in favor of software patents (even though mixed views within the industry) & why did many developers take advantage of the opportunity to get them?  
• 2006-now: why has the tide shifted again toward doubts or hostility about software patents?  
• What solutions have been proposed to address “bad” software patent problem?
PATENTABILITY

• To be eligible for a patent, an inventor must submit an application to the patent office, which will be examined for:
  – Eligible subject matter (SM)
    • Machine, manufacture, composition of matter, & processes
    • All processes? Or only technological ones?
  – New, nonobvious, & useful
  – Adequate claims, proper disclosures
• Issued patent presumed valid, good up to 20 yrs
MID-1960’s VIEWPOINTS

• PTO doubted patentability of SW:
  – SW=text but “printed matter” ineligible for patents
  – Processes embedded in SW were often “mental processes,” capable of being done in the mind
• 1966 Presidential Commission recommended vs. SW patents, saying copyright would adequately protect them
  – even though Cop. Office then not sure SW was ©’ble
• IBM, Honeywell, other computer makers were vs. SW patents back then
  – Impediments to SW that could run on their machines
GOTTSCALK v. BENSON (1972)

- Benson (Bell Labs ee) developed a method for transforming binary coded decimals to pure binary form
  - 1 claim was for the method in general terms
  - 1 claim mentioned hardware elements (re-entrant shift registers)
- SCT: not patentable SM (9-0 vote)
  - Mathematical algorithm = scientific principle
  - Claim would preempt all uses of algorithm in all fields
  - Did not transform matter from 1 form to another
PARKER v. FLOOK (1978)

• Flook claimed an improved method for updating alarm limits for catalytic converter process

• Novel & nonobvious algorithm
  – Field of use limitation in claims (only use of that algorithm in catalytic conversion process)
  – Some post-solution activity (adjusting alarm limits so plant wouldn’t blow up)

• SCT: not patentable SM (6-3)
  – Field of use, insignificant post-solution activity not meaningful limits; worry about artful claim drafting
DIAMOND v. DIEHR (1981)

• Diehr claimed patent for improved method for curing rubber, which included SW as component
  – SCT affirmed patentability (5-4) because claim was for a traditional manufacturing process
  – Dicta: everything under the sun made by humans OK

• Initially seemed like a narrow decision
  – Only when SW was part of a conventional mfg process
  – PTO treated it so, denied many SW applications
FEDERAL CIRCUIT

• When PTO denies patents, CAFC reviews
• CAFC took an increasingly an expansive view of patentable SM, especially as to SW
  – Freeman-Walter-Abele test in 1980’s: if claim does not wholly preempt use of algorithm, OK as to SM
  – A few claims also rejected as mental processes (e.g., In re Meyers: expert system for modeling medical diagnoses)
STATE STREET BANK (1998)

• Signature Financial had gotten a patent on a data processing system for particular financial structure having certain tax advantages
• SF sued SSB; DCt ruled patent was invalid under SCT precedents & earlier cases holding business methods to be unpatentable
• CAFC: business methods **ARE** patentable SM
  – Indeed, everything under the sun made by humans = patentable SM as long as it produces “useful, concrete & tangible result”
FLOODGATES OPEN

• Tax planning methods
• Jury selection methods
• Dating methods
• Meditation methods
• Method for teaching experiential writing
• Method for assessing person’s character
• Process of relaying story having unique plot
• Under State Street Bank, all seemingly pass SM threshold (even though no link to technology)
  – Though claims might be rejected for lack of novelty, obviousness or overbreadth
UPTICK IN SW PATENTS

• Partly because patent lawyers were strongly recommended getting patents, if only for defensive purposes
• Partly due to desire by some to have some to ensure freedom to operate
• Partly owing to VC interests in patents as some assurance that firm might attain competitive advantage
• Partly because © became “thin” after CA v Altai
SW PATENT PROBLEMS

- Patents on non-novel techniques
- Patents on trivial (obvious) innovations
- Functional claiming
- Overbroad claims
- Lack of meaningful disclosure
- Move from defensive to offensive uses
- Rise of open source SW (easier to detect)
- Rise of secondary markets for patents purchased by non-practicing entities
SCT INTEREST SINCE 2006

• SCT took appeal in LabCorp. v. Metabolite on SM issue
  – M claimed LC induced infringement by reporting to doctors levels of homocysteine in blood sample, which doctors could correlate with vitamin deficiency, thereby infringing the patent
  – SM issue not cleanly presented below, so SCT dropped case
  – Justice Breyer wrote dissent saying patent was for discovery of natural phenomenon; invalid on SM grounds

• Microsoft v. AT&T: 5 Justices asked whether software was patentable (even though issue not in the case)

• eBay v. MercExchange: Kennedy concurrence for 4 Justices called into question business method patents
  – Overturned CAFC automatic injunction rule if patent infringed
  – Damages may be sufficient as equitable matter
PTO RENEWS SM REJECTIONS

In response, PTO began rejecting claims on patent SM grounds:

- Bilski: method for managing risks of energy consumption based on weather uncertainties
- Borton: method for business projections
- Ferguson: method for marketing a product
- Barnett: method of coupon distribution via Internet
- George: method for planning activity levels after rapid time zone changes; chart depicting
IN RE BILSKI

• Bilski sought a patent on a method of hedging risk in fluctuation of commodity prices
• PTO rejected on SM grounds, Bilski appealed
• Under SSB, no reason to doubt that Bilski’s claim would satisfy SM standards
• On appeal, CAFC articulated new SM test:
  – Did inventor claim a machine?
  – Did inventor claim a transformation from 1 state to another?
  – Bilski did not meet either, so CAFC upheld denial
WIDELY DIVERGENT VIEWS

• Everything under the sun is patentable SM
  – Weed out bad patents with 102, 103, 112
• Only traditional manufacturing processes are patentable; no evidence Congress intended o/w
• Constitution limits Congress’ power to those processes in “useful arts” (= technology)
• Need for some physical transformation or technical effect to be patentable SM, but SW OK
• Need for broad conception as to technological processes (e.g., applied economics OK)
REASONS NOT TO LIMIT

• “Technology” is incapable of precise definition, so not worth trying to weed out on SM grounds
• Don’t limit patents to yesterday’s technologies (i.e., manufacturing); risk of harming today’s most significant advances
  – New technologies not “transformative” in physical way, as previous advances generally were
• Many advances embodied in SW, biotech are often expensive to develop, cheap to imitate; need patent investment incentives
• Trying to limit patent SM will lead only to “artful drafting” to bypass it
BILSKI v KAPPOS

• SCT took Bilski’s appeal
• Clear from oral argument Bilski was going to lose; only ? was on what rationale
• Like the CAFC, the SCT was not all of one mind on this
• Ultimately held Bilski’s claims were too abstract to be patent SM
• Revived Benson & Flook as important precedents, also too abstract
WHAT IMPLICATIONS FOR SW?

• Despite FSF objections to “sw patents,” unlikely CAFC or SCT would outlaw them all
• *Diehr*-like claims for programs as elements of traditional manufacturing process are safe
• Claims for methods that achieve technical effects will probably be patentable SM
  – *Abele* would pass this test; x-ray system better
  – But *State Street Bank* would probably flunk this test because result of this process was generation of share price #s
IMPLICATIONS FOR SW

• Software, as such, is probably not patentable SM, even though *In re Beauregard* said object code on disk = patent SM
  – PTO, SCT likely to say program code is ©’ble, not patentable, SM

• *Benson/Flook*-like claims: where innovation lies in algorithm/mathematical concepts, not patentable SM

• Other information innovations embodied in sw (e.g., data structures, UI designs) may not be patentable SM as too abstract
SOFTWARE: EASY ISSUES

• Not enough to claim field of use restriction
• Not enough to claim insignificant pre- or post-solution activity
  – How to measure “insignificance”? 
• Computer implementation of X function may be too abstract to qualify for patenting
  – Bessen & Meurer, Patent Failure discusses this
• Not patentable if preempts use of algorithm, as in Benson
  – SG insists that M-or-T is distinct inquiry from preemption inquiry; CAFC blurred the two
  – Even preempting within a field is a problem
SOFTWARE: EASY ISSUE?

• Method or apparatus claims?
  – SG seemed to suggest that apparatus claims for
    programmed computer to do X might satisfy SM
    requirements
  – SCT seems unlikely to find this acceptable, as it
    would be too easy to circumvent intent of SM ruling
    • Stevens, Breyer, and Roberts seemed very dissatisfied with
      SG’s argument on this issue
  – But if buy SG’s theory, does computer become new
    machine each time it plays a different CD of music?
    • Would digital music be patent SM as *Beauregard* claim?
SW: HARDER ISSUES

• What transformations will qualify?
  – *Diehr* was easy case because method transformed rubber & computer implementation arguably overcame under-, over-curing problem
  – What about data?
    • *Benson* involved transformation of data
    • Method to transform MP3 data to WAV?
    • Method of calculating mean item in group of items?
    • Method of presenting information (e.g., HTML)?
SW: HARDER ISSUES

• What does it mean to be tied to a particular machine?
  – SW may be component of x-ray or other particular machines, in which case claims likely to be OK
  – But merely being tied to a general purpose computer may not satisfy patent SM
    • *Fuzzysharp*: DCT granted SJ to D where claims only mentioned components of general purpose computer
  – Any middle ground?

• Does M-or-T provide the right framework?
  – Best argument in *Fuzzysharp* is that method is more efficient way to assess visibility of 3-D surfaces for graphics displays (reduces # of calculations)
OTHER SM CASES

• *Mayo v Prometheus* (2012): SCT held method of diagnosing treatment need by measuring metabolites in blood & adjusting dosage of drug unpatentable as discovery of principle of nature

• *Assn for Medical Pathology v Myriad*: SCT considering whether discovery of gene that predicts breast cancer risk is patentable SM or a product of nature
CLS BANK v ALICE CORP

• CAFC upheld patent on computerized trading platform designed to reduce settlement risk when trusted 3rd parties settle obligations
• SCT remanded for reconsideration in light of *Prometheus*
• Just recently CAFC decided that method and system claims were unpatentable on SM grounds, but disagreed on rationale
• Alice may ask SCT to review & decide when (if ever) SW innovations are patentable
POSSIBLE SOLUTIONS

• Court decisions striking down all or most SW patents is possible, but unlikely
  – PTO working on guidelines to clarify standard
  – Some issued patents are likely invalid
• Courts may take a closer look at novelty, nonobviousness, breadth of claims
• New post-grant review regime in PTO may help weed out “bad” SW patents
• Setting higher maintenance fees may deter trolls
• SHEILD Act in Congress
OTHER SOLUTIONS

• Defensive patent licensing pledges
• Open Innovation Network pooling
• Standard setting organization patent disclosure & RF or RAND commitments
• Antitrust scrutiny of those who have made RAND commitments and fail to abide
• Activism vs. “bad” SW patents
CONCLUSION

• People have been arguing about the patentability of SW for almost 50 years
• No evidence that SW patents have been “good” for the software industry
• But no evidence they have been ruinous either
  – Though patent “trolls” have extracted some rents, they have less leverage after eBay v. MercExchange re injunctions
• Patent portfolios, cross-licensing, & patent pools to protect open source help address SW patent problems
• Other patent reforms may be more important than SM
  – KSR as to obviousness standard
  – Improved post-grant review system to weed out “bad” patents
2008 Berkeley Patent Survey

- Survey of high technology entrepreneurs in 2008
- Predominantly software, computer hardware, biotech, & medical device firms
- Surveys mailed to @15K firms drawn from Dun & Bradstreet (D&B) & Venture Expert (VX) databases
- 1332 responses
  - 12% response rate for SW/HW, 24% for biotech/MD (correcting for returns, dead firms)
  - No statistically significant differences between respondents & non-respondents in firm characteristics, patenting activity
  - joint work with Stuart Graham, Rob Merges, Ted Sichelman
OWN OR APPLY FOR PATENTS?

• SW firms: @1/3 yes, 2/3 no (cf. non-SW firms: 82% yes, 18% no)
• But venture-backed SW cos more likely to patent
  – D&B firms: 24% yes
  – VX firms: 68% yes
• Firms that derive most of their income from products more likely to patent than service cos
• Product innovators more likely than process innovators to patent
• Consultant SW cos less likely to patent
  – Only 15% of consultant firms have/seeking patents
  – Yet innovation is as important to them as to other SW cos!
OWNING, LIC’G PATENTS

• Owning patents varies w/i SW industry sector:
  – 90% VX of Internet SW cos had/applied for patents
  – cf. only 21% of VX Internet content cos
• Of the 1/3 of SW cos that owned or applied for patents
  – @ 6 patents filed by SW co; 1 brought in at founding; 1 obtained by transfer
  – Cf. other firms: 18 patents filed for by co; 3 brought in at founding, 5 obtained by transfer
• SW firms also less likely to in-license patents
  – Only 9% reported this, cf. 43% of non-SW firms
WHY PATENT?

• For the 1/3 of SW firms that owned/seeking patents
  – protection vs. copying was most cited reason to patent (2.33 on 0-3 scale)
  – enhancing reputation (2.17) next
  – increasing likelihood of financing (1.96) & of IPO (1.97) next
  – prevent patent litigation & improve nego’g position (1.78)
  – ability to get licensing revenues less important (1.18)

• Non-SW patenters rated all reasons even higher (except as to enhancing reputation where same)
WHY NOT PATENT?

• SW firms that didn’t patent cited costs as most important reason not to
  – Cost to get patent was a significant factor
    • 64% cited these costs as impt, 28% as most impt
  – Cost to enforce also significant
    • 52% cited these costs as impt, 13% as most impt
• Costs were high: VX firms reported that last patent had cost $40+K, D&B reported $18+K, cf. non-SW firms $56+K
• Little difference between D&B and VX firms on reasons not to patent
OTHER FACTORS

• Desire not to disclose the innovation
  – An important reason NOT to patent for non-SW firms (48%), less so for SW firms (25%)
  – MOST important reason NOT to patent for non-SW firms (28%), cf. SW firms (8%)
  – Trade secrecy deemed adequate for 44% of non-SW firms, cf. 29% for SW firms

• Ease of inventing around
  – 46% of SW firms cited this, cf. 41% of non-SW firms
  – Most impt factor for 13% of SW firms
UNPATENTABILITY?

• 42% of SW firms cited unpatentability of last significant innovation as a reason NOT to patent
  – 24% cited this as the MOST impt factor
  – 2\textsuperscript{nd} most common answer after costs to obtain
  – Most important reason not to patent among the 2/3 firms that were non-patent holders

• Unclear what to make of this, but it is an interesting finding
  – SW patents have been controversial for decades
  – What kind of judgment underlies this perception?
    • Subject matter? Unrealistically high expectations about how invention standards? Concern about lack of novelty?
IMPTC TO COMPETITIVE ADV:
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IMPTC TO COMPETITIVE ADV?
D&B on left, VX on right

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- 1 = slightly

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- 1.57 ©
- 1.6 TM
- 1.66 secrecy
- 1.75 diffic of RE
- 1.5 patents
- 2 = impt
- 3 = very impt