IV.

Today's Interesting Websites: http://www.zillow.com – created by the inventor of Expedia.com

Neighborhood information: http://www.criminalsearches.com for state and local crimes (not federal)

Surf Addiction
Are you addicted to the Internet? *Psychology Today* offers the following quiz:

- Do you stay online longer than you intended?
- Given the opportunity, can you refrain from logging on?
- Have you neglected loved ones, chores, sleep, reading, TV, friends, exercise, hobbies, sex or social events because of the Internet?
- Are you spending 38 hours or more a week online?
- Do you feel anxious, bored, sad, lonely, angry or stressed before going online?
- Do you feel happy, excited, loved, calmed or confident while on the Internet?
- Do you favor interacting with friends and games over other Internet activities?

Give yourself a point for each Yes. 5-7: you're addicted. 3-4: watch it. 2-1: everything's OK.

The Internet is changing the way Americans live and work. 85% of Americans are online vs. 67% a few years ago. Average time spent online per week is nearly 20 hours vs. 9.4 hours in '00. Those who regularly use the Internet spend significantly less time reading books, magazines and newspapers, viewing TV and listening to the radio – although people still watch more TV in general. TV still is pre-eminent – researchers are amazed at just how many hours Americans watch TV – 30 plus hours per week.

40% of Americans say they spent less time with family last year due to 1) the Internet, and 2) TV (compared with 10% in 2006.

Web searching is catching up to email as the primary activity for US Internet users. Source: Pew Survey

Percent of users who each day:

Read email:	80
Search:	75
Read news:	55
Job-related work:	40
IM:	15
Banked:	26
Chat /Forum:	15
Booked travel:	20
Read blog:	15
Auction:	9

Is the Internet bad for you? Some reasons why it may be…
The direct experience of life is routinely crowded out by the simple imagery of living. This, in turn, becomes a synthetic ideal we try to live up to. We give up awareness, information and experience that

is not online. The technology acts to filter out nuance from the info it conveys – making things simpler, linear It raises false expectations for the real world beyond. Geographical distance is irrelevant. 'Here' and 'there' are disembodied notions. We live with less direct contact with nature and the sources of our knowledge.

The Internet transforms humans into consumers to meet the demands of a global market. It shapes your sensibilities into a unified state of mind, ready to confuse your needs with the advertiser's need to sell stuff.

Interestingly, 25% of Americans say they don't use the Internet. Some see no use for it. But among that group, nearly one in five has been a user in the past. Most Internet users cite technical reasons for going offline – they had computer or ISP problems. Another finding was among non-users, 20% live in households where someone else has a computer and goes online. These non-users were termed by researchers as 'evaders' – after factoring out drop-outs and evaders, about 1 in 6 Americans are truly disconnected – having no direct or indirect experience with the Internet.

How Important is the Internet?
Some say not very. It has grown spectacularly, but if it collapsed tomorrow, would most of us would go on with life in a way that would not be true if we could no longer drive cars (although the same might not be true of businesses)? Some say it has failed in two critical ways: 1) there are no Internet products so valuable that consumers would buy them. Instead, people pay for connectivity but not much else. It has become a gigantic white elephant with dazzling technological capabilities but depressing commercial realities. The ideal, desired solution of the companies that depend on the Internet's success is to let everyone download everything they want – music, films, books, etc. for free. This would induce people to buy faster computers and faster connections, but this isn't innovative – it's saving an industry by ripping off many others.

The second failure: it is not simple nor reliable. Ordinary consumers don't want to understand or delve into the mysteries of their appliances. They want to turn them on and have them work – all the time. They don't want it 'down' or not printing for inexplicable reasons. This dependability or simplicity is still elusive.

What is needed: true innovation. People will not buy what they don't need or want. The scarcity of innovation creates a vacuum that is one of the things underlying the economy's lethargy. What do you think?

Snooping
http://spock.com and http://peekyou.com lets you cull information on someone from dozens of websites. Lets you track your digital breadcrumbs.

Is the Internet Good for you?

See 50 Things Replaced by Modern Tech
http://mashable.com/2013/01/22/50-things-replaced-technology/

The cyber-world expands people's social networks and even encourages people to talk by phone or meet others in person, a new study finds.

The Pew Internet and American Life Project also finds that U.S. Internet users are **more apt** to get help on health care, financial and other decisions because they have a larger set of people to which to turn. Further rebuking early studies suggesting that the Internet promotes isolation, Pew found that it was actually helping people maintain their communities. The study found that e-mail is supplementing, not replacing, other means of contact.

Meanwhile, Internet users tend to have a larger network of close and significant contacts -- a median of 37 compared with 30 for nonusers -- and they are more likely to receive help from someone within that social network..

Nearly half of U.S. users of the Internet went online for help with major life decisions such as finding a college for their child or looking for a new place to live, according to a recent survey.

Some 60 percent of Internet users, or an estimated 80 million Americans, said the Internet helped them make big decisions or face a major moment in their life during the previous two years, the survey found. That was up from 40 percent of Internet users who answered the same survey questions in 2002.

An estimated 30 million Americans turned to the Internet when seeking more training for a career, while 20 million used it to choose a school for a family member or to help another person with a major illness, the Pew Internet group said.

Some 16 million Americans used the Internet when buying a car or making a major investment or financial decision, it said. An estimated 10 million Americans used the Internet when looking for a new place to live; 8 million when changing jobs; and 7 million when dealing with their own major illness or health condition, the survey said.

The Myth of a Digital Life

The digital or mobile lifestyle isn't actually easier or better or more satisfying than the 'analog' version. Computer technology supposed to make life easier just isn't working. Then there are work-arounds such how to play a video that inexplicably crashes. The next generation always ends up dealing with the technology of the world as they find it – not as their parents found it. So to accept the digital lifestyle as is – rather than the marketing version – is inevitable. The question should be: can it serve us better? Will it give us greater ease and comfort? Will it make lives easier and more productive?

Community and Technology

In 1993, the year the Mosaic browser came out, Howard Reingold wrote ***The Virtual Community*** – Secker & Warburg., about his experiences with the Well, launched in 1985 – originally named the Whole Earth 'Lectronic Link as a follow up to cofounder Steward Brand's Whole Earth Catalog. It was a dial-up virtual community hosted on servers in Sausalito, CA, serving the Bay Area where people dialed in to forums, discussion groups and other forms of communication. Howard found it addictive: his daughter used to say, "Daddy is saying holy moly to his computer again"

Another form of collaborative knowledge-building that exploits the power of networking is the wiki – the best known is Wikipedia. Launched in 2001, it sits atop a MySQL open source database system, uses

an open source content management system – it has accountability issues but is an example of ***The Wisdom of Crowds***, (Doubleday) by James Surowiecki – search for this term.

The original attempt to implement this was http://Digg.com – where registered members posted links to interesting content and vote on what they find interesting – that goes to the top of the list. These days, http://reddit.com tries to do the same thing.

Bowling Alone: the Collapse and Revival of American Community by Robert Putnam – Simon & Schuster. Look for reviews for it at http://www.amazon.com or http://www.bowlingalone.org

In the 1950s, a typical man could be a mason, belong to a church, play gin rummy with friends, read the paper every day, help run the campaign of a candidate for county sheriff and vote in virtually every election. In sociological terms, this man had a lot of **social capital** – a rich network of formal and informal relationships that were personally and professionally beneficial and he was engaged in civic and political affairs. He was the sort Alexis de Tocqueville had in mind when speaking of the American propensity for forever forming associations. The pre-boomer generation was one of the most civically engaged generation - but as they've passed on, their kids and grandkids have become increasingly disconnected from civic life and social networks – not only voting less – turnout down about 25% from 1960 – but also far less engaged in civic and religious organizations, community projects, having friends over for dinner, card clubs and myriad other group activities. Disconnection even extends to bowling – league bowling down more than 40% since 1980- argues hollowing out of democratic infrastructure began suddenly when first gen of TV-raised kids reaches adulthood – privatizing effects of TV caused about 25% of decline in social and civic engagement.

Also – rise of 2 career families, suburban sprawl, increase in commuting – all siphon off time, energy and interest in social activities. Social momentum – parent disengagement leads to even less disengagement by kids. What do you think about this trend?

Trend has disturbing connotations – the link between social capital and civic engagement is strong – de Toc also observed – in republics, knowledge of how to combine is the mother of all other forms of knowledge – on its progress depends the progress of all others. A democracy without this knowledge is one without citizens – interesting data show decline measurably affects public health, econ. prosperity and social justice.

What do you think?

What to do?
Putnam notes technology might help – although the digital divide and computer generated anonymity and isolation exist – there is the possibility for city wide citizen debates about local issues or joint explorations of local history. Other solutions? Putnam proposes new grassroots organizations; more family friendly and community congenial workplaces; more involvement in schools.

Reed's law of community building: usefulness of large social networks scales exponentially with the size of the network.

Is this the Future of Work? http://mashable.com/2013/11/11/resume-robots/

Social Media and Networking

See how the world consumes social media: http://mashable.com/2013/01/17/social-media-global/

See http://5.mshcdn.com/wp-content/uploads/2011/04/social-networks.jpg

While many early Internet mechanisms such as Usenet bulletin boards offered a form of social networking, the first site specifically for networking was probably http://classmates.com Founded in 1995, it fosters relationships based on high school and college affiliations. In 1997 SixDegrees.com was founded, where users could seek connections based on any existing relationships.

In June 2003, Chris DeWolfe and Tom Anderson decided to create their own website, incorporating the 'degree of separation' concept from Friendster, classified ads from Craigslist, web journals from LiveJournal and other tools. MySpace was conceived as a next generation portal around the best social interaction features out there. It opened quietly in September of that year. By June 2004, it had surpassed Friendster.

Then Mark Zuckerberg came up with a new way for college students to connect. Now Facebook has surpassed Google as the most visited website, and MySpace is dead.

The growth of social networks and job boards has inspired combinations, looking for niches. Do you use any?

Twitter Etiquette and Social Networking Tools

Remember to Direct Message to thank a new follower. When a friend follows you, follow them. Hashtags # help others find topics quickly. RT means Re-tweeting something you think your followers would enjoy about someone else's post. Smaller links mean more room to tweet: try http://is.gd. Using @ means your speaking to a particular person.

See Tweet status globally at http://aworldoftweets.frogdesign.com/

Other Examples of Online Communities: http://www.eBay.com http://everquest.com

http://ning.com is making it easier for users to create their own elaborate social networking sites –with videos, photos, blogs, discussion forums. It is free with ads or a monthly fee with a 3rd party ad server allowed.

http://meetup.com – encourages face-to-face meetings between like-minded members.

MOs (massively multiplayer online games) are played by thousands of people simultaneously. Most are role-playing games; one of the most popular is Everquest, which has more than 430,000 players whose objective is to amass more treasure, better weapons and 'experience points.' Plots of 'land', special clothing and weapons are regularly auctioned for real money on eBay. The GNP of their on-line world, Norrath, is about $135 million, the same as Bulgaria… The largest one is World of Warcraft – with more

than 8 million players paying $15 a month (nearly 40% online at any one time

Also see the wildly hyped and now moribund Second Life: http://secondlife.com This is an invented online 3-D world with 6 million registered users. A graphical virtual world where registrants use avatars or synthetic characters to roam around. Only 5% of registrants are regular users. During the summer of 2007, Linden Lab eliminated gambling (5% of its economy) which led to the first virtual bank run. It has been adopted by many marketers as a medium in which to promote products and services available in the real worldIBM and Linden Lab have been demonstrating virtual world interoperability which would let avatars move between 2L and other online words. This site spawned all sorts of copycats.

It is interesting to speculate on the metaverse that will evolve over the next decade – a) augmented reality – enhancing the physical world for an individual; b) lifelogging – recording / reporting state and life history of objects and people; c) virtual worlds – augmenting economic and social life of physical communities and d) mirror worlds – reflections of the physical world.

What Drives Internet Meanness
Vitriol draws traffic to bloggers and other social networking sites. The psychological term is disinhibition effect – people express themselves more bluntly online than they would in person. The old filters – good manners – atrophy online and the result is cultural narcissism where people think only their feelings and opinions matter.

The social networking movement assumes we are all one big happy community. The reality is physical removal makes it easy to vent

Kids are increasingly participating in similar sites:
Disney Online leads the way in popularity by users, followed by Nickelodeon; Mattel; Cartoon Network; ClubPenguin; PBSkids; Webkinz...

Cheating is engrained in the 'gaming' culture of some of these sites; with users using other software to gain tokens or other credits in these worlds: an interesting notion that young children are learning to cheat to get ahead of peers.

It's interesting that several important features of real communities are beginning to be provided online – albeit in different ways than offline – ways that have their own strength & weaknesses. Indeed, the most popular online applications are those that facilitate communication – person-to-person in email or IM, person to world via personal web pages and blogs, and person to group via mailing lists and chat rooms and games.

Several neighborhood email groups exist for Logan Square, Hyde Park, South Loop, Irving Park, Bucktown, a Glenview subdivision, Praire Crossings subdivision in Grayslake. Recommendations for building and service contractors, promotions for social events, expressing opinions top emails.

One essential characteristic of communities is that they are **self-policing** – they minimize the role of the state, the police and the courts by relying on gossip – you know what store to avoid and who is likely to repair your roof on-time because of a subtle system that rates and updates **reputations** through off-line chatter.

Online communities need to find ways to do this – in auctions, for example, at least one side is taking a risk – often the buyer so each is keen to know the others' reputation. E-Bay handles this by an ingenious system of asking buyers and sellers to rate each other. – as a result the participant acquires a score that reflects the number of positive and negative comments received all posted online. There are no comparable stats for offline communities which may not do so well in fact. Offline gossip is more nuanced – you would know that someone did not deliver this time because his wife just discovered she has breast cancer so you would give that person another chance – on the other hand eBay encompasses millions of people while offline systems encompass only a few hundred people.

http://Slashdot.com developed a way of evaluating contributors through 'karma' and http://reddit.com tried by using up-voting / down-voting.

Interesting, most virtual game worlds are hotbeds of virtual crimes, violence, theft and harassment. Containing such crime is a rising challenge. Crime seems simply to be an extension of the freedoms that make these worlds so attractive in the first place. Crime may be an unavoidable function of constructing a more complex, compelling world. What do you think?

Virtual communities cannot provide nearly as much subtle and encompassing knowledge of members as a real community but they can include many more people. One's strong suite is depth, the other is breadth. Like reputation, **trust** is also important both on and offline. For real communities people's default is to trust – from childhood taught to presume members of the community are good people – considered inappropriate to distrust unless there is cause. Online, it's opposite – I do not know you other than your online alias – so how can I trust you? Three developments allow e-trust to flourish – auction communities provide free insurance for low value transactions – escrow accounts for larger amounts –quality of items can be determined by an appraiser with info posted.

Real communities **foster intimacy** as well as trust as people get to know one another and form close warm bonds. Argued such closeness cannot be possible online because people cherish anonymity and hide their true selves behind handles and false presentations. Actually, there are the tools online for fostering intimacy – not only one-to-one in e-dating but also among group members – best to think of these tools as building blocks. Sometimes you'll get to know each other's 'avatars' who represent each real person in a detailed, highly textured world where they interact with each other to solve problems, win knowledge and riches, and kill monsters.

If a community is to be intimate – it must exclude some people – by keeping membership homogeneous and small and stable – intimacy fostered. Some groups closed or invisible – much greater intimacy is possible if anonymity is surrendered voluntarily. – if number of participants is kept small – admission is controlled to foster affinity and people drop their net masks.

The Internet is very effective at knitting communities together. Of these estimated 90 million cybergroupies
79% stay in regular contact with at least one group
50% say online communities helped them meet people they otherwise would not have met.
40% say the 'Net helped them become more involved with groups of which they are already members.

The most popular online communities:
50% belong to trade or professional groups
50% cited hobby groups

31% joined sports fan groups
29% joined entertainment fan groups
29% cited local associations.

12 steps to real community

1. is there a necessary shared purpose that we accomplish together
2. does each member have an identity? Can we tell who is who, even if members remain anonymous
3. are we able to share info and ideas that fit our purpose
4. How can we build trust? What tells us that its safe to deal with other people in the community
5. How do we form reputations? What helps us build status?
6. have we created ways to work together in small groups
7. is our environment a shared space that is appropriate for our goals
8. do we know who belongs in our community and who doesn't
9. what's our system of governance? How do we regulate behavior so that it supports our shared values?
10. is there a system of exchanges that allow us to trade knowledge, support, goods, services and ideas
11. Are we able to express our group identity in a timely manner? Are we aware of what other members are doing right now?
12. do we have ways to review our history and track our evolution – and leave behind what's best forgotten?

What do you think about these steps? Which is the most important? Are there any missing?

Peer-to-Peer Computing
What is this? In typical client-server computing, servers control the flow of data and information into and out of client computers. Essentially, the server runs the show. With P2P computing, the server is removed from the equation, allowing computers – and more specifically, their users, to share files and other data directly, without going through a central server.

P2P creates the effect of communal living – sharing one cabinet where a group puts everything they're willing to share and also having a locked cabinet where private things are stored. By downloading various software, users can connect to a network of others who have downloaded the same software. You specify which info on your hard drive you want to make public and you can access what others have made public.

60% of all Internet traffic is P2P file-swapping. (62% video; 11% audio, the rest misc. file types)

How can P2P work well? As a service that charges members or when buyers and sellers use P2P to cut out the middlemen (exchanges) that serve them. Dozens of firms offer P2P software – the market is still volatile. Most IT departments oppose it for bandwidth and security reasons. But 'sharing & connecting' is a powerful rubric – last used when the Web exploded into use. Because of security concerns, a sort of hybrid may emerge which allow peered clients to pull data as needed from a closest peer while pushing changes back to a central location for archiving and management. There are many 'faces' to p2p.

a. Pure p2p. Completely decentralized and characterized by a lack of a central server or central entity; clients make direct contact with each other.

b. Computational p2p: Uses the technology to disseminate computational tasks over multiple clients; peers do not have a direct connection to one another.
c. Datacentric p2p. Information and data resides on systems or devices that is accessible to others when users connect. Sometimes called peer-assisted or grid-assisted delivery. Applications include distributed file and content sharing.
d. Usercentric/hybrid p2p. Involves clients contacting others via a central server or entity to communicate, share data, or process data. Often used in collab. Applications.

Four basic p2p markets have been identified – capturing unused CPU power, real-time person-to-person collaboration, supply-chain coordination, & advanced searching and file sharing.

Torrent: Search for this term. This free file-sharing program was one of the most popular downloads on the Web and a thorn in the side of the movie industry. A recent agreement with the MPAA requires it to block users from easily finding pirated movies. It addresses some of file-sharing's problems: how downloading slows down when many people are accessing the same file, and that some people 'leech' – download without sharing. It breaks up large files such as movies into many small pieces. When you download a file, you receive pieces from many other Torrent users at once, maximizing your speed. At the same time, it uploads parts of the file from your computer too. By some accounts, Torrents count for 40% of all Internet traffic…. As the recording industry goes after Torrent, the traffic moves to another application.

Music Pirates Beware!
support illegal downloading are liable – This whole issue might be moot – since society has become based on digital data with an explosion of devices that make today's copyright battles unmanageable for media owners. Even draconian security measures do not prevent the latest movie and book from becoming digitalized.

Warning: Many shared files are laden with viruses and spyware.

Twiki.org offers open source software that allows the construction of a website called a **wiki** that all members of a project team can edit to enhance their working together.

http://wikileaks.org is a website which purports to allow people to anonymously post 'leaked' information. What do you think of the ethical ramifications of such a site?

Podcasting
What is podcasting? Sort of an audio version of a Web log. Anyone with an Internet connection can use their computer to record audio programming which is then distributed to a list of subscribers who have asked to receive it.

Slow Listening
An interesting phenomenon has been observed – a cluster of habits called digital listening where folks accumulate music faster than they can listen to it and skip restlessly from track to track, often without getting through more than a fraction of one song. Some experiment with a music diet – downloading a new file only after listening to a previous one. What do you think?

Technology Hype Cycle:

Remember this as you keep hearing about what's coming next. Most new technology-based changes begin with a 1) Technology Trigger (visibility); which leads to 2) Peak of Inflated Expectations; 3) Trough of Disillusionment; 4) Slope of Enlightenment; and finally, a 5) Productivity Plateau (maturity). This process can take up to ten years. For example, of security technologies, biometrics is at the top of expectations curve but up to ten years away from productivity; Public Key Infrastructure (PKI) is in the home stretch – 2 years or so away.

2/10 Rule: This "rule" defines when a technology moves from the interesting and cool stage to really useful. Enthusiasts will have you believe a certain technology is going to be a big deal in 2 years when it usually take 10 years, but when it blossoms, it really is a big deal. Examples: web, RFID, VOIP, open source, network computing…

Drowning in Data
World's biggest databases: Stanford Linear Accelarator Center, NASA Ames Research Center and agencies like NSA run databases in the petabyte (1,000 terabyte). Every 29 days, Stanford accumulates more data than entire Library of Congress. Walmart has one of largest commercial databases – capturing data on every item for every customer at every store every day. – refreshes more than 1 billion rows every day. Other huge databses: Yahoo Serach, Nielsen Media

What's On The Horizon in University Life
- More User-Created Content (blogs, wikis, videos)
- Social networking (see above – connections with friends)
- Mobile phones as browsers.
- Virtual worlds (next gen 2nd Life, Active Worlds)
- New 'scholarship' in academia (collaborations?)
- large scale, multi-player educational games

What is the Future according to Microsoft?
Microsoft is attempting to rebuild its entire product line around offering tools for Web-based services – creating a sub-culture among Internet companies which provide Web services – these become the underpinning of everything that now gets done on the Web.

Office365 includes web versions of Excel, Powerpoint and Word to compete with Google Docs

Someday, according to Microsoft, everyone in America will have a hand-held device that will link to the Internet - running Microsoft software, accepting input from human speech, and will control just about every bit of gear in its owners life. To turn on heating or cooling system at home or play a song, or write something, you speak the words. . .

What is Sony's Vision for the Future?
Same as Microsoft, except that the TV will control everything instead of the PC. These dueling visions are scary to some folks who would rather control what they see and do rather than becoming programmable automatons with the controls in the hands of Microsoft or Sony and the copyright 'mafia.' They would control what you see through the gateways – if they do not think an application will make them money, they will have no reason to do the work to support it. What do you think of this opinion?

What is the future of the Web according to Timothy Berners-Lee?
The inventor of the WWW is spearheading a futuristic project, known as the **Semantic Web**, in his role as director of the Web's global standards body, the 3W Consortium, based at MIT. This will be a more powerful web – where documents and data will be annotated with special codes allowing computers to search and analyze the Web automatically. It would consider web pages like data in a relational database. It would infuse meaning into the Web and make data machine-understandable. The current Web works well for humans to understand its linkages but not for machines. This new coding would eventually allow the easier finding of specific information. It would allow the integration and manipulation of external, heterogeneous Web data. These codes include OWL (Web ontology language), RDF (resource descriptor framework), URI (uniform resource identifier), and DAML (Darpa agency mark-up language), and are designed to add meaning to the global network in ways that make sense to computers, not humans. This machine-readable intelligence would come from hyperlinked vocabularies Web authors would use to explicitly define their words and concepts as they post stuff online. The idea is the codes would let software 'agents' analyze the Web on our behalf, making smart inferences that go far beyond the simple linguistic analysis performed by search engines. This would let you run queries across the Web, fishing for correlations. New analytical tools would replace browsers – allowing us to display data by color codes, maps or types of sources searched. There isn't much buy-in from Corporate America or the IT industry for this vision – they're focusing on the growth of business automation software known as Web Services that allow disparate computers and devices to communicate over the Internet. The Semantic Web is more about expressing things in data form and making the data reusable. The real change will be in thinking about the Web as a library and not the new TV.

Think of a cell phone using radio technology to communicate with tabletops, walls and other objects equipped with digital billboards – it would ID surfaces safe for projecting the data without having to use a tiny screen. Think of someone forgetting why he or she spent a certain sum and pulling up bank statements for remembered dates checked against a calendar and other family info to yield the answer.

Web 2.0 is another term bandied about that describes the perceived ongoing transition of the World Wide Web from a collection of websites to a full-fledged computing platform serving web applications to end users. Ultimately Web 2.0 services are expected to replace desktop computing applications for many purposes. It includes Blogs, mash-ups, microcommerce, podcasts, RSS, social networks, service oriented architecture, software as a service and wikis.

What is the future according to Ray Kurzweil?
Ray is an inventor and author who sees great things ahead for computing. He says innovations in basic chip architecture and 3-D circuit design as well as new paradigms such as molecular transistors, carbon nanotube gates and quantum computing will continue to grow at an even greater rate that posited in Moore's Law.

Moore's Law, the doubling of computer power every 18-24 months, is widely accepted as a prescription for uninterrupted market growth and steady improvement in productivity, but it is expected to hit physical limits dictated by physics about 2015. But transistor density and the physical properties of silicon are only 2 of the many variables determining how much power can be packed into a given space for a given # of $.

As widely used today, Moore's Law is an inflated label for what was originally a casual observation by Gordon Moore in 1965 to suggest healthy growth for the then-nascent silicon chip industry, five years before he co-founded Intel. His observation was based on a mere 3 cycles of growth – from 1 transistor on a chip in '59 to 32 transistors in'64 to 64 transistors in '65 to 42 million transistors in '00.

A nanotube is a tubular carbon molecule rolled from a graphite sheet 1 atom sheet. It has semi-conducting properties similar to that of a silicon transistor but is far smaller and many times stronger and can be fabricated by chemical processes. By fusing physics and chemistry in a process known as chemical self-assembly, critical portions of a chip can basically be fabricated in a beaker, doing away with the need for exotic lithography and clean rooms. Ray posits supercomputers will have the speed to emulate all the regions of the brain by 2025. By 2030, machines will be able to access and improve their own source code. By 2040, he thinks one cubic inch of nanotube circuitry will be 100 million times more powerful than the brain. By 2020, images will be written directly on our retinas. By the late 2020s, nanobots wil be able to navigate bloodstreams – attacking pathogens or enahancing cognitive functions, substitute signals from virtual environments.

U of C researchers managed to build a functional FM radio from a single carbon nanotube. First song played? Derek and the Domino's Layla and the Beach Boy's Good Vibrations.

Currently chips have a thinkness of at least 140 nanometers (one nanometer is one billionth of a meter. New chips are just 90 nanometers thick.

Nanotechnology already exists in nascent form. It has the potential to become much more: Programmable, DNA-strand-size 'assemblers' with infinite, self-replicating powers may one day be able to turn a pile of dirt into a potato or a field of grass into a piece of beef.

One worry, fostered by sci-fi, is these tiny assemblers or robots would learn to reproduce themselves and take over the world – know as the gray goo problem. Fortunately, this isn't going to happen. Nanotech centers aren't working on nanorobots because we don't have the technology to build successful macro-robots. Also there is the sticky-finger problem – if a nanobot had 'fingers' made from just a small number of atoms, it could never let go of anything since atoms want to bond with other atoms. Nanotechnology research is focusing on exploiting its ability to miniaturize and manipulate matter on a atomic scale. Downsides include biological viruses.

Recently HP Labs created a molecular-scale 'crossbar latch' that can flip a binary 0 to 1 and vice verse and preserve the output of that computation for use in subsequent calculations. The switch is just a single molecule thick can also restore weakened electrical signals so the distinction between 0s and 1s stays crisp. It consists of three criss-crossing platinum and titanium wires joined by a layer of electrically-switchable molecules 2.8 nanometers thick. This research is sponsored by DARPA.

What is the future according to MIT researcher Thomas Knight?
Synthetic biology – using biochemistry to substitute for silicon-based chips. Chip making processes place atoms of silicon and dopants – impurities added to define the chip's electrical properties – crudely but well enough to work. As circuits shrink, it gets more challenging. Knight is working on what he calls BioBricks to grow programmable organisms that use DNA strands to mimic some operation of conventional circuits – that can be spliced together to do higher-level work. They are v. slow (working in seconds or minutes compared to nanoseconds – and in practical terms, a long way off. The ability of biological circuits to self-replicate or to be used for destructive purposes will be a future challenge.

Homework

Find example of ‘community’ on the web, email me the URL and tell why it represents an example of community.

Visit http://www.worldofends.com/ and tell me what you think of this thesis in at least three paragraphs.

Think of a topic for your website.