***Question 1:**

Cyberspace and the Internet are frequently confused with one another as illustrated in class when we, junior and seniors in communication, answered the question "how are they different?" with silence. The Internet is a system of machines and cyberspace the non-physical representation of what modes of entertainment and education exist because of those machines. However, popular culture tells us something much different: that it can be something similar to virtual reality. Beginning in 1984 with the novel *Neuromancer*, the world has been overtaken with the idea of the cyberspace and the Internet as computers became more accessible and literature about it became rampant, but as imaginations run wild people lose sight of what the Internet is and what precisely it entails.

The structure of the Internet is a constantly growing web of devices in ever-increasing concentration that connect computers all around the world. Such devices are small like Ethernet cables and wireless routers, while others are mainframes with enormous amounts of storage space. However, it was not always so. Initially, the Internet was for government and educational use only under the supervision of Advanced Research Projects Agency or ARPA (Rheingold, 2000). ARPA organized the Internet in a way that there was no central hub for messages to be sent and routed, but instead several smaller ones were put in place (Rheingold, 2000). In doing so, it would be very hard for the Internet system to be shut down by mechanical failure and attack (Rheingold, 2000). Another innovation to the structure of the Internet was packet-switching, which meant messages could be routed through different hubs if one hub failed to send the message (Rheingold, 2000). The Internet is a physical grid of machines. If one machine does not work, then the entire system does not shut down. In this way, the Internet is efficient. When we access cyberspace we see the

Internet at work, which is why the two terms are frequently confused. We can see the machine, but we only know what it is doing if we are reaping the benefits.

To preface later discourse, it is important to point out that the word cyberspace was used was in William Gibson's novel *Neuromancer* written in 1984. In the novel, he calls cyberspace "the matrix", which was to exist within computers. Cyberspace is described as being riddled with geometric shapes and colors, much like early three-dimensional graphics before they were even commonplace (Holmes, 2009). To get into "the matrix", a the user must connect with a telephone line, which is important both as a prediction for Internet dialup connection as well as it is an inspiration for getting out of the matrix in the movie *The Matrix* (1999). Finally, cyberspace is described to project the user's "disembodied consciousness into the consensual hallucination" (Gibson, 1984), much like what we see in later films dealing with a form of cyberspace, including both *The Matrix* (1999) and *The Thirteenth Floor* (1999). Further, it is significant that cyberspace is a sensual and visual experience that is supposed to feel real (Holmes, 2009). The culmination of all these aspects point to a goal for future computer developers and themes present in films.

The Matrix showed us a world where machines had become self-aware and turned against their human masters, using a majority of them for energy (Wachowski & Wachowski, 1999). A small population of humans has retreated underground to fight the machines through a representation of cyberspace called the "matrix" where virtually anything is possible (Wachowski & Wachowski, 1999). The differences in the Wachowski brothers' (1999) vision of cyberspace is that it is physically like real life and death within cyberspace results in death in real life. *The Matrix* version of cyberspace is a futuristic dystopian mistake. Most humans "live" oblivious to the fact that they are living within a computer program (Wachowski & Wachowski, 1999). Although somewhat scary, it seems to be a far off goal with the ever-improving of our games and

the ever-increasing interactivity that we have come to expect in cyberspace. The same year, *The Thirteenth Floor* (1999) was released to theatres, but was overshadowed in the box office by *The Matrix* (1999). It held more of a focus an interactive artificial intelligence. That is to say, the non-player characters (NPCs) were so real that they felt and displayed human curiosity and emotions to a point that they were indistinguishable from real people (Rusnak & Emmerich, 1999). The major plot device of the film, however, was that the world in which the NPCs lived was incomplete and the edges of the world, or map, were simply black empty spaces with green lines as to indicate terrain that has yet to be rendered (Rusnak & Emmerich, 1999). Both *The Matrix* (1999) and *The Thirteenth Floor* (1999) have a narrow view of cyberspace albeit interactive. There does not seem to be a way to quickly search it, only walk around or drive to places within the simulation. Cyberspace now is still largely text-based, but seems to have almost infinite stores of information. Graphic representations, like World of Warcraft and Second Life exist, but virtual reality ones do not yet exist for use by the public.

The Internet in *The Matrix* (1999) and *The Thirteenth Floor* (1999) are both an interesting, yet unrealistic look at how one connects to the Internet in the future. First of all, each requires your body to be immobile and practically unconscious. Next, death can result from overexposure. *The Matrix* (1999) shows our main band of heroes sitting in chairs with a large port in the bank of their head where a needle is inserted (Wachowski & Wachowski, 1999). When the needle goes into the back of their head, they have accessed the Internet (Wachowski & Wachowski, 1999). To log out of the Internet, there needs to be someone who is not logged in to assist them through the use of a telephone. The Internet-user's consciousness streams through the lines, back into their body (Wachowski & Wachowski, 1999). To access the Internet *The Thirteenth Floor* (1999), users must lay down on their backs, barefoot, while a fluorescent light shines on them (Rusnak & Emmerich,

1999). The user's consciousness streams into the body of an NPC within the program and in order to leave the program, they must set a timer on the Internet hardware to log them out automatically (Rusnak & Emmerich, 1999). If they stay in the program too long, they will die. Neither forms of the Internet sound very appealing against the current low-risk means of accessing the Internet. When I open my laptop, it logs into my home network or the school network automatically and I undergo no physical change at all. If we were to have virtual reality as seen in the two films discussed, there would be more hardware and a lengthier process of becoming connected.

The Internet and cyberspace appear to be mutually exclusive. The Internet does not have a purpose without cyberspace and cyberspace cannot exist without the Internet. Authors and Hollywood have high-eyed dreams with incredible ideas about human innovation in terms of artificial intelligence and the capacity of what computers can do. I can safely say that I dread the days where I will mistake graphics for reality. Luckily, it seems that it will remain science fiction for the time being.

Question 1:

The term cyberspace was coined by science fiction writer, William Gibson, in his 1984 novel, *Neuromancer*. Cyberspace is information that doesn't exist in physical space. It is a concept or idea of how we visualize information, and can also be described as a virtual world, data "cloud", or placeless space. While the concepts of cyberspace and the Internet differ, there is some overlapping between them. Both are informational worlds but the information is represented in different ways, with physical information being accessed on the Internet and information in cyberspace being accessed through a simulated world. William Gibson viewed cyberspace as a metaphor for the Internet. Both the Internet and cyberspace also provide a social environment to its users. The Internet allows information to be transferred back and forth across a global network, and cyberspace enables users to communicate within a virtual realm. The extent and usage of both cyberspace and the Internet has grown very rapidly in the last decade (Dodge, 2001, p. 2).

According to Martin Dodge (2001) in his book, *The Atlas of Cyberspace*, "more recently, it has been recognized that the process of spatialization – where a spatial, map-like structure is applied to data where no inherent or obvious one exists – can provide an interpretable structure to other types of data" (p. 2). Dodge and Kitchin note that the importance of these maps and spatializations relates to the significant effects of information/communication technologies and cyberspace on the social, cultural, political and economic aspects of everyday life (Dodge, 2001, p. 2). The representation of cyberspace through maps and spatializations "can help users, service providers and analysts comprehend the various spaces of online interaction and information, providing understanding and aiding navigation" (Dodge, 2001, p. 2).

Some have taken a more artistic approach to providing a visual representation of cyberspace, such as architect, Marcos Novak (2001), whose work can be seen in the attached source, and whose aim was "to explore the "liquid architecture" of cyberspace" (p. 251). His work "challenges visualizers of cyberspace to extend their analysis beyond conventional understandings of space and to explore new ways of thinking about how cyberspace might be visually conceived" (Dodge, 2001, p. 251). Novak (2001) argues that "cyberspace has a spatial and architectural form that is dematerialized, dynamic and devoid of the laws of physics; spaces in which the mind can explore free of the body; spaces that are in every way socially constructed, produced and abstract" (p. 251).

The Internet is made up of a network of linked computers. It is a global, digital infrastructure that connects millions of computers and tens of millions of people and allows for the exchange of information and communication through package switching. Information made up of bits and bites can be accessed through transmitted airwaves, also known as a wireless connection, or through the use of an Ethernet cable. The Internet was introduced with the military's creation of Arpanet in 1969 and since then has grown to be a popular public research tool.

Tamara Munzner (2001), a graduate student in Computer Graphics at Stanford University "has done interesting work on the geographic visualization of the Internet" (p. 101). She has "investigated the potential of constructing spatializations in hyperbolic space, [which has] advantages for visualizing the detailed structure of large graphs containing many thousands of nodes, such as the Web" (Dodge, 2001, p. 101). The figures displayed in the attached source are examples of Munzner's 3-D hyperbolic spaces. At first glance, these images appear to be similar to those representing the Internet as a mapped network of linked locations around the world. Upon further examination of Munzner's model (2001), it is stated that "the pyramid glyphs represent

pages, the curving lines are the principal hierarchical hyperlinks…and the [overall] structure of nodes and links is projected in hyperbolic space inside a ball, known as the sphere at infinity" (p. 101). The way we think of the Internet and Cyberspace is changing. Space is moving from a disconnection between the physical and virtual to connected.

William Gibson believed cyberspace to be a graphical representation of data. He envisioned cyberspace as a consensual hallucination, very similar to the concept expressed in *The Thirteenth Floor*. In the film, Douglas Hall and Hannon Fuller voluntarily pass back and forth through a virtual world in which they created, and what they believe to be reality. They spent six years developing a machine, also referred to as "the system," that would allow their physical body to stay in place, but that could connect and transmit their minds to people living in 1937. Essentially, it was a space where he could download his mind. The two worlds become so blended that it is impossible to distinguish what is real from what isn't, and in a sense, they are hallucinating. Both cyberspace and the world depicted in *The Thirteenth Floor* represent a virtual world and the idea of "placeless space". The very title alone reveals this concept because in today's world, there is no such thing as a 13th floor due to superstitious beliefs. Both cyberspace and *The Thirteenth Floor* are information worlds, neither physical, nor concrete. At the conclusion of the film, an abstract grid, which is a common graphical representation of cyberspace, is revealed at the end of the road, or "simulation" rather. This represents "the code" that is behind the virtual world. Novak's (2001) notion of cyberspace as "a space the mind can explore free of the body" relates back to Gibson's concept of cyberspace as a non-space for the mind, as well as the virtual time traveling machine presented in *The Thirteenth Floor.*

The Thirteenth Floor also relates to Helen Couclelis' article, "Misses, near-misses and surprises in forecasting the informational city," in that they both have to do with failing to

acknowledge the limitations behind their beliefs in technology, whether that is through myths and fallacies of instant access in the information age, or a man-made machine created to surpass all previous scientific knowledge and defy the laws of physics. Couclelis (2007) states, “Access is not synonymous with ubiquitous information and communication technologies (ICT)” (p. 72).

Janet Murray’s article, “From Additive to Expressive Form,” also relates to *The Thirteenth Floor* because of the confusing distinction between reality and digital creation that comes with the continuous, rapid advancement of technology. Douglas Hall couldn’t distinguish who was a real human being from who was a digital character, even when it came to his own body. Similarly, in Joseph Weizenbaum’s ELIZA program, “He had created a being so much like an actual person that we would no longer be able to tell when we were talking to a computer and when to a human being. This is very much like the fear that people would mistake film images for the real world” (Murray, 1997, p. 70).

***Question 2**

In Helen Couclelis' excerpt, "Misses, near-misses, and surprises in forecasting the informational city", she discusses seven myths of the informational city. The two myths that I will be focusing on are myth number six, the transmission of space, and myth number seven, casting away our material bodies.

Myth number six, the transmission of space, hypothesizes that in the future people won't need to go on a vacation to get the experience of being in the mountains or on a tropical island. Instead, they will be able to stay in the comfort of their own home, and have simulations of these other places brought to them through the use of virtual reality. Transmission of space argues that graphics, sounds, and images will be able to bring the same experience to a person in their living room that they would get by traveling there. According to Couclelis (2007), "The technology for putting something like this together already exists. But is this really "the transmission of place"? Can you climb that distant peak in the Alps and return to your chalet sunburned, dead tired, hungry and elated?" (p.75)

Myth number seven, casting away our material bodies, is pretty straightforward. According to this myth, humans will be able to be present on another side of the world and free themselves from their material bodies. According to this myth, people would be able to engage in all sorts of virtual activities in an out-of-body experience. They would, in essence, leave their body behind. Couclelis (2007), states that "This is the ultimate fantasy: to liberate ourselves from the burden of the 'meat' that is our body in order to expand the range and reach of the pleasures that this very body allows us to enjoy. The dc-materialization and tele-transmission of bodies is a staple of modern science fiction." (p.75)

Both of these myths, the transmission of space and the casting away of our material bodies, relate to the movie, *The Thirteenth Floor*. This movie, a science fiction film about virtual reality, incorporates these myths well. Myth number six, the transmission of space, can be seen in *The Thirteenth Floor* in that scientist Hannon Fuller creates a virtual reality simulation that can transport a person from the current time to the 1930s, in Los Angeles. This incorporates the transmission of space because Fuller does not have to leave where he is to travel there; instead Los Angeles in the 1930s is brought to him. Even more prevalent is myth number seven, casting away our material bodies. This myth is the underlying idea of the entire movie. The characters in *The Thirteenth Floor* engage in a virtual reality where they can enter another era, and leave their material bodies behind. When they enter this new time, they take up residence in someone else's body, and their material body stays behind, connected to the virtual reality machine. In *The Thirteenth Floor,* they are able to blend the lines of reality and engage in the ultimate fantasy.

Deaton (2003) discusses a virtual environment that was developed to help soldiers in the military adjust to and be ready for combat. According to Deaton (2003), the program is being developed in an "effort to provide a new technology for training in cultural familiarization through the application of highly experiential, scenario-based training in virtual environments that can be used to develop specific skills for interacting with members of a culture of interest."(p.2) This supports myth six in that the transmission of space is evident in this program. Personnel are being trained in what to expect in real war-type environments through the use of virtual reality. They are not actually there, but the graphics make it seem as though they are. Siklos (2006), discusses Second Life in his New York Times article, *A Virtual World, but Real Money.* According to Siklos (2006), people create a new and improved digital version of them selves and proceed to make friends, play sports, and run businesses on Second Life. Even businesses are getting involved in

this virtual reality. (p.1) This both supports and contradicts myth seven, about casting away our material bodies. Second Life allows people to enter a virtual world and make an ideal avatar of themselves, portraying their body in the best light possible. However, they are still not really leaving their material bodies behind, as they are still part of their bodies while they are engaging in these activites.

Question 2

In Helen Couclelis' chapter "Misses, near-misses and surprises in forecasting the information city," the possibilities of the Internet that were very prominent in the past are taken into consideration and debunked. Of these seven myths, two are, according to Couclelis (2007), "the dissolution of cities" (p. 73) and "a much-reduced need for mobility" (p. 74).

For the first myth (the dissolution of cities), Couclelis uses a text written by Marshall McLuhan in 1964 named "Understanding media: the extension of man." This myth describes the possibility of a 'global village' in which cities will dissolve and be forgotten by future generations because information is readily available to all users of the Internet. Couclelis (2007) states "that all the currently available data and projections speak of explosive urbanization rates in virtually all of the world's developing regions" (p. 73). Other evidence that supports Couclelis can be drawn from the movie *The Thirteenth Floor*. In the movie, although this is not explicit evidence to confirm Couclelis research, the characters create a virtual world modeled after Los Angeles in the 1930s and Los Angeles in the then-present day 1990s. They chose to create a city and not a modern-day agrarian society. By doing this, they gave their characters more opportunities for interactions that they could study and monitor. Then, by going into the simulation themselves, they were given more options and more people with which to interact and converse. Other researchers have also studied the dissolution of cities. Stephen Graham, author of "Telecommunications and the future of cities: debunking the myths" agrees with Couclelis. Graham (1997) says "urbanization across the world continues apace and is, if anything, accelerating rather than slackening" (p. 23). In addition, Graham considers the idea that the growing market for the Internet and telematics is increasing the advantages of large cities because there are several types of communication and

exchange available in a shorter distance. For example, as discussed in class, the idea of instant access is relevant here. There are limits to instant access. For some, cell phone reception or internet connection is not as strong in rural areas as it is in urban areas: which means everything cannot be accessed at any given time. For the most part, this lack of access in rural areas only reiterates the importance of the city-structure for Internet and cell phone coverage. The idea of instant access is not universal and, until it is, it will be more of an urban staple than a rural one.

The second myth, the reduced need for mobility, is considered plausible by Shafraaz Kaba (1996) in "Building the future: an architectural manifesto for the new millennium." Coulelis dismisses the possibility of telecommunication as a replacement for physical mobility to and from the workplace. She also concludes that we have only intensified the "traffic and congestion" to the early-morning and 5 o'clock rush (p. 74). Even though the idea of telecommuting may be attractive for professionals, the workplace is multifaceted and requires interactions beyond those presented by the Internet and telematics. *The Thirteenth Floor* does not directly relate to this myth. It does, however, provide a platform for discussion on the topic of traveling to and from work and a different type of telecommunication. In class, we have discussed the basics of Second Life. The idea of the simulation in *The Thirteenth Floor* could be an adaptation of technology used for virtual meeting spaces. Even so, the simulation would only be possible for a short duration of time (as seen in the movie), so the physical movement from home to work would still be more effective. Graham also discusses this myth in his article. Graham (1997) concludes that "in reality…transport and telecommunication flows tend to grow together, to be mutually reinforcing" (p. 25). As discussed in class, there is supremacy of materiality. This is an example that draws from Couclelis' conclusions about the myth. Telecommunication (being part of the digital world)

is a way to relate to the physical world so it will not be as effective as actually being in a certain space.

Question 3

The two categories of interfaces are closely related, focusing on connecting humans to information and each other. According to class discussion, the Human Computer Interface (HCI) is the software or hardware that allows people to access what is on the computer through communication. Examples include the mouse, keyboard and Windows. By clicking a particular object with the mouse, one can tell the computer system what to access, and the computer can then return that information to the user. Another example of interface is a microphone, as according John Donovon (2005), allows voice recognition to control computer function. The other definition is more general, saying that Human Human Interface (HHI) is anything between two parties that helps them to understand each other. Examples include the telephone and printing press. The written word is a way for one person or group to communicate thoughts to another entity. The strong connectivity between HCI and HHI is that they are both information translators. For example, Windows allows users to access different files without typing in code. An HHI, non-technological example is graphics, which can help two entities understand the same concept better than words often can.

The Thirteenth Floor uses non-traditional interfaces for connecting to the Virtual World. In the 1990s realm, the users lie down and enter a tube that resembles an MRI machine. Green lights glow from within, similar in appearance to a tanning bed. In the "real world," the users would sit in a chair and put on headphones to connect to their virtual reality. This differs significantly from how people access the Internet today. The most common interface I use is a Web Browser, such as Mozilla Firefox, which I access by clicking my mouse on the program icon. Another way is through Smart phones, where the telephone service provider grants access to Internet through a

handheld interface. Another way to look at modern interfaces is through non science-fiction virtual realities, which according to Wikipedia is a computer-simulated environment. These experiences can be accessed through interfaces such as binocular-looking stereoscopic displays and wired gloves (http://en.wikipedia.org/wiki/Virtual_reality). These are similar to those used in *The Thirteenth Floor*, but in the science fiction model, the person's consciousness travels somewhere else while his physical body remains, and in the latter virtual realities people are not connected to the Internet. In today's Internet virtual realities, people can also move through fictional spaces by using avatars in SIMS or Second Life, controlling them with a keyboard or mouse.

Murray's (2007) article explains how digital environments allow interaction and immersion for computer users. The digital medium is participatory. This means that computers are not simply a database of information. The system can be programmed to create an interactive experience between computer and user. That's where interfaces come in. Before the use of interfaces, code had to be compiled before running it into the computer, which according to Murray is like "writing a book and then hiring someone to translate it for your readers" (p. 76). Interfaces allow the automatic translation between man and computer code. Without the participatory function of digital media, computers would not be as easy to use. Whenever a program is used, we give the computer non-coded directions and our request is returned with a non-coded response. This concept began with textual games such as Zork, where players could enter "go north" or "open box" and the program would return text with what happens next. According to Murray, "the designers could focus their inventive powers on making the virtual world as responsive as possible to every possible combination of these commands" (p. 79).

Users immerse themselves into the computer, leading to another one of Murray's (2007) elements of digital media: spatial, which she refers to as the "digital dance" (p. 83). One would

think that by spatial, Murray means that we can see 3D shapes and graphics on the computer screen. While this is useful, it is nearly an additive. Instead of thinking of space in visual terms, the digital environment allows the user to navigate through digital space. For example, Zork uses only text to lead the user through the game's maze, causing the player to be more immersed than in a board game. Murray contends that the "slamming of a dungeon door behind you…is a moment of experiential drama that is only possible in a digital environment" (p. 82). Another way to think of digital space is how a user navigates through software or the Internet. We move from page to page, window to window, creating trails in a specific path. Murray describes this as cyberspace, "an environment with its own geography in which we experience a change of document on our screen as a visit to a distant site on a worldwide web" (p. 80). The spatial element allows users to navigate through thoughts, information and programs in an unparalleled, nonlinear way.

***Question 3**

An interface is a producer of meaning. By breaking down the word "interface" we can better understand the term as being something that is in-between two objects which needs a third party in order to make one understandable to the another. Manovich (2001) describes an interface as the way we as users interact with computer systems (Manovich, 2001). Manovich categorizes interfaces into two categories: human-computer "cultural" interface and the modern interface. The role as the human-computer interface shows how technology is becoming a tool that is necessary in society, whereas the modern interface shows the transition of interfaces over time (Manovich, 2001). What Manovich is describing, are the two different meanings of the term interface.

The first definition, the human-computer interface (HCI), shows the interaction between humans and machines. The software and hardware within a computer allow the user to manipulate what is being done on a computer. For instance, common interfaces on a computer include the keyboard, screen, mouse, and many more. To further explain this lets look more closely at the screen. The screen gives a visual representation of the underlying code that the computer is using, in such a way that the user can understand what is being presented. Without the use of a screen, this information would be in the device, but the user would have no way of accessing the information. Similarly, a computer mouse is a type of HCI that allows the user to directly manipulate items on the screen, creating a "middle-man" between the computer and the human.

The second meaning of the term interface says that an interface can be anything that helps facilitate actions between two things. This means that it does not necessarily have to refer to technology and is a more general definition of the term. For instance, sign-language can be considered an interface. It allows for communication from the sender of the message to the

receiver of the message by use of hands. In this sense, hands are used as the interface that allows for the conversation to take place. Furthermore, language, in general, can be described as an interface because it allows for two people to understand one another. In the same sense, it is acting as a mediator between the two individuals.

The film *The Thirteenth Floor* (1999) is a sci-fi/ mystery movie that depicts virtual worlds that exist and are fully self-sustaining (Emmerich, 1999). In the film *The Thirteenth Floor* there are many interfaces that are used. Couclelis (2007) accurately describes the environment in the film by saying "we now live in two parallel worlds, one made of atoms, the other made of bits" (Couclelis, 2007). This idea directly applies to the film because the individuals in the film literally exist in atoms, but they can also convert themselves into bits by downloading their minds into unsuspecting avatars. By the more general meaning of the term, interfaces such as language, writing, and gestures are used, but also there are many examples of human-computer interfaces as well. The biggest examples of a HCI in the film are the devices used for virtual travel. An interesting point in the film is to see the differences in how Douglass and Fuller transcend into another time and how Jane, from the year 2024, travels. The interfaces that they use are very different. Douglass and Fuller must place their entire bodies into a machine and set a timer in order to visit a virtual world. In contrast, Jane is able to use a headset which allows her the same virtual experience. The devices that we use when interacting with the Internet, are more similar to the device that Jane uses to interact with the virtual world. When listening to music on the Internet, through Napster or Playlist.com, etc, the user can choose to use headphones. Unlike in the film, these headphones only allow us to *hear*, we cannot *see* things as Jane is able to.

According to Murray (1997) there are four characteristics of the digital medium: procedural, participatory, spatial, and encyclopedic. Procedural and participatory deal with the interactivity

between the human and the machine. The second two, spatial and encyclopedic, deal with the immersion that takes place for the user (Murray, 1997). Participatory deals with the saying "it takes two to tango." It demonstrates, not only, the computer responding to the user, but also that the computer induces behavior. For instance, I frequently watch my guy friends play the game *Madden*, a football game on Xbox 360. They use the controller to manipulate where the ball is being thrown and when to tackle people. The computer responds to the controller and properly carries out the commands. I can also see the players responding to the game. Often times I will hear them yelling or throwing the controller because the game "cheated." This usually means that they are not winning the game. This connection demonstrates the interactivity of the game and how both ends are affected by game-play.

Another characteristic that Murray discusses is how digital mediums are encyclopedic. This deals with the idea of information overload and how much users can access. Murray (1997) states: "Since every form of representation is migrating to electronic form and all the world's computers are potentially accessible to one another, we can now conceive of a single comprehensive global library…a library that would be accessible from any point on the globe" (Murray, 1997). An example of this can also be seen in Google. Whenever I have a question that needs to be answered, my response is always "Google it." I use Google for anything and everything. If I need to know what time a movie is playing in my area, I search on Google. If I need the recipe to make a pineapple upside-down cake, I look it up on Google. If I need to get information about interfaces, databases, or virtual spaces, I can "Google it." The information that is accessible on Google is seemingly endless and certainly demonstrates how digital media can be encyclopedic.

Question 4

Murray (1997) introduces the idea that digital environments are spatial mediums. She does not mean the idea of space created by the vivid graphics of the latest video game. The spatial quality she is referring to is created by the interactive process of navigation within these environments (1997). In this way, space could be the vast world of WoW, *Second Life*, or even the text-based games like *Zork*. Johnson sees it much the same way. "The Desktop Metaphor" made the computer spatial. It not only made the computer immersive by giving it a navigable representation of physical space, but also interactive through the ability to give commands and have a response returned. However, Johnson thought there were two important parts of the metaphor. The first is that it gives familiarity. The second and almost more important is that is has distance from the thing it is representing. This allows it room to be itself and grow as a medium in its own way. (Johnson, 1997) This can be tied back nicely to Murray's concept of spatial environments. There is not a dependence on graphics to represent something perfectly, a large part of this concept of space must be left up to the interpretation and imagination of the mind. This is similar to Dibbell's point in "the Scarlet Balloon". When he rises above LambdaMOO in the balloon to try and get a map-like view of it, he is only met with text descriptions. He was again being told to use his imagination just like he would everywhere else in the world to "fill in the details" (Dibbell, 1998, p.48). Krueger is referring to this same idea when talking about mapping cyberspace as a whole. There is not one static way to look at these spatial environments. They are relative to their user. (Krueger, 2007) There some of the spatial quality is almost removed from these digital environments when they are more graphically reliant. If this is the case, then the simulations in *The Thirteenth Floor* would seem to be lacking in spatial quality. However, they are still defined

by their users. When Fuller uses the simulation in pursuit of virtual sex, the interactive and explorative qualities of the simulation are different from those when Hall is using the simulation to try and discover the truth about Fuller's murder. In this way, while the extensive graphics and strict dependence on "real-life rules" would make this less of an information-space by the definitions of Johnson and Murray, the fact that it is still defined by the intentions and interactions of the user do give it an immersive spatial quality.

In the early years of computers, there were two major types of people that worked with computers: hackers and hobbyists. Both related to computers as machines. The graphic interface began a shift from their perspective and the rise of another type of person: the user. These people desired to relate to computers through interacting and playing around with them. (Turkle, 1995) As Ceruzzi points out, computers began to come with more word processing, accounting software, and games. The war of the ease of access PC led ultimately to Apple's release of the Macintosh (2003). This was a truly closed system and was marketed as "the computer for the rest of us". It was designed specifically with users in mind. We were more drawn to these new, easy-to-use graphic interfaces. We desired the simulation over the calculations behind the curtain. This is the opposite of what Hall goes through in *The Thirteenth Floor*. He has been immersed in a simulation the entire time without his knowledge. However, when he drives to the "end of the world" and see the wireframe end of the simulation, he is forced to look past the simulation at that reality of how everything worked. This is the reverse of our shift, where we were almost trying to escape the nuts and bolts side of things into the blissful ignorance of simulation. This is where the change in transparency comes in. In the days of hackers and hobbyists, transparency described how easy it was for one to see how something worked. However, as we shifted into a culture of simulations, the definition shifted as well. This new meaning of transparency meant "ease of use". (Turkle,

1995) It now described how easy it was to figure out how to use a computer, rather than how it worked. In this way, we had truly completed our shift to a culture that was willing to live in the bliss of simulation. Though God forbid something should break.

***Question 4**

In the article "From additive to expressive form, Murray explains that computers are spatial mediums. According to Murray (1997), digital environments are unique because they are the only "environments [that] can present space that we can move through" (From additive to expressive form, p. 79). The author is clear to point out that the spatial quality of digital environments is not created by graphics but instead "…created by the interactive process of navigation". The two digital characteristics of the digital medium that allow for interactivity are the concepts of "procedural environments" and "participatory environments". Murray (1997) states: "we know where we are" in a digital environment when we click on an object or enter a text command and the computer reciprocates when the "screen display changes appropriately" ("From additive to expressive form", p. 80). As the user clicks with the mouse, the interface reciprocates by displaying new information. Lev Manovich (2001) explains that an interface is "rarely a neutral transport mechanism" but instead just as the user performs actions upon the interface by clicking on objects with the mouse, so too is the interface acting on the user by changing the organizational content of the display to alter their experience. (The Interface, 2001). For example, when interacting with the game *Zork*, the game says "you are in an open field" and the user interacts by typing "go right", the computer responds with "you have arrived at a door", you are interacting *with* the computer. While the game is entirely textual, interactivity is created by the combination of the characteristics of a procedural and participatory environment where navigation immerses the player creating the powerful visualization of space.

Johnson's concept of computers as spatial mediums focuses on how the design of the interface shapes the way users understand the binary code that operates beneath the surface of the desktop.

According to Johnson, computers can be described as "information spaces". In the article "The Desktop", Johnson states: "the way we choose to organize our space says an enormous amount about the society we live in – perhaps more than any other component of our cultural habits". Spatial organization provided by GUI, specifically the desktop metaphor, operate as a mechanism for understanding the "meat" of the code. Furthermore, he details the daunting task at the beginning of the "bitmapping revolution": How to organize the infinite dataspace of information contained inside the "information space" of the computer? Johnson's comparison of the computer to real estate further exemplifies his perspective that the computer was indeed a tangible space that needed proper representation and delineation: The windows interface. According to Johnson, Englebart's design "staked out portions of the monitor" giving it "space" and "Kay's overlapping windows gave it *depth*…stacks of paper suggested a three-dimension approach…you could enter into" (Johnson, The Desktop, p.47). The combination of space, depth, and the paper icon metaphor allowed for users to understand the computer as an environment of information and more critically an information space.

Both Murray and Johnson view computers as virtual space that can be traversed through navigation, whether through the concepts of procedural and participatory environments (Murray) or the design of the graphical user interface (Johnson). To Murray, the capacity for navigation is not created through graphics; rather her conviction is that navigation *creates* the spatial quality within the computer. Johnson, however, believes that the spatial organization of the interface creates the ability to navigate around, in, and through the dataspace. Both scholars believe the core dataspace is made of code and algorithms. According to Murray (1997) "the new digital medium is intrinsically procedural…an engine…to embody complex, contingent behaviors" (From additive to

expressive form, p. 72). Similarly, Johnson (1997) remarks that "the information space makes imaginable—the other wise invisible cotillion of zeros and ones…" (The Desktop, p. 1).

Excluding the final scene of 2024, *The Thirteenth Floor* depicts simulated information spaces that are composed of "electrons" where individuals navigate through virtual space using a interfaces to travel through time and cast away their material bodies. The years 1937 and 1999, are simulations made of data. Ultimately both Murray and Johnson's concepts of computers as spatial mediums apply to the simulated worlds of *The Thirteenth Floor* because of the concept of navigation within a world of code. When D. Hall reaches the end of the simulation, he finds that the entire world is constructed of a grid reminiscent of the empty "information space" that Johnson (1997) refers to when discussing the development of the graphic interface. (The Desktop, p. 1) This same scene also demonstrates the notion of Murray's concept of navigation because D. Hall was instructed to drive as far as he could to a place he had never been until he couldn't drive any further only to reach a space devoid of graphics.

Originally "computer holding power" was intrinsically related to the internal structure of the machine and its programming capacity. In the age of calculations hackers were interested in the software and how to push the limits of the code while hobbyists wanted to master the hardware of the computer by breaking it down into its smallest unit. However, the shift from calculations to simulations occurred with the introduction of Macintosh in the 1980s, attracted a new group of users who were no longer encouraged to dive beneath the surface of the desktop. With metaphors of "simulated pieces of paper" and they way it felt "when you held a mouse and it moved…[and] you saw your physical movements mirrored on the screen by an indicator icon", they felt empowered as if they were getting to know a new friend. (Turkle, A Tale of Two Aesthetics, p.

42). The desktop metaphor kept users gliding on the surface of the screen despite their knowledge that the binary code of calculations were somewhere beneath the new simulated landscape.

Turkle's postmodern view inverts the traditional meanings of transparency and opacity. Instead, she explains that the introduction of the Macintosh began this change when they introduced their new desktop metaphor in the 1980s. Mac users spoke of ease of use synonymous with the new desktop metaphor. They were now discussing transparency a new way unlike the transparency that IBM users felt when they were able to look inside, open, and configure their computer's settings. With the desktop GUI users could operate their machines "without needing to look into the inner workings of the computer…a kind of transparency enabled by complexity and opacity—like a toaster" (Turkle, A Tale of Two Aesthetics, p.42). This shift from transparency meant that users could make their computers work and consequently they gained a sense of intimacy with their technology.

***Question 5:**

Main frames and computers have been around for many decades, but it wasn't until 1969 that the Internet came into play. The Internet was established as an infrastructure or network of computers (i.e. servers and routers) that were connected globally through a standard protocol that harnessed packet-switching technology. The first owners and users of the Internet were members of the U.S. Department of Defense and their network for connection was ARPANET. The creation of ARPANET was a direct result of the Soviet's launch of Sputnik. DoD was responsible for the safety of U.S. citizens and thus, put together the Advanced Research Projects Agency (Rheingold, 2000, p. 64). In 1962, J.C.R. Licklider, (MIT) became the head of the Information Processing Techniques Office (IPTO) which was the early innovator of computer science, "making great strides in the areas of time sharing, networking (Spawning the Internet), packet satellite networking, artificial intelligence, digital signal processing, high performance computing and hypertext" (Kleinrock, 2008, p. 10). In 1970, ARPANET hosts began using Network Control Protocol (NCP), which was the first host-host protocol (Kleinrock, 2008, p. 13). A few years later, ARPANET hosts were using a special protocol called IP, Internet Protocol, (Hameri and Nordberg, 2003, p. 325). Because, at this time, the Internet was owned and controlled by the U.S. government and HEP researchers, the primary use of the ARPANET network was for information sharing and military communication. Created in 1972 by Ray Tomlinson of BBN, email (electronic mail), became a primary application of the Internet (Kleinrock, 2008, p. 13). After the email application was established, a new network protocol was created. It was called File Transfer Protocol, FTP, and it was based on client-server framing. FTP made it possible to not only send data and messages from server to server, but also exchange and manipulate files. This application

made it possible for files to be transferred from various computers across a network such as TCP/IP (Transmission Control Protocol/Internet Protocol) (Todd, 1999, p. 36). Telnet (Teletype Network) was first developed in 1969 but did not become popular until the 1970s. Telnet was a network protocol used on the Internet that created an interactive communication space. It provided contact with a command-line interface from a host. During the time of computer science research and information sharing, MUDs were created to expose a different aspect of the Internet. MUDs (Multi-user dungeons) were developed by Bartle in 1979 and they made it possible for Internet users to connect to others via a virtual gaming environment. They were the precursors to other social and gaming networks such as Habitat (1985), Habbo Hotel (1999) and Second Life (2003). In 1979, Usenet was created and quickly became a popular Internet forum much like the bulletin board system and many modern-day chat rooms (Kleinrock, 2008, p.13).

One of the original purposes of the Internet was to share ideas among many different users simultaneously, namely those working in the High Energy Physics (HEP) community. During the early 1980s, the HEP community was working with the CERN laboratory to get a better understanding of particle matter. According to Hameri and Nordberg, "a globally distributed multi and high-technology environment [was] at the very core of the HEP community and it [was] exactly this environment which triggered, or directed, the development towards the global networking concept called the World Wide Web" (2003, p.324). After being created in 1979, CSNET was officially funded by the National Science Foundation (NSF) in 1981, enabling more computer science researchers to connect to the Internet. In 1983, the Department of Defense split ARPANET into MILNET, used for military purposes, and ARPANET, for civilian and research use (Abbate, 1999). Also in 1983, TCP/IP became the official standard for ARPANET and then in 1986, NSFNET, funded and owned by the National Science Foundation, became a main network.

NSFNET was mainly used for research purposes and information sharing. Seeing the need for some type of global hypertext, Tim Berners-Lee proposed a project, known as the World Wide Web (WWW) in 1989 (Kleinrock, 2008, p.14). Before this, however, a 2D MMO was created called Habitat that connected users in social environments. By typing in simple commands, users were able to navigate through a virtual world, communicate with others and develop their own virtual reality.

Entering into the 1990s, the Internet had already made monumental strides since its establishment in 1969, but there was much more to come. During the 1990s, the Internet "would grow enormously in the number of networks, computers, and users it included; it would be transferred from military to civilian control; and its operation would be privatized, making the network much more accessible to the general public" (Abbate, 1999, p.181). Beginning in 1991, Tim Berners-Lee made the first website available on the Internet; the National Science Foundation adjusted their acceptable use policies and began to allow commercial use of the Internet (Kleinrock, 2008, p.14); in 1993 Marc Andreessen and Eric Bina of the National Center for Supercomputer Applications (NCSA), globally introduced the Internet with the release of the Mosaic browser (Hameri and Nordberg, 2003). In 1994 the Netscape browser was released and users were introduced to the address box, which contained the Uniform Resource Locator (URL) that allowed the navigation through different websites (Todd, 1999, p.37). In the mid 1990s, there were over five million Ethernet Local Area Networks (LANs) and many businesses and corporations began creating their own LANs (Abbate, 1999). In order to shift the Internet from government control to commercial use, three service providers, PSINet, CERFNet, and Alternet, joined forces in 1991. The combination formed the non-profit Commercial Internet Exchange (CIX). The CIX "set up a gateway to link the three networks, the operation of which was financed

by a membership fee, and the members agreed to accept traffic from any other member network free of charge (Abbate, 1999, p.198). Later in the 1990s, applications of the Internet including blogs, Voice-over Internet Protocol (VoIP), and Napster began to emerge. Social gaming and networking programs (i.e. The Palace, 1996 and Habbo Hotel, 1999) became even more popular and technologically advanced with top of the line graphics and new interfaces. This was when there was a more defined shift to privatization and commercialization of the Internet. Users became everyday people who could access the World Wide Web right from their home. In 1995, US government ownership of the Internet's infrastructure, NSFNET, was officially terminated by MERIT (Abbate, 1999).

Question 5

From its creation in 1969 to today, the Internet has been an ever-changing, ever-growing medium that serves a number of purposes. Initially used strictly for information sharing and military communication, the Internet has turned into arguably one of the most powerful and influential mediums in the world. Government control originally forbid any commercial use or privatization of the Internet, but during the 1990s that all changed. Many different networks were established and this made it increasingly hard for there to be any ownership of the Internet and the World Wide Web. According to Kleinrock, the number of Internet hosts started out at one in 1970, and the Internet has since grown to house over one billion hosts (2008). The Internet makes many things possible, from basic information sharing and researching to social networking and gaming, file transfer to recreation, and all that's in between.

The Internet is still considered quite a new technology as it is only four decades old; though throughout its short history it has experienced many changes. During the first three decades the Internet experienced tremendous amounts of changes that took the innovation from a private domain of researchers and the military to available to the general public. In the first decade of the Internet, the 1970s, the Internet was only used by the military. The military accessed the Internet through the network called ARPANET. ARPANET was developed by the Department of Defense, which started with a contract signed on December 6, 1967 that granted a study to create a design for a computer network (Congressional Digest, 2007, p.35). Through the network of ARPANET the military could e-mail (available since 1972), exchange files with file transfer protocol (FTP), and use TELNET which, at the time, "the main Internet protocol for creating a connection with a remote machine (e Souza e Silva, 2010)." As the first network of the Internet, ARPANET was an

exclusive network, and only the military could access, creating a need for another less exclusive network (Abbate, 2000, pp. 181-220).

In the 1980s, the users of the Internet increased to include the academic research community, as researchers needed a way to share information through the computer. The academic research community used the networks CSNET (1981) and NSFNET (1984). These two networks were created by the National Science Foundation (NSF). With these two networks, the academic research community could use transmission control protocol (TCP) for emails and file sharing, Internet protocol (IP), bulletin board system (BBS) for file sharing, usenet (a discussion system), IRC (real time Internet text messages), mailing lists, and MUDs. As the NSF creates the two networks, CSNET and NSFNET, the ARPA connection creates an open door policy. With civilian access to ARPANET in 1983, the Department of Defense created MILNET as a private network for the military. Also, during the 1980s the domain name system (DNS) was created to translate website names in IP addresses. In the 1980s, the Internet saw many changes as it evolved from a private industry to public sector information tool, and more applications were applied to the Internet (Abbate, 2000, pp.181-220).

During the 1990s, the Internet became commercialized as now every civilian could gain access to the Internet. When the Internet became a commercialized tool, the World Wide Web was created. Different from the Internet, the World Wide Web is "a mechanism that unifies the retrieval and display of subset of date on the Internet (e Souza e Silva 2010)." This new network was created by Tim Berners-Lee at the European research center, CERN. According to Ari-Pekka Hameri and Markus Nordberg's article "From Experience: Linking Available Resources and Technologies to Create a Solution for Document Sharing—The Early Years of the WWW" the

World Wide Web was originally invented for researchers in the field of high-energy physics who needed a new way of sharing information.

However, as the World Wide Web became global in 1993 with many different servers entering into the network. The World Wide Web allows computer users to use browsers, search engines, HTML (the language used to create website), and HTTP (a transfer protocol for hypermedia). In the article "The World Wide Web" by Tim Berners-Lee, Robert Cailliau, Ari Luotonen, Henrik Fystyk Nielsen, and Arthur Secret five properties of the World Wide Web are illustrated: boundless information stored in a reference where they can be retrieved, an address system, a network protocol (HTTP), a mark-up language (HTML), and a "body of data available on the internet (Berners-Lee et al, 1994, p. 76)." Throughout these three decades, the Internet has changed from a private, limited information source to a source of accessible random information that anyone can use.

While the each of the innovations of the Internet have each equally contributed to the growth of the Internet and to creation of the World Wide Web, the shift from a research network to a commercially used tool is crucial in the understanding the link between past Internet and today's Internet. In 1985, the Internet was a widely used tool in the research community, and the public sector, mainly business communities, began to use the tool for a means of communication through e-mail. As the popularity of the Internet grew, high speed networks were created in 1988, which enabled easier access to the information provided on the Internet. During the 1980s, recognition of the commercial sector of the Internet came into interest, and in 1991 and 1992 two organizations were created to help commercialize the Internet: Internet Society (1991) and the Internet Activities Board (1992). With the development of the World Wide Web, a broader community was created and more commercial activity took place (Leiner et al, 2009, pp.22-31).

***Question 6**

As we know online multiuser environments, including LambdaMOO and Second Life, have two main origins: they are the products of the development of the Internet as a communication medium and following Dibbell (1998) they are descendents from maps. MUDs, Multi-user dungeons, are “simply another member of that broad class of representations specializing in the schematic depiction of place, and generally known as maps” (Dibbell, 1998, p.51). In other words, MUDs are a synchronous form of communication, they contain a visualize, ‘game-like’ atmosphere while also being a text-based interface, MUDs are interactive compared to being a passive activity like watching a movie, and they are spatial so that users feel immersed in the space while also giving definition to the space.

The reason why Dibbell (1998) refers to MUDs as being descendents from maps is because maps invite interaction but frustration as well. The users of maps and MUDs want to be inside the map/MUD but will quickly get frustrated because they are unable to actually be on the space. “The earliest appearances of maps seem to have been followed not long after by the first attempts to shatter their surfaces and place the viewer, as it were, inside” (Dibbell, 1998, p. 52). Individuals essentially want to be transplanted into a particular territory where they can navigate around and interact with others there but sadly since the flat surface of a map cannot be penetrated frustration will set in.

Paul Adams (1998) makes a great point when he states that“…Nodes can, and often do, move from location to location without affecting the topology of the "virtual place," and often cyberspace's "occupants" interact with no idea of each other's locations, we are justified in considering computer networks as "locales" of structuration in their own right. Doing so sheds

light on the meaning of social processes and places" (Adams, 1998, p.99). When reading this article, I couldn't help but stop and evaluate the difference between the social process in a face-to-face setting versus the social process that takes place in a virtual world, like Second Life. Adams (1998) makes individuals realize that there are constraints within social interaction according to a person's "place."

MUDs are also compared to board games that date all the way back to 2000 B.C. (Go in China) and 500 A.D. (Chess in India). Even these ancient board games have similar characteristics of MUDs because the objective is to battle, conquer the other players and territories, while also taking over the King. Both MUDs and board games represent space while also providing certain boundaries that can't be crossed. The game pieces within board games represent the users in MUDs, and ultimately signify us, individuals, in space. Now-a-days, MUDs are compared to board games like Monopoly or Life because these are economic contests rather than battle contests, like Checkers and Chess. Dibbell (1998) explains that board games may have changed over the years but "what has remained a constant in their appeal is that they quite literally map the real world of day-to-day and ultimately life-and-death existence onto the timeless and ultimately inconsequential realm of the imagined" (p. 53). Clearly, games have encompassed the complexity of life into the open-endedness theme amongst board games and virtual worlds.

MUDs are also products of the Internet because the "multiple user dungeon/dimension is a text-based game or just social space expressed through writing" (Mortensen, 2003, p. 397). In order to actively participate in a MUD, there were a few mandatory components that were needed: a computer, access to the Internet, and a keyboard. These three components would allow the user to perform certain commands while playing the game. Text was the only way that players could describe space and their appearance because the earliest online multiuser games did not include

graphics. It was up to the users involved to have a sense of imagination so that they could envision their surroundings and the other avatars so that the virtual world seemed realistic. Some MUDs were solely used as social spaces, where individuals could meet people from around the world but other MUDs involved competition. The competition either involved player versus player or player versus environment. The timeline of the development of MUDs began with Maps, then Board Games and Narratives, which transformed into Dungeons and Dragons and the use of the Personal Computer. Following the creation of the PC, single player games and the Internet were combined to create the first MUD in 1979, where people were finally able to connect to one another. Once people figured out interactive and online MUDs, MUDs then turned into MMORPGs (Massively multiplayer online role playing games), including World of Warcraft.

Once communication was able to take place over the Internet, two different types of applications were created—Synchronous Applications and Asynchronous Applications. Synchronous Applications are more time consuming than Asynchronous Applications because these applications can only handle one message at a time because the message that is being sent must be received by the other user and then a reply must be sent back in response to the question that was just sent. Certain examples would include AOL instant messenger, g-mail chat or yahoo messenger. On the other hand, Asynchronous Applications are used more often because it is a way to send a message to someone else but you do not have to wait for an instant response. In other words, the element of time does not exist in these types of communication device. These applications include e-mail, blogs, discussion boards, social networking sites, and social forums.

Question 6

Online multi-server environments, such as LambdaMOO and Second Life are both products of the development of the Internet as a communication medium, as well as descendants from maps.

Early multi-server environments, MUDs, were text-based, interactive social spaces where people could go and experience synchronous communication. According to Dibbell (1998), the coming of age of computer-mediated communications, and the development of the Internet as a communication medium, occurred simultaneously by a cluster of developments. The earliest online bulletin boards were created, the first Usenet newsgroup was formed, and two students, Roy Trubshaw and Richard Bartle, introduced a program that would allow two or more players to enter a game without being in close physical proximity. This was known as an MUD, or multi-user dungeon. (p.57)

The development of the Internet as a communication medium was only one origin of online multi-server environments. The second origin was that these environments were the products of maps. Maps represent space and invite interaction- people want to get into the maps. Dibbell (1998) states that the creation of maps was closely followed by attempts to get inside of them. These attempts today can be classified as board games. (p.52) Board games are maps of the real world; they borrow the complexity of real life and mesh it with the tension between what is real and what is not. Shortly after the first maps were created, the first board games were created. Sennet was invented in Egypt in 3300 BC, GO was created in China in 2000 BC, Chess was developed in India in 500 AD, and Checkers originated in France in 200 AD. According to Dibbell (1998) these games have evolved into current day Monopoly and Life. However, what has not changed since the creation of the first board game is that they all literally map out the real world. They all

represent battles, strategy, and capturing something. They include life-and-death experiences as well. Through the roll of the die or the drawing of a card, a person's fate in a board game can be changed for better or for worse. (p.53) Dibbell (1998) also wrote that in 1973, Dungeons and Dragons was created, taking away the military-based aspect of board games and introducing a fantastical aspect. Three years later, the first computer-based role playing game was introduced, and thus began the computer gaming revolution. (p.56)

MUDs, or multi-user dungeon/dimensions, are interactive text-based environments. They are social spaces that allow for synchronous communication between people who may or may not be in close physical proximity with one another. According to Dibbell (1998), MUDs are representations and depictions of place, and their origins, as well as the origins of board games, can be traced back to maps. (p.51) According to Mortensen (2003) MUDs are text-based role-playing games that allow space to be expressed through writing. There are no graphics in MUDs, instead scrolling text makes up the interface between the player and the MUD. To interact with the computer, the player uses written commands. (p.387) According to Krantz (1996), since their creation, MUDs have grown in popularity thanks to faster computers and better graphics. These better graphics can be credited to the designers of MUDs, who want to make the games seem like movies, where players can essentially create their own script and write their own plots. (p.2)

Two examples of synchronous communication applications on the Internet are chatroulette.com and SKYPE. Two examples of asynchronous communication applications on the Internet are Facebook and eHarmony.com. The difference in these modes of communication is that synchronous communication applications allow you to communicate with the person interactively and simultaneously. With chatroulette.com and SKYPE, you are seeing the people who you are

communicating with through cameras hooked up to each of your respective computers. Even though you might not be geographically close to one another, you are able to communicate without even realizing this. With asynchronous applications such as Facebook and eHarmony, there is a delay in the communication with people. You can leave someone a message in their inbox on Facebook or write on their wall, but they are not communicating with you back and forth as they would be if you were connected to SKYPE. The same goes for eHarmony.com.

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