

Word and code, code as world

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ABSTRACT: This paper examines imaginary worlds – complex but logical-and-controllable systems. The paper analyzes the overlap between structural characteristics of different sorts of imaginary worlds, as they are constituted in (fantasy) literature, role-playing games and computer code.

KEYWORDS: Imaginary worlds, fantasy, science fiction, role-playing games, MUD, programming.

INTRODUCTION

During 1997-1999 I interviewed a number of persons who had made "careers" and become managers or "wizards" of a so-called MUD¹ [9]. What struck me then was that there was a large overlap between a number of interests of theirs. Beyond the more-or-less obvious interest in (programming) computers, many were also interested in other relatively unusual hobbies such as role-playing games or so-called live action role-playing games and reading (often large amounts) of fantasy or science fiction literature.

This overlap between people who read fantasy or science fiction, who engage in role-playing games (offline or online) and who are engaged in science and engineering – with computer science and programming being a particular favorite – has been noted also by other authors [1, 4, 7, 11, 13]. I am here not primarily interested in the very people whose interests overlap, but rather in the overlap itself – e.g. what those overlapping interests might have in common that (apparently) appeal to certain persons.

I suggest that what these different interests have in common is that they all constitute certain kinds of *imaginary worlds* and that these appeal to persons who bear a fascination and a will to understand and master *complex systems that are logical and controllable*. I quickly add that what I present here though is not a fully-fledged theory that can fend for itself, but rather a humble suggestion that I offer for public review in the hope that it has enough going for it to be developable.

After briefly developing the concept of imaginary worlds, I will below describe a number of imaginary world (literature, role-playing games, computer-based role-playing games, computer code) and trace some similarities between them.

IMAGINARY WORLDS

The term "imaginary world" here refers to an autonomous and often carefully crafted world that is different from the ordinary world that we live in. Such a world has a logic and "reality" of its own, but that logic and reality is different from the everyday lived-in world.

The term "imaginary world" is closely related to Tolkien's [10] term "secondary world" which referred to a world created by its teller and governed by internally consistent rules to which the reader gives credence. An imaginary, or secondary world just *is* and doesn't need to be explained in relation to the ordinary world we live in. Such a world is based on rules that are internally logical and coherent, only these rules are based on propositions that are not true for us here and nowⁱⁱ. Different sorts of magic can for example work according to some principles that are "unknown" (of patently false) to us, but that are logical and self-coherent *within the framework of the imaginary world*ⁱⁱⁱ. Interestingly, magic does not magically just work. Instead there is a remarkable consensus among fantasy writers as to its nature and the rules it obeys. Magic is for example often bound up in spells that can be invoked, the ability to master magic is arduous, there is a connection between magic ability and longevity and magicking without true understanding invites disaster [2].

Tolkien's use of the term secondary world refers to a world created by an author and realized through text. I widen the scope here and choose the complementary term imaginary world to refer also to worlds that come alive in other ways than through the pages of a book, e.g. through role-playing games, through a computer terminal etc. It is thus not the case that I argue that computer code is a literary genre, but rather that a central concept in certain literary genres (fantasy, science fiction) is to establish imaginary worlds. It is therefore not just the case that imaginary worlds *appeal* to certain kinds of persons, but, an imaginary world in itself *constitutes* what appeals to them – a complex system that is logical and "controllable" (understandable).

WORLDS

Worlds of Text

Most well known and perhaps also most well crafted of all literary fantasy worlds is Tolkien's Middle-Earth. Through *The Lord of the Rings* the reader gains a glimpse of a world that is much older and more complex than the tale that the three volumes themselves narrate – a world that Tolkien had created during the preceding four decades and that contained a wealth of languages and myths of its own. The name of Tolkien's world is strictly speaking "Arda", Middle-Earth is just a single land in that world and the chronology of Arda's history starts 37000 years before *The Lord of the Rings*. What goes for Arda and fantasy novels in general is also true for science fiction novels:

"A science-fiction writer is allowed to postulate

time machines, intergalactic travel, or mental telepathy, but cannot do it arbitrarily. [...] You can postulate anything, but once the rules of the system have been defined they must be adhered to scrupulously. Such are the rules for creating "rule-governed worlds." They are known to every computer programmer and are now being passed on as cultural knowledge to a generation of children" [13, p.81].

Worlds of Shared Fantasy

Less well known than Tolkien's Arda, but equally painstakingly crafted is Barker's^{iv} creation of the fantasy world Tekumel. Where Tolkien brought his world to life through the pages of a novel, Barker's Tekumel came to life through the rule system of a role-playing game, *Empire of the petal throne*.

When Barker encountered Dungeons & Dragons in the 1970's, he became frustrated with the lack of a developed cultural and social structure in the game. This led him to dust off and update his maps and expand the languages of Tekumel – two tasks that he started to work on in high school. Barker has supplied Tekumel with a detailed description of its history, races, geography, political organizations, religions, languages etc. He has also published a 130-page dictionary between English and the fictitious Tekumel language Tsolyani (a language that he furthermore speaks fluently).

The first fantasy role-playing game, *Dungeons & Dragons* (D&D) was published commercially in 1974. Role-playing games like D&D are most often enacted in Tolkien-inspired fantasy worlds. The characteristics of different types of creatures, such as elves, dwarfs, dragons, ogres etc. are explicated, and their game-related behaviors and effects are laid out in great detail. The same is true for armor, weapons, magic spells and potions. The same is true for character traits and professions. And mental health. And equipment. And divine intervention. And so on. It is exactly such expositions – collected in thick rulebooks – which one gets hold of when a role-playing game is bought. What is bought is a "game system" i.e. an operationalized system for how a (fantasy) world works in detail. From a perspective not of creating, but of consuming imaginary worlds, Bennahum [1] describes how he was introduced to D&D at the age of 10 (after having read and admired Tolkien's *Lord of the Rings*):

"Helping [our referee] were books sold by the company that invented Dungeons and Dragons, Tactical Studies Rules (TSR). [...] We bought every book. [...] Tactical Studies Rules provided us with the vocabulary, or commands, that made the game possible. They published the books with lists of all the objects that might comprise a story. The numerical values assigned to each object were cleverly thought out by TSR, designed to support our imaginations. Without them ten-year-old

Dungeon Masters [referees] would have had to acquire a whole new set of skills in mathematics and statistics – skills that in fourth grade were hard to come by. For instance, a broadsword might wound fatally but be so difficult to wield that the odds of striking a blow were low, unless the character was experienced and of a certain species. Men could wield these swords better than elves (who were smaller). Conversely, elves were better archers, but bows are useless in close combat. Multiply all these objects against each other and the game became complex, engrossing, and very much about strategy.

The effects of the players' actions are computed according to the different conditions that bear upon the situation and as rendered through a complex rule system and a certain element of chance. The referee, or Dungeon Master (DM) provides the setting and acts as the environment in which the characters act. In a concrete sense, the players can be said to react to the reality of the fantasy that the DM narrates/presents. However, the DM at the same time reacts to the players as it is the decisions and actions of their characters that determine the course of events. The DM and the players thus jointly construct (and negotiate) the game and its outcome. "Fantasy gamers share a "fantasy," which they collectively construct and modify. [...] Fantasy gamers are not psychotic – their fantasies are *systematic, logical, and realistic* to the assumptions they make" [4, p.12, my emphasis]. A decade older than Bennahum and ready for more elaborate challenges, "Boston referees, many of whom play at MIT, have created interlocking universes called a Multiverse and arranged them so that players can play in these compatible dungeons with no break in the logical structure of the game" [4, p.32].

Worlds of Code

Computer-based Fantasy Worlds. D&D (and other role-playing games) do not *force* any group to use the detailed game systems in any specific way. It is often stated in the rulebooks that these should be regarded as flexible resources to be used as appropriate in any specific situation. The most important difference between D&D and a MUD – a computer-based/computerized role-playing game – is that a MUD runs by itself in accordance to the computer code it consists of. A MUD works without the minute-to-minute involvement of a DM and it "unwittingly" always apply all specified rules all the time to the best of "its" knowledge. The close intertwining of role-playing games and computers was present even before these games became computerized:

"Many dungeon masters keep records of what their players have accomplished (killed an important monster, met a powerful character by chance, and so forth), and some have begun to codify this on home computers. The Cornell University D&D Club keeps computer printouts detailing every player in the club, the characters that each runs and

the actions that the character has taken. One game was adjourned for half an hour while the president of the club ran home to check whether a character had ever before appealed to his god to be resurrected" [11, p.11]

A MUD could possibly constitute a captivating imaginary world as it puts not just one, but two superimposed imaginary worlds at one's disposal at the same time. The first world is the fantasy world of a novel or a role-playing game with its own history and its own rules for how magic, monsters, death and rewards works [8]. The second world never too far away is the underlying world of the computer system. Bennahum's [1] description of playing D&D (above) is by himself interpreted as a training ground for future programming exercises:

Together we acted as computers, stringing the objects together (sword-meets-magic spell) and computing their relative value and outcomes, dice tumbling on the floor, pencils in hand, clutching paper listing our possessions and current state of health that when calculated and recalculated led in turn to a new cycle. The games we played began to alter my abilities. [...] Now, of our own free will, out of school, we were taking on problems – math, probability, mapping – the mechanics of which were rarely called upon for most ten-year-olds. More subtly still, we were doing a special kind of problem solving, what some might call systems analysis.

In D&D we were creating a large, complex system with history, time, and a future. Multiple "inputs" affected the outcomes of any turn in the game. Figuring out what was best for you and your team and balancing that against uncertainty required the ability to see both close up and far away at once. We were seeing individual objects as part of larger objects that in turn formed a complex whole. The same kind of thinking would be reinforced later as we discovered computers."

During my own studies of a MUD game, one of the magician-programmers gave me a document of his own making, "Formulae Venificus – (Rules For Magicians) – A system of magic (v 0.2)". This 22-page long document draws up the guidelines for a generic system of magic and focuses on how to formalize magic so as to make it possible to incorporate it into the game/computer program:

"The text that you see before you [...] describes in all aspects a system of magic for role-playing games. [...] As [the system] has been designed with computability in mind, it should be possible to automate the usage of the system for usage in multi-player computer games."

The document contains elaborate information about

different areas of magic (generic, summoning, travel, detection, protection, combat, healing), spell attributes and requirements, and not the least spell interdependency. It furthermore contains a list with "actions" (move, change, inflict), "modifiers" (big, tiny, anti-) and "occurrences" (fire, poison, sleep, heal) and a dictionary with translations to Latin. After each word in the list ("each leaf in the skill tree") has been assigned a corresponding Latin word, the magical language can now be "calculated" and "put together with other important attributes like spell levels to create a continuous text" (e.g. Acid arrow = "Noceo Hostium Cum Acidus Telum").

Computer Programs as Worlds. Turning from computerized role-playing games to the very computer itself as an imaginary world, we could designate it to be the "ultimate" imaginary world both in terms of logic and complexity. The inside of a computer is an autonomous and often carefully crafted world that is different from the ordinary world that we live in. It has a logic and "reality" of its own, but that logic and reality is very different from the everyday lived-in world as it follows only its own rules of logic. An expert programmer expresses his sentiment about the imaginary world of a computer like this:

"[...] in computer science you *create* the world. Within the confines of the computer, you're the creator. You get to ultimately control everything that happens. If you're good enough, you can be God. On a small scale. [...]"

You can do anything you want to do, in fact, but as you add complexity, you have to be careful not to create something that is inconsistent within the world you've created. For that world to be beautiful, it can't contain any flaws. That's how programming works. One of the reasons people have become so enamored with computers is that they enable you to experience the new worlds you can create, and to learn what's possible" [12, pp.73-74].

An operating system such as Linux can in this manner be regarded as an imaginary world. MUDs are from this perspective just one variety of the imaginary worlds that can be created by computer code. The computer thus represents a *very* complex system that is *very* logical and (barely) understandable/controllable. In other words, a worthy challenge for any self-respecting hacker.

Worlds of Text (Revisited)

Completing the circle and finding ourselves back where we started, computer code has now and then also been regarded as a genre of text, or literature:

Sussman learned to read programs with the same sensitivity that a literature buff would read a poem. There are fun programs with jokes in them, there are exciting programs which do The Right Thing,

and there are sad programs which make valiant tries but don't quite fly" [7, p.118].

Donald Knuth [5] goes further and concludes that programs in and of themselves constitute a literary genre:

"Computer programs are fun to write, and well-written computer programs are fun to read. [...] At first, I thought programming was primarily analogous to musical composition – to the creation of intricate patterns, which are meant to be performed. But lately I have come to realize that a far better analogy is available: Programming is best regarded as the process of creating *works of literature*, which are meant to be read.

Literature of the program genre is performable by machines, but that is not its main purpose. The computer programs that are truly beautiful, useful, and profitable must be readable by people. So we ought to address them to people, not to machines. All of the major problems associated with computer programming – issues of reliability, portability, learnability, maintainability, and efficiency – are ameliorated when programs and their dialogs with users become more literate."

On a similar theme, Lessig [6] points out how the US Congress creates "East Coast Code" that *in words* prescribes how to behave, while the software industry create "West Coast Code" that *through computer code* regulates or determines our behavior when we use computers and the Internet.

CONCLUSION

I have here pointed out a number of similarities and overlaps between different sorts of imaginary worlds in literature, role-playing games and computer code, but this opens the paper up to two different lines of legitimate critique.

The first is that any number of similarities can be found between many different things that are logical and controllable (chess, crossword puzzles, haiku poetry) and indeed between any two or three different things whatsoever.

The second is that beyond certain similarities, there are also a number of crucial differences between different imaginary worlds (degree of interactivity, degree of sociability, degree of control, degree of completeness or negotiability, between "active" creation and "passive" consumption). I have here concentrated on the similarities and glossed over these differences but they could instead be emphasized, developed and explored.

An especially interesting dimension is how the degree and types of control (or lack of control) differ between different imaginary worlds. Increased complexity on the one hand creates a more interesting imaginary world but

on the other hand decreases the level of control that is possible. This then creates a tension or perhaps even a contradiction if it is the promise of (possible, future) control that in the first place creates the strong attraction to such worlds. It might very well be the tip-of-the-tongue, now-you-see-it-now-you-don't, just-out-of-reach promise of control that constitutes the very attraction of these worlds. A personal movement of oscillating between being in-control and out-of-control also implies that the optimum level of complexity and challenge will differ between different individuals and within the same individual over time.

Although there obviously are degrees to which different persons are attracted to imaginary worlds and complex-but-logical-systems, it still seems that more and more people do come and will come in contact with them as they spread further into popular culture. If this is true, it obviously says something important about our age, our society and about us.

ACKNOWLEDGEMENT

I want to thank the anonymous reviewers who commented on the previous version of this paper. Although their insightful comments (for practical reasons) did not make a great impact on the paper itself, they did make an impact on my understanding of the problem at hand and how to go about to develop it.

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ⁱ A MUD – or a Multi-User Dungeon – is an Internet-accessible text-based multiplayer adventure game. While most MUDs, including the one I studied, are adventure games – most often enacted in a medieval fantasy setting – some are instead used for purely social purposes. See [3] for a short description of MUD systems.

ⁱⁱ It could be argued that every novel enacts an imaginary world but I will here restrict the discussion to fantasy and science fiction literature.

ⁱⁱⁱ For the purpose of this paper, technology is considered to play the same role in science fiction as magic does in fantasy literature. We here do well to remember Arthur C. Clarke's third law stating that "any sufficiently advanced technology is indistinguishable from magic".

^{iv} All information on Barker and Tekumel comes from [4].

^v I have chosen not to disclose the name of the author of this (unpublished) document.