

Using Science Fiction to teach Computer Science

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Abstract

The paper will describe an experimental course that uses science fiction to motivate students to explore specific topics in computer science, understand the evolution of computing and to evaluate the perceptions of computing by our society. In addition to exploring new areas of computer science the course is designed to strengthen the traditionally weak communications skills in computer science majors. The paper will discuss the planning for such a course, the use of the internet as a research tool for both the instructor and the students, and the outcomes for the students including technical expertise, knowledge of the evolution of computer science, communication skills, research skills and an awareness of the place of computing in society at large.

Introduction

The course grew from the desire to teach a survey style introduction to computer science concepts that would be accessible to any student regardless of background. Historically East Tennessee State University had a very low enrollment of non-majors in computer science classes. In addition, a course, the “Physics of Science Fiction Films” [1], had been successfully taught by Dr Luttermoser in the physics department for several summers. The plan was to use science fiction literature as a motivating point, and then have students use internet research sources to explore basic topics in computer science such as the history of computing, basic hardware issues, the function of an operating system, networking, the use and abuse of databases, and, if time allowed, a little programming in a simple language like LOGO [2].

The course was proposed as one of a series of ‘self supporting’ courses designed to encourage innovative topics. The usual minimum enrollment criteria was removed, and the professor’s salary was based on enrollment. Some initial advertising was done in the spring of 2002, but apparently not enough as the enrollment was 100% computer science majors, mostly rising sophomores and juniors. This required a very quick revision of the course to challenge these students. The course obviously needed to focus on more advanced areas of computer science, but there was also another opportunity here. The one criticism leveled at most computer science departments by their employers is that our graduate’s technical skill level is much higher than their written and oral communications skills. It was realized that this course would be an ideal platform to develop these skills. The redesign also brought out two more areas that could be addressed. The first was the

ability to assess the validity of technical claims made in documents aimed at a broad audience. The other was a chance to get computer scientists to try and take a step back and see how their work is perceived by the general public. Of course to keep student, and instructor, interested the course would also have to be ‘fun’ looking at fiction that naturally lead into the science topics, and also incorporating both written and performed science fiction works.

Development

Given this change, the first developmental task was to set the courses goals and methods to achieve them:

- 1) Increase students writing abilities
 - a. Weekly writing assignments critiqued by professor
 - b. Final research paper
- 2) Increase students oral communication skills
 - a. Weekly class discussions with feedback from instructor
 - b. Final oral presentation of research
- 3) Increase understanding of how society views computer science
 - a. Read literature made for a general audience that concerns computers and the fears/hopes of what computers might be in the future
 - b. Look at literature from different time periods to see changes
- 4) Be able to analyze proposed (fictional) technology in light of current technologies and predict its likeliness
 - a. Every written and oral presentation to focus on this
 - b. Lectures will also focus on this
- 5) Increase research skills
 - a. Weekly written assignment requiring factual research not given in class
 - b. Give WWW links as a starting point
- 6) Introduce areas of computer science not covered in main curriculum
 - a. Each weeks topic to focus on a different area
 - i. Covered in lecture
 - ii. Part of written assignment
 - iii. Part of discussion assignment

To accomplish these goals, certain resources were needed: a basic textbook, a set of factual computer science resources, a set of fiction that could be used to illustrate these concepts and a set of science fiction films that also illustrated the topics. The first requirement was a textbook. While not absolutely necessary to teach the course, most students find a level of confidence in having a textbook. In searching, a few works had dealt with themes in SF but not directly addressed the issue of computer science. Fortunately the series of “The _____ of Star Trek/Wars” books was reaching its zenith. This included the “The Computers of Star Trek” [3] by Gresham and Weinberg. The text starts with a brief history of the evolution of computing devices and a description of the von Neumann architecture and basic operating systems and networking principles. Then it presents basic security protocols, user identification encryption,

artificial intelligence, robotics and virtual reality. The text was very well suited for the course as it gives multiple examples of taking a piece of fictional technology and comparing it to the current technology. It also illustrated the idea of comparing the fictional technologies proposed to the state of the art at the time the fiction was written. While the computer science topics are diverse and presented at a very basic level, it could easily be supplemented to go further in depth on several of the topics as well as additional ones.

The next need was to fix the set of topics to cover. Since all of the students had a basic knowledge of programming and would be getting a solid background in the courses yet to come, this course was designed to explore topics and areas not normally covered using a set of fictional stories to illustrate the concepts. The short list of topics was: The history of computing, Knowledge Bases, Artificial Intelligence, Web Presence, Telepresence, Virtual Reality, and Computer Security.

Then a series of factual and fictional works on these topics was needed. The factual research was fairly straight forward. A scan of the University Library revealed some resources, however not enough. This was supplemented by numerous on-line resources found using the standard search engines such as Google [4], as well as a search of the ACM [5] and IEEE [6] web sites. The fiction, both written and video or film, was a bit more difficult. As a first step, the University library and the instructor's private library were scanned to find some pieces. Then a more in depth search was needed. Several of the science fiction index pages, the Science Fiction Resource Guide [7], The Ultimate Science Fiction Web Site [8], The University of Michigan Fantasy and Science Fiction Website [9], and The Science Fiction Foundation Collection Home Page [10], in particular were most useful in locating works that would support these topics.

The traditional problem at this point in development is getting copyright clearances to the works. This was expedited by the internet. The XAN-EDU service [11] allows one to upload a set of references and they handle the copyright searches and clearances. This easily cut weeks off of the lead time needed for a literature intensive course.

With the goals and resources in place, all that remained was the final planning (see the syllabus in the appendix) and the teaching of the course.

Teaching

The course, being a single summer term, was only 5 weeks in duration with the final week spent mostly on student presentations of their research work. This gave room for the main topics: History of Computing, Data and Knowledge Bases, Artificial Intelligence, Networks and Tele-presence. The course was designed to get students involved in analysis of the material as quickly as possible. They wrote papers on these topics each week of the course, while also preparing a final research paper that considered some aspect of computer science and its portrayal in science fiction.

Each topic was motivated by several science fiction readings and videos. The course introduced each main topic with a lecture that gave an overview of the technical area and also cited its presence in science fiction works. Parallels were drawn between the predictions made and the state of the art of the research at the time. The lectures were followed by the screening of selections from science fiction television shows and movies. Then a short quiz was given which covered that weeks readings and asked the students to do some analysis of the films they had just watched. The quiz was followed by a class discussion on the validity of the computer science that had been presented in the film. This served as a starting point for the student's required weekly essay. The discussion portion of the course was also aimed at getting the students more comfortable with presenting ideas in class. The fact that it dealt with the reading they had done before class and the film they had just seen as well as responding to other students opinions gave them experience "thinking on their feet" about the technical validity of new information in respect to what they already knew. This is one of the verbal skills that employers most frequently state they want to see more developed in our graduates. The essays also required them to do analysis of technical issues, but this time the resources were books and journals as well as a wide array of internet sources.

Each week they were presented with three choices in an essay topic, which would require them to analyze the fiction and fact that they had read (or seen in class) against both the technology of the time the fiction was written and the current state of the art. They were required to do further research about the area and present a critical analysis. A sample of the essay options is given below.

Sample Essay Assignment

- 1) Take any work of Science Fiction (OTHER than those assigned or viewed in so far in class) and examine the presentation of AI in it. Which of the areas within AI that we discussed in class are discussed in the fictional work?

Knowing where we are today in AI implementation is the AI:

- a. Superseded by today's technology
- b. Feasible with today's technology
- c. Beyond today's technology and
 - i. Possible
 - ii. Impossible

- 2) HAL was a landmark fictional AI. He did many amazing things in 2001 and 2010. Which of these things do you think are:

- a. Possible Now
- b. Were good predictions based on the technology of the 60s/80's
- c. Were just wishful thinking?

Justify your conclusions by citing facts about the AI of those eras and today.

- 3) The three readings all show Artificial Intelligence arising from different causes. Compare any two (or all three) of these stories. Consider how realistic the AI they show is in terms of its origin, and abilities. Consider the state of the art when the piece was written and what we know now.

One area that was given serious weight in the grading, and had been discussed at length in the class, was the necessity to validate the sources they were using. This issue has come to the fore in academic circles in recent years. Ten years ago the primary source for information in student papers was the University Library where the books and periodicals had been subjected to editing and peer review before publication and then selected by the professors and librarians for inclusion in the collection assuring a fair level of accuracy. I do not know of any formal studies, but the anecdotal evidence in the author's recent courses shows that the World Wide Web has now become the primary source. While this gives access to an unprecedented wealth of knowledge, there is no requirement for editing, peer review or selection of the information on the web. It has now become critically important for students to learn techniques for judging the validity of the information they are retrieving. In the first lecture of the course the basics of site evaluation are presented (who is the author, what is their reason for presenting the information, is the same information presented on other sites, is the information presented in a professional manner). These factors must then be used in selecting sources for the research papers.

Example

In the first week of the course two topics have to be covered, the first being how to extract technical information from fiction, and the second being the history of computing.

To set the tone for the class, the first 15 minutes are taken up with two video presentations. The first is from Star Trek IV “The Search for Spock” [12] the scene in which Scotty is trying to use a 1980’s era MAC. He first attempts to use the voice interface (non existent), and then attempts to use a mouse as a microphone to reach the voice interface and again fails. The 1980’s character suggests he uses a keyboard. Mr. Scott then proceeds, in the space of 15 seconds, to build at least 3 text documents, a spreadsheet and a fairly complex molecular diagram. In this, the students get to see great science fiction, well produced, visually appealing and completely awful computer science. This is followed by a scene from the television series “The Starlost” [13] where a young character from a primitive society is attempting to get information from a database via a natural language interface. The sets are low budget, the acting passable at best, but the computer science fairly good. The interface reacts to the keywords it understands and refuses or responds unexpectedly to unexpected input. The only shortcoming in the science is that the level of technology portrayed came to pass in 15 years from the shows production not the hundreds of years stated.

Then the lecture covers the history of computing devices from Naipers Bones through to ubiquitous computing on the net. The fictional readings for the week are:

“A Logic Named Joe” [14] an early work by Leinster with elements of AI in it, but which also makes an eerily accurate prediction of the creation of the World-Wide-Web, and the incredibly swift public acceptance of and dependence on this resource. “Starman Jones” [15] a juvenile work by Heinlein with incredibly detailed and accurate physics and celestial mechanics, but which requires a user to pre-process input to the ships computer using a slide rule and a book of binary logarithms because the computer can only take binary integers as input. The final selection is Asimov’s “Lives and Times of Multivac” [16]. This story is reasonably accurate, with the exception of its presentation of future computers as isolated mainframes. It is however included for a much different reason. It tells the story of the attempts of a group of humans to shut down the computer AI system that has assumed control of all mankind. It ends with the main character stating the system will soon shut down; however, his co-conspirators, realizing they will no longer be taken care of, are less than happy.

The topic concludes with the screening of two Star Trek episodes: “The Ultimate Computer” [17] from the original series, and “Contagion” [18] from the Next Generation. These two episodes clearly show how the perception of the computer in the workplace changed between the 1960’s and the 1980’s. In “The Ultimate Computer” the Enterprise has been fitted with the latest generation of computers, automating almost all functions and cutting its crew from 430 to 20. It contains several scenes in which Kirk and McCoy discuss the unfairness of being replaced by a computer, and how a computer can never do the same job as a person. In Contagion the Enterprise D computer is infected by an alien computer virus, which in and of itself is not great science. However, the key difference here is that the entire crew speaks of how impossible it is to perform their jobs without computers. In the span of 20 years the computer has come from being an enemy in the workplace to an ally.

The discussion that followed this was always quite lively. The majority of these students, in their early twenties, never knew the fear of being replaced by a computer that pervaded society in the 60's and 70's. They suddenly understand some of the deep seated distrust of computers that still pervades society.

Conclusions

The course was taught during the summers of 2002 and 2003, each class having about 15 students. Unfortunately, as a summer course, there was no formal evaluation by the students of the course. Ad-Hoc evidence based on conversations with several students in subsequent terms seems to show the goals were met. The students felt they were better prepared for written and verbal reports in terms of research, analysis of source material and presentations. Many also stated that this course was the first in which they had had to do independent analysis of "technical" information and that it had served as a good starting point for their later work.

In terms of course development, the topic by topic setup of the course has made it easy to create and update modules in the course. The basic framework of the course makes it adaptable to other disciplines and forms fictions, say the Psychology of Mysteries. While courses (and books) of this nature have been popular in academia for a while, the limited resources of any individual library made them difficult to teach. The ubiquity of the World Wide Web and the plethora of sources it makes available has made courses of this nature practical on any campus.

References

- 1) The Physics of Science Fiction Films. <http://www.etsu.edu/physics/courses.htm#scifi> retrieved 8/23/04
- 2) The LOGO Programming Language
<http://www.engin.umd.umich.edu/CIS/course.des/cis400/logo/logo.html>
Retrieved 8/24/04
- 3) “The Computers of Star Trek” Lois Gresh and Robert Weinberg, Basic Books US 1999
- 4) Google Search Engine www.google.com Retrieved 8/27/04
- 5) ACM Portal <http://portal.acm.org/portal.cfm> Retrieved 8/27/04
- 6) IEEE Member Digital Library
<http://www.ieee.org/products/ieeemdl/htmlpages/whatisit.html> Retrieved 8/27/04
- 7) The Science Fiction Resource Guide <http://www.sflow.org/SFRG/> Retrieved 8/26/04
- 8) The Ultimate Science Fiction Web Guide
<http://www.magicdragon.com/UltimateSF/SF-Index.html> Retrieved 8/25/04
- 9) The University of Michigan Fantasy and Science Fiction Website
<http://www.umich.edu/~umfandsf/> Retrieved 8/25/04
- 10) The Science Fiction Foundation Collection Home Page
<http://www.liv.ac.uk/~asawyer/sffchome.html> Retrieved 8/25/04
- 11) Xanadu Homepage <http://www.xanadu.com/> Retrieved 8/27/04
- 12) Star Trek IV The Voyage Home, Paramount Pictures, Nimoy and Bennett Directors, 1986
- 13) The Starlost, “Voyage of Discovery’ Codrainer Bird Scriptwriter Harvey Hart Director 1973
- 14) “A Logic Named Joe” Murray Leinster in Machines That Think: The Best Science Fiction Stories About Robots and Computers Isaac Asimov, Patricia S. Warrick, Martin H. Greenberg eds. Henry Holt & Co New York 1984
- 15) Starman Jones Robert A. Heinlein Del-Rey Press Toronto 1975

16) Lives and Times of Multivac Isaac Asimov in the Bicentennial Man and Other Stories Fawcett Crest New York 1975

17) Star Trek “The Ultimate Computer” Dorothy Fontana Scriptwriter, John Meredyth Lucas Director 1968

18) Star Trek the Next Generation “Contagion” Steve Gerber and Beth Woods Scriptwriters, Joseph L. Scanlon Director 1989

Appendix One: The syllabus from the summer 2003 Session

CSCI 4956/5956
The Computer Science of Science Fiction

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Texts : The Computers of Star Trek. Gresh and Weinberg
 : Course Packet of short fiction
Supplements : Will be posted on-line, or distributed.
Prerequisites : CSCI 1250 or CSCI 1700
WWW Site : Blackboard Site established

Overview

This course will look at the portrayal of Computers and Programs in Science Fiction Literature, Television and Movies. We will examine how the view of computers and computing has changed over the years. We will also see how close the current state of the art in areas such as Artificial Intelligence, Automation, Networking and Database is to these predictions.

Assignments the course will have:

Five quizzes: 20% of Final Grade

These will be 5 to 7 short answer questions drawn directly from the preceding lecture and/or film presentation, the time limit will be 10 minutes.

Four short papers 40% of Final Grade

On each Wednesday one or more topics will be given for a paper to be written analyzing the topic we have covered and the assigned readings. Students will be expected to do more research on the topic on line, or in the library, additional fiction that illustrates the topic, and/or factual information on the science is expected. **ALL**

SOURCES USED ARE TO BE CITED, use the APA or Turabian style. Using a source means using ideas or concepts from the paper. **ALL DIRECT QUOTES FROM A SOURCE ARE ALSO TO BE CITED AND ENCLOSED IN QUOTATION MARKS.** The paper will be graded on the number and quality of sources, the effectiveness of the arguments made, grammar and spelling, organization and adherence to the topic. The papers will be four to five pages in length, typed 11-point font, space and a half line spacing with 1-inch margins on all sides.

Five Class Discussions 15% of Final Grade

Following each film and quiz we will hold a class discussion; points will be awarded based on the quantity and quality of contributions to the discussion.

A Term paper 15% and a presentation of that paper 10% The paper will be 10-15 pages in length. The student and instructor will agree upon the topic and sources in advance. The grading criteria will be the same as used for the short papers. In addition the results of your research will be presented to the class in a presentation of 8-10 minutes duration, and evaluated by both myself, and your peers. Note that part of your grade will come from the constructiveness of your evaluation of your peers.

A list of possible suggested topics and a bibliography of fictional work, and computer science works will be available on the blackboard site.

Unless otherwise stated a paper is due one week from the day it is handed out. Papers will be accepted without penalty until the start of class on the day it was announced due. Past this point, the assignment is considered overdue and 10 percent of the grade will be deducted for each 24 hour period (or fraction thereof) that passes until it is turned in, up to 4 days, thereafter the assignment is worth 0. If you are having problems with an assignment, see me BEFORE the due date and we will deal with the situation. A missed quiz or discussion will count as a zero.

Readings

Readings beyond those in the text or course packet will either be distributed in class or placed in a folder called "Week N Readings" in the External Links section of the Blackboard site. Each student is expected to have completed the assigned readings BEFORE the start of that week's class.

Your assignments will be graded as promptly as is possible. If you wish to have an assignment re-graded ask me within one week of the assignment being returned. When re-grading an assignment the entire assignment will be re-graded. The chart below will be used in figuring percentage to letter grade conversions.

Percentage	Letter Undergraduate	Letter Average	Letter Graduate
93-100	A	96.5	A
90-92	A-	91.0	A-
87-89	B+	88.0	B+
83-86	B	84.5	B
80-82	B-	81.0	B-
77-79	C+	78.0	C+
73-76	C	74.5	C
70-72	C-	71.0	C-
67-69	D+	68	F
60-66	D	63	F
0-59	F	29.5	F

Guidelines

Much of the work in this class will involve short answer, and essay questions. For your answers to receive full credit they must be legible, and well organized.

The prerequisites for this course are a requirement for enrollment; students who have yet to take these courses may be administratively dropped from the roll. If you have not taken these courses, but feel you have a sufficient background, you must meet with me to demonstrate this fact, and then may receive a written waiver, if it is merited.

The schedule for quizzes is below. If you have a schedule conflict, you should see me beforehand. A missed quiz will be automatically averaged in as a grade of zero. Class attendance is not mandatory, but is highly recommended. It remains your responsibility to get all assignments and class notes. It is also your responsibility to check

regularly for notifications of changes in the course assignments. Class notices will be posted to the Blackboard sites and/or emailed to student's ETSU assigned e-mail accounts. It is expected that you will, as always, conduct yourselves according to the highest ethical standards. All work on quizzes, short papers and the term paper is expected to be exclusively yours. You may work with other students when preparing homework solutions. However, such collaboration should only involve approaches to the problems and general issues. Each student must write their own solution to each problem in their own words. If you have a question as to the degree of collaboration allowed, ask me first.

Academic Dishonesty, including but not limited to plagiarism (as described in the A.S.T. Language Skills Handbook), sabotage of another students work, giving or signaling answers during an exam, will not be tolerated. One incident will result in a zero for the assignment involved. Two incidents will be grounds for immediate failure of the course and/or disciplinary action. As a clarification of the CAST policy on plagiarism, any use of phrases from work not your own will be considered plagiarism, as will trivial re-sequencing of the words in other persons work. For example if a web-site, article, or other persons HW contains the phrase: "Rotational Delay is the time for the disk head to cycle completely between two blocks" your use if the answer "The time for the disk head to cycle completely between two blocks is the rotational delay time" would be considered plagiarism, as would the direct use of the original sentence. Note also that web sites, news groups, mailing list archives while all valid resources for your use are considered as published works in terms of plagiarism.

Graduate Participation

Graduate students enrolled in this course will complete the same assignments as the undergraduates. However their short papers and term papers and presentations will be 20% (or one page whichever is greater) than the requirements listed for undergraduates. In addition a greater level of synthesis will be expected in their work.

Proposed Syllabus

Attached is a tentative schedule for the course.

It may become necessary to amend this schedule during the term.

Lecture and HW Schedule

Week	Class	Title	Chap	Short Paper Due	Quiz	Term Paper
1	June 2	Introduction, Definitions	1,2			
	June 4	Computers Frankenstein or Frigidare			1	
2	June 9	Databases I		1		
	June 11	Databases II			2	Topic
3	June 16	AI Part I	5,6	2		
	June 18	AI Part II			3	Sources
4	June 23	AI Part III	3,8	3		
	June 25	Security, Hacking			4	Outline
5	June 30	Networks, VR, Tele-presence	7	4	5	
	July 2	Presentations				Final Paper

Reading Assignments

Week	Reading	Author	Date	Collection
1	The Lives and Times of Multivac	Asimov, Isaac	1975	Bicentennial Man and Other Stories
1	Answer	Brown, Fredric	1954	Machines That Think
1	Starman Jones	Heinlein, Robert	1953	
1	A Logic Named Joe	Leinster, Murray	1946	Machines That Think
2	Soldier Ask Not	Dickson, Gordon	1967	
2	Foundation's Conscience	Zebrowski, George	1989	Foundation's Friends
3	Dial F For Frankenstein	Clarke, Arthur C.	1963	Machines That Think
3	The Moon Is a Harsh Mistress	Heinlein, Robert	1965	
3	Code of The Lifemaker	Hogan, James	1983	
4	The Bicentennial Man	Asimov, Isaac	1976	Machines That Think
4	Valentina Soul in Sapphire	Delaney & Stiegler	1984	
4	The Electric Ant	Dick, Phillip K	1969	Machines That Think
5	That Thou art Mindful of Him	Asimov, Isaac	1974	Bicentennial Man and Other Stories
5	Waldo	Heinlein, Robert	1940	Waldo & Magic, Inc.

Title	Scriptwriter(s)	Air Date	Series
Week One			
The Voyage Home (IV)	Leonard Nimoy & Harve Bennett	26-Nov-86	Star Trek Movies
Voyage of Discovery	Cordwainer Bird	22-Sep-73	The Starlost
The Ultimate Computer	L.N. Wolfe & D.C. Fontana	08-Mar-68	Star Trek
Contagion	Steve Gerber and Beth Woods	20-Mar-89	Star Trek The Next Generation
Week Two			
Voyage of Discovery	Cordwainer Bird	22-Sep-73	The Starlost
The Goddess Calabra	Martin Lager & Ursula K. Le Guin	06-Oct-73	The Starlost
Gallery of Terror	Alfred Harris & George Ghent	17-Nov-73	The Starlost
Star Wars Episode II	Lucas	16-May-02	
Wolf in The Fold	Robert Bloch	22-Dec-67	Star Trek
Elementary My Dear Data	Brian Alan Lane	05-Dec-88	Star Trek The Next Generation
Week Three			
2001 A Space Odyssey	A. Clarke & S. Kubrick	03-Apr-68	
2010 The Year We Make Contact	A. Clarke & P. Hyams	01-Jan-84	
Week Four			
The Changeling	John M. Lucas	26-Sep-67	Star Trek
The Measure of a Man	Melinda Snodgrass	12-Feb-89	Star Trek The Next Generation
Emergence	Braga & Menosky	09-May-94	Star Trek The Next Generation
Week Five			
The Booby Trap	Roman & Piller	30-Oct-89	Star Trek The Next Generation

Every week will follow the same format

Monday: Collection of short papers from the prior week, lecture on the science and the fictional representations of the science

Wednesday: A movie or episodes of a series that illustrate the point, a quiz will follow the presentation covering the Monday lecture and the movie. We will conclude with a class discussion (graded) on what was shown and how it applies to the movie. Then the short paper assignment will be given

Appendix Two: Bibliography of Science Fiction Works featuring Computers and Computer Science

Bibliography for the CS of SF

Title	Author	Date	Collection
Harvest of Stars	Anderson, Poul	1993	
The Positronic Man	Asimov & Silverberg	1992	
Foundation	Asimov, Isaac	1951	
Foundation and Empire	Asimov, Isaac	1952	
Second Foundation	Asimov, Isaac	1953	
The Caves of Steel	Asimov, Isaac	1953	
The Rest of The Robots	Asimov, Isaac	1964	
That Thou Art Mindful of Him	Asimov, Isaac	1974	The Bicentennial Man
The Life and Times of Multivac	Asimov, Isaac	1975	The Bicentennial Man
The Bicentennial Man	Asimov, Isaac	1976	The Bicentennial Man
Foundation's Edge	Asimov, Isaac	1982	
The Robots of Dawn	Asimov, Isaac	1983	
Robots and Empire	Asimov, Isaac	1985	
Foundation and Earth	Asimov, Isaac	1986	
Prelude To Foundation	Asimov, Isaac	1988	
Forward the Foundation	Asimov, Isaac	1993	
Foundation and Chaos	Bear, Greg	1998	
Foundation's Fear	Benford, Gregory	1997	
Moonwar	Bova, Ben	1998	
Foundation's Triumph	Brin, David	1999	
Answer	Brown, Fredric	1954	Machines That Think
Cyborg	Caidin, Martin	1972	
The Rapture Effect	Carver, Jeffrey	1987	
The City and The Stars	Clarke, Arthur C.	1953	
The Ultimate Melody	Clarke, Arthur C.	1956	Tales From The White Hart
Dial F For Frankenstein	Clarke, Arthur C.	1963	Machines That Think
The Lost Worlds of 2001	Clarke, Arthur C.	1972	
2061:odyssey three	Clarke, Arthur C.	1987	
The Final Odyssey	Clarke, Arthur C.	1997	
Fatal Error	DeCandido, K.R.A.	2000	Star Trek S.C.E. Book 1
Valentina	Delaney & Stiegler	1984	
Independence Day	Devlin,Emmerich, Molstad	1996	
The Electric Ant	Dick, Phillip K	1969	Machines That Think
Soldier Ask Not	Dickson, Gordon	1967	
The Final Encyclopedia	Dickson, Gordon	1984	
The Chantry Guild	Dickson, Gordon	1988	
Permutation City	Egan, Greg	1994	
I Have No Mouth and I Must Scream	Ellison, Harlan	1967	Machines That Think
Harmonies of The Net	Fancher, Jane	1992	
The Questor Tapes	Fontana, D.C.	1974	
Marooned on Eden	Forward & Forward	1993	
Return to Rocheworld	Forward & Fuller	1993	

Rocheworld	Forward, Robert	1990	
When Harlie Was One	Gerrold, David	1972	
The Difference Engine	Gibson & Sterling	1991	
Foundations Conscience	Zebrowski, George	1989	Foundation's Friends
The Turing Option	Harrison & Minsky	1992	
Misfit	Heinlein, Robert	1939	Revolt in 2100
Waldo	Heinlein, Robert	1940	Waldo & Magic, Inc.
Starman Jones	Heinlein, Robert	1953	
The Moon Is a Harsh Mistress	Heinlein, Robert	1965	
Time Enough for Love	Heinlein, Robert	1973	
To Sail Beyond The Sunset	Heinlein, Robert	1987	
The Butlerian JihAD	Herbert & Anderson	2002	
Inherit The Stars	Hogan, James	1977	
The Two Faces of Tomorrow	Hogan, James	1979	
Giants' Star	Hogan, James	1981	
Code of The Lifemaker	Hogan, James	1983	
Code of The Lifemaker	Hogan, James	1983	
			Minds, Machines & Evolution
Silver Shoes for a Princess	Hogan, James	1988	
Entoverse	Hogan, James	1991	
Realtime Interrupt	Hogan, James	1995	
The Immortality Option	Hogan, James	1995	
A Logic Named Joe	Leinster, Murray	1946	Machines That Think
Cybernetic Samurai	Milan, Victor	1985	
Dream Park	Niven, L. & Barnes, S.	1981	
Becalmed In Hell	Niven, Larry	1965	Tales of Known Space
A World Out of Time	Niven, Larry	1976	
One Face	Niven, Larry	1979	Convergent Series
The Schumann Computer	Niven, Larry	1979	Convergent Series
The Integral Trees	Niven, Larry	1983	
The Barsoom Project	Niven, L & Barnes, S.	1989	
The California Voodoo Game	Niven, L & Barnes, S.	1992	
	Niven, L. , Pournelle J. & Flynn, M.	1991	
Fallen Angel	Nolan, W. & Johnson, G.	1967	
Logan's Run	Orwell, George	1949	
Nineteen Eighty Four	Piper, H. Beam	1963	
The Cosmic Computer	Pohl, Frederik	1976	
Gateway	Pohl, Frederik	1980	
Beyond The Blue Event Horizon	Pohl, Frederik	1984	
Heechee Rendezvous	Pohl, Frederik	1987	
The Annals of the Heechee	Robinson, Kim S.	1993	
Red Mars	Ryan, Thomas	1977	
The Adolescence of P-1	Sheffield, Charles	1993	
The Mind Pool	Stasheff, Christopher	1969	
The Warlock in Spite of Himself			