

A Brief History of Computer Games

The machines, the games, and the people behind them.

Introduction

When I was 12, my parents bought me a Commodore VIC-20, my first computer. It was a simple, cheap, and limited machine. Despite that, I was the happiest kid in the world the day I opened that box.

You should know that computers didn't have a friendly operating system or pre-installed software then. In fact, the only life sign I saw when I switched the VIC-20 on was a short message and a blinking cursor. However, the Commodore engineers were kind enough to provide an instruction manual, 164 pages long.

The first page, excluding the description of the cables and switches, contained three lines of code. I immediately started typing these lines, my first program ever, and the computer executed them. It was a revelation. A computer, a real computer, ready to be programmed! I fell in love with coding that day, and many years later, I still love it.

It turned out that the manual was a sort of crash course on programming. Once I finished it, I wanted to know more. Unfortunately, there was no Wikipedia or YouTube. There was not even the Internet. There were books, but books were expensive, and I didn't have a bookstore close to my home. That's why I had to rely on the primary source of knowledge in the 80s: the newsstand.

Newsstands were a paradise. There were magazines about everything and tons of publications about computers and electronics. Some of them included cassettes with games you could load on your computer. Some others had technical articles, guides, and also program listings. These were long pages full of lines of code you had to patiently type on your computer, wondering what would be the result (usually, not the one you expected).

My favorite was an Italian magazine called LIST, which, as you can imagine, was mostly just program listings. The problem was not all programs were for the VIC-20. This is how I realized that my little machine was not alone. The world was full of marvelous machines called *home computers*. They had fancy names such as Commodore 64, ZX Spectrum, SEGA SC-3000, Texas TI 99/4A, Apple II, BBC Micro, Oric-1, and many more. I didn't know then, but I lived in the golden age of home computers and 8-bit technology.

Soon after, all my friends had a computer; Italy was a market dominated by Commodore, so, in most cases, it was a Commodore 64. Since everybody had a computer, we started to spend afternoons playing games: *Archon* was one of our favorites, but we also played a lot of *Pitstop II*, *Burger Time*, *Ghostbusters*, *One-o-one*, not to mention the joystick breakers *Activision Decathlon* and *Summer Games*. This is how my passion for computer games started, and it was destined to last.

Years later, at the end of the '80s and beginning of the '90s, I played all the best Amiga games: from *Turrican* to *Lemmings*, *Another World*, *Elite*, or *Dune II*, not to mention the infinite matches against my friends at *Kick Off 2* and *Sensible Soccer*. Then the PC era arrived. Computers had more memory, more processing power, better graphics, and high-quality sound. The games were fantastic. I played *Ultima VII*, *Civilization*, *Colonization*, *Eye of the Beholder*, *Wing Commander*, the LucasArts adventures, and too many titles to list them all.

Today, many birthdays later, my passion for computer games is still alive.

So alive, I decided to go back to the past and study everything about them. First, who invented the first home computers, and how? Besides, how did the arrival of the first computers in everybody's home change the history of video games?

Computer games are different because the same machine where they were played could also be used to create them. Unlike coin-op or console titles, exclusively released by big companies like Atari or Namco, everyone can make a computer game. This is why the story of computer games is so fascinating. Thanks to home computers, kids and students in the '80s could start to tinker with a programming language and develop their ideas. Many game designers, and even big game companies, started this way. Who were these people, and how did they create the games that made history?

Another exciting aspect is the variety of platforms. See, for example, the chart below, which shows the number of games released for each computer during the years.

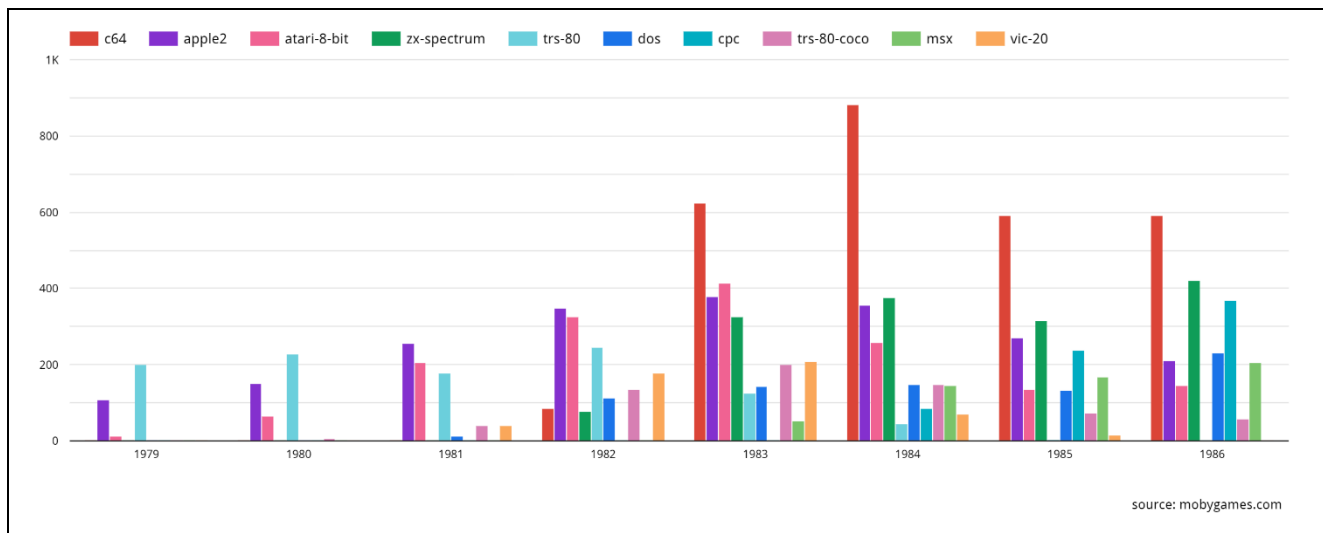


Figure 1 - Year by year, the number of games released for each computer - from 1979 to 1986.

There were so many unique models. How could companies possibly have created versions of their games for all these different computers?

Some platforms were more popular than others, but it's not just about the number of releases. Some computers were more influential than others. Which platform was the favorite of the game developers? Which ones gave birth to the best games? Was the Apple II more significant than the Commodore 64?

In short, what are the machines and the titles that made the history of computer games?

In this short ebook, I'll try to answer all the above questions as best as possible.

Just one final note in this introduction. This is not a book about *video games*. If not briefly, you won't read about *Space Invaders* or *Pac-Man* here. This is also not a book about *console games*, so there won't be any mention of *Mario*, *Sonic*, *Zelda*, or their creators.

This book is about *computer games* and their history, which started in 1977.

The primary sources for all the stories you will read in this book are "*Hackers: Heroes of the Computer Revolution*" by Steven Levy, "*Break Out: How the Apple II Launched the PC Gaming Revolution*" by David L. Craddock, and Jimmy Maher's fantastic blog "*The Digital Antiquarian*". You might also find occasional references to Brian Bagnall's book *Commodore: A Company on the Edge*.

The numbers and charts in this book are possible thanks to a fantastic website called mobygames.com, the oldest, largest, and most accurate video game database.

1977

In 1977, I was five years old, and I hadn't the faintest idea that computers existed. However, many kilometers from my home, on the other side of the ocean, something important was happening. Three companies, Commodore, Apple, and Tandy, would release the first successful *personal* computers. Of course, computers existed before 1977, but they were big, expensive, and required a team of experts to be operated. This changed in 1977.

In January, Commodore announced the *PET 2001*, a machine designed by Chuck Peddle, the engineer who also created the 6502 microprocessor. It took months after the announcement for the actual product to be released, during which Steve Wozniak and Steve Jobs released the *Apple II* with their newly founded company, Apple. Almost at the same time, Tandy Corporation released the *TRS-80*.

These three machines, now known as the *1977 Trinity*, were the first fully assembled computers, easy to use, and cheap enough for ordinary people to buy. Some called them *microcomputers* to distinguish them from *minicomputers* (machines smaller than mainframes but still the size of a wardrobe).

Microcomputers started to appear before 1977, but they were sold in kits and required some technical knowledge. The PET, the Apple II, and the TRS-80 were different. That's why a new name was introduced: *personal computers*.

Introducing Apple II.™

Clear the kitchen table. Bring in the color TV. Plug in your new Apple II and connect any standard cassette recorder/player. Now you're ready for an evening of discovery in the new world of personal computers. Only Apple II makes it that easy. It's a

You've just run out of excuses for not owning a personal computer.

Cassette interface, so you can swap with other Apple II users. You can create dazzling color displays using the unique color graphics commands in Apple BASIC. Write simple programs to display beautiful kaleidoscopic designs. Or invent your own games. Games like PONG—using the game paddles supplied. You can even add the dimension of sound through Apple II's built-in speaker.

But Apple II is more than an advanced, infinitely flexible game machine. Use it to teach your children arithmetic, or spelling for instance. Apple II makes learning fun. Apple II can also manage household finances, chart the stock market or index recipes, record collections, even control your home environment.

Right now, we're finalizing a peripheral board that will slide into one of the eight available motherboard slots and enable you to compose music electronically. And there will be other peripherals announced soon to allow you to talk with another Apple II, or to interface to a printer or teletype.

Apple II is designed to grow with you as your skill and experience with computers grows. It is the state of the art in personal computing today, and compatible upgrades and peripherals will keep Apple II in the forefront for years to come.

Write us today for our detailed brochure and order form. Or call us for the name and address of the Apple II dealer nearest you. (408) 956-1010. Apple Computer Inc., 20803 Stevens Creek Boulevard, Bldg. B3-C, Cupertino, California 95014.

Apple II™ is a completely self-contained computer system with BASIC in ROM, color graphics, ASCII keyboard, lightweight, efficient switching power supply and molded case. It is supplied with BASIC in ROM, up to 48K bytes of RAM, and with cassette tape, video and game I/O interfaces built-in. Also included are two game paddles and a demonstration cassette.

SPECIFICATIONS

- Microprocessor: 6502 (1 MHz)
- Video Display: Memory mapped, 5 modes—all Software-selectable.
 - Text—40 characters/line, 24 lines upper case.
 - Color graphics—40h x 48v, 15 colors
 - High-resolution graphics—280h x 192v; black, white, violet, green (12K RAM minimum required)
 - Both graphics modes can be selected to include 4 lines of text at the bottom of the display area.
- Completely transparent memory access. All color generation done digitally.
- Memory: up to 48K bytes on-board RAM (4K supplied)
 - Uses either 4K or new 16K dynamic memory chips
 - Up to 128K ROM (8K supplied)
- Software
 - Fast extended BASIC in ROM with color graphics commands
 - Extensive monitor in ROM
- I/O
 - 1500 bps cassette interface
 - 8-slot motherboard
 - Apple game I/O connector
 - ASCII keyboard port
 - Speaker
 - Composite video output

Apple II is also available in board-only form for the do-it-yourself hobbyist. Has all of the features of the Apple II system, but does not include case, keyboard, power supply or game paddles. \$598.

PONG is a trademark of Atari Inc.™

*Apple II plugs into any standard TV using an inexpensive modulator (not supplied).

apple computer inc.™

Circle 272 on inquiry card.

Figure 1 - Apple II ads (1977)

Once people started to buy these new devices, a problem arose: what to do with them? The cover of the October 1977 issue of Popular Science shows a Commodore PET calculating the calories of an Oriental Salad recipe. A December 1977 Apple advertisement shows a man analyzing stock market charts on his Apple II. But the reality was different; playing games was what most computer owners ended up doing. Including me, when, years later, I became one of them.

The idea of creating computer games was not new. Computer enthusiasts started to develop games long before 1977. **The Oregon Trail** is perhaps the most famous example. Everybody knows the 1985 Apple II version in the U.S., but the program was written in 1971 for the HP-2100.

Colossal Cave Adventure, the title that gave birth to the text adventure genre, was programmed on a DEC PDP-10 mainframe, like the famous Infocom's **Zork**.

The BASIC language interpreter, created by Bill Gates and Paul Allen in 1975 and known as *Microsoft BASIC*, made programming even more popular and led to the creation of many amateur games. Until then, BASIC, much easier than the standard machine language, was only available on large computers. Gates and Allen, the founders of Microsoft, were the first to create a microcomputer version.

As we will see later, the BASIC language would fundamentally influence the history of computer games.

Microsoft BASIC was also the first example of commercial software. At that time, the mere concept that somebody could create a computer program and make money selling it did not exist.

In a way, Bill Gates invented it and paved the way for business based on software, including computer games. With the arrival of home computers, an activity that was just a hobby became profitable.

I will start talking about games in the next chapter, but first, let's return to the *Trinity*. What kind of machines were they?

The Commodore PET was an all-in-one computer based on an 8-bit chip, the MOS Technology 6502 microprocessor. It had only 4 or 8KB of RAM and a monochrome 9-inch monitor. There was no need for a color monitor because it could not show colors or graphics, only text. There were special characters, a sort of glyphs, you could combine to make graphics. I will talk about them later.

The PET included the best BASIC language interpreter available at the time, the one developed by Bill Gates and Paul Allen.



Figure 2 – Commodore PET

The Apple II, designed by Steve Wozniak, was still based on the 6502 chip. It had 4KB of RAM and included a keyboard and two game paddles. There was no monitor; users needed to connect it to a TV. The fact that it had paddles shows that Wozniak thought about games since the beginning. In fact, the Apple II was the only one of the three computers with bitmap graphics and colors (four).

The BASIC language was not as good as the one developed by Microsoft and could only operate on integer numbers. However, the hardware design of the Apple II was clearly better than the other machines. This is why it would continue to be produced for many years.



Figure 3 – The Apple II

The TRS-80 Model I, released by Tandy Radio Shack, was based on the Zilog Z80 microprocessor; it had 4KB of RAM and an optional black and white TV as a monitor. It could show only text, with uppercase letters only. Since it had no ROM to store the BASIC interpreter, the language included (known as Tiny BASIC) was very limited.

The components used to build the TRS-80 were very cheap, and it was clearly the less reliable and user-friendly computer of the three. Despite this, it had the lowest price and was readily available at the many Radio Shack stores around the US, so it became the most successful of the trio during the first years. As Bill Gates said in 1993, "*Radio Shack, with its distribution and its name, set the market on fire*".



Figure 4 – The TRS-80

When the three models were released, the only games available were the ones created by the computer makers. The first PET manual, for example, included the program listing of a *Lunar Lander* clone. The Apple II manual included the code of *Breakout*, the famous arcade designed by Wozniak for Atari.

Not much, but it was only the beginning.

1978

The first commercial games appeared in 1978.

At least, I thought this until I read about *Peter Jennings* and **MicroChess**.

In 1975, MOS Technology (later acquired by Commodore) released a microcomputer called KIM-1. Chuck Peddle designed it as a demo product for the new microprocessor 6502. It was a single-board computer, the predecessor of the Commodore PET. If you have seen a *Raspberry PI*, imagine a big Raspberry PI with a small keyboard and a small LCD screen mounted on top.

In May 1976, programmer and chess player Peter Jennings bought a KIM-1 and decided to write a chess program. With just 1KB, it wasn't an easy task, but after months of programming and testing, the program could beat other human players. In December 1976, Jennings started to sell Microchess for \$10. Peddle offered \$1000 to purchase the rights to the program (maybe to include it with the PET, who knows?), but Jennings refused, thinking that he would make more money by selling his software. He was right because his game became a success.

In 1978, Jennings released versions of Microchess for the TRS-80, Apple II, and Commodore PET, but, as far as I know, his KIM-1 version released in 1976 was the first commercial game.

Not all computer games released in 1978 were advanced like Microchess. The first titles released in 1978 were simple board games inspired by the great classics like Checkers, Othello, and Mastermind or adaptations of famous arcades such as *Breakout* or *Pong* or ports of old mainframe games.

It is crucial to realize that at the time, there were no books teaching programmers how to make games, no developer tools, and not enough technical documentation. The only one was the official manual, which generally contained an introduction to the BASIC language.

Actually, the BASIC interpreter was the only software pre-installed on those machines. When the lucky owners of the PET, Apple II, or TRS-80 switched on their computers, they were welcomed by a screen telling them that the interpreter was ready to accept commands. Users had two options: loading an existing program from a tape or typing their BASIC program.

Many (like me) opted for the second choice, and some became passionate about coding and game development. This is why many computer games, including the first commercial titles, were developed in this simple language.

Creative Computing, the magazine for computer hobbyists founded in 1974 by *David H. Ahl*, played a significant role in teaching people how to code in BASIC.

The magazine started to publish program listings, including games, even before the year of the "Trinity" and even before Microsoft BASIC existed.

In January 1978, after the arrival of the first computers, David Ahl released a second edition of his book **BASIC Computer Games**. The 101 programs were ported to the Microsoft BASIC dialect, making the games compatible with most home computers. Precisely when people needed something to do with their new toys.

In most cases, those titles were the first games computer owners played on their machines. **BASIC Computer Games, Microcomputer Edition**, would become the first computer book to sell a million copies.

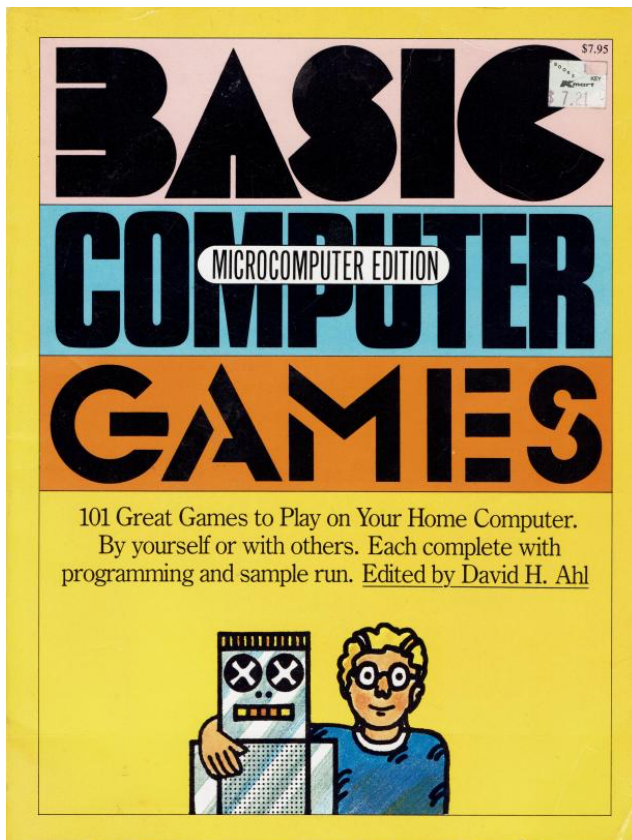


Figure 1 – BASIC COMPUTER GAMES, Microcomputer Edition (1978)

It's a pity this book was never distributed to Italy (and probably Europe). But since it was an essential piece of history, I bought it 40 years later from a collector – better late than never. I also had the chance to interview David Ahl (you can read the interview [here](#)).

For most people, the main reason for buying the book was to get the program listing for **Super Star Trek**. This was an enhanced version of the famous Star Trek game initially created by *Mike Mayfield*, then improved by *Bob Leedom*, and finally republished in 1978 in the Creative Computing book. David Ahl and Steve North reported it to Microsoft BASIC. Star Trek was the most played game on mainframes and, thanks to this book, became the most played game on home computers.

Star Trek is an early example of a sci-fi turn-based strategy wargame. Your goal is to find and destroy the Klingon fleet spread over 64 sectors, carefully managing the limited energy, using your phasers and torpedoes. Despite the simple mechanics and the text-only interface, it is delightful to play. In fact, I like it so much that I created several remakes of Super Star Trek.

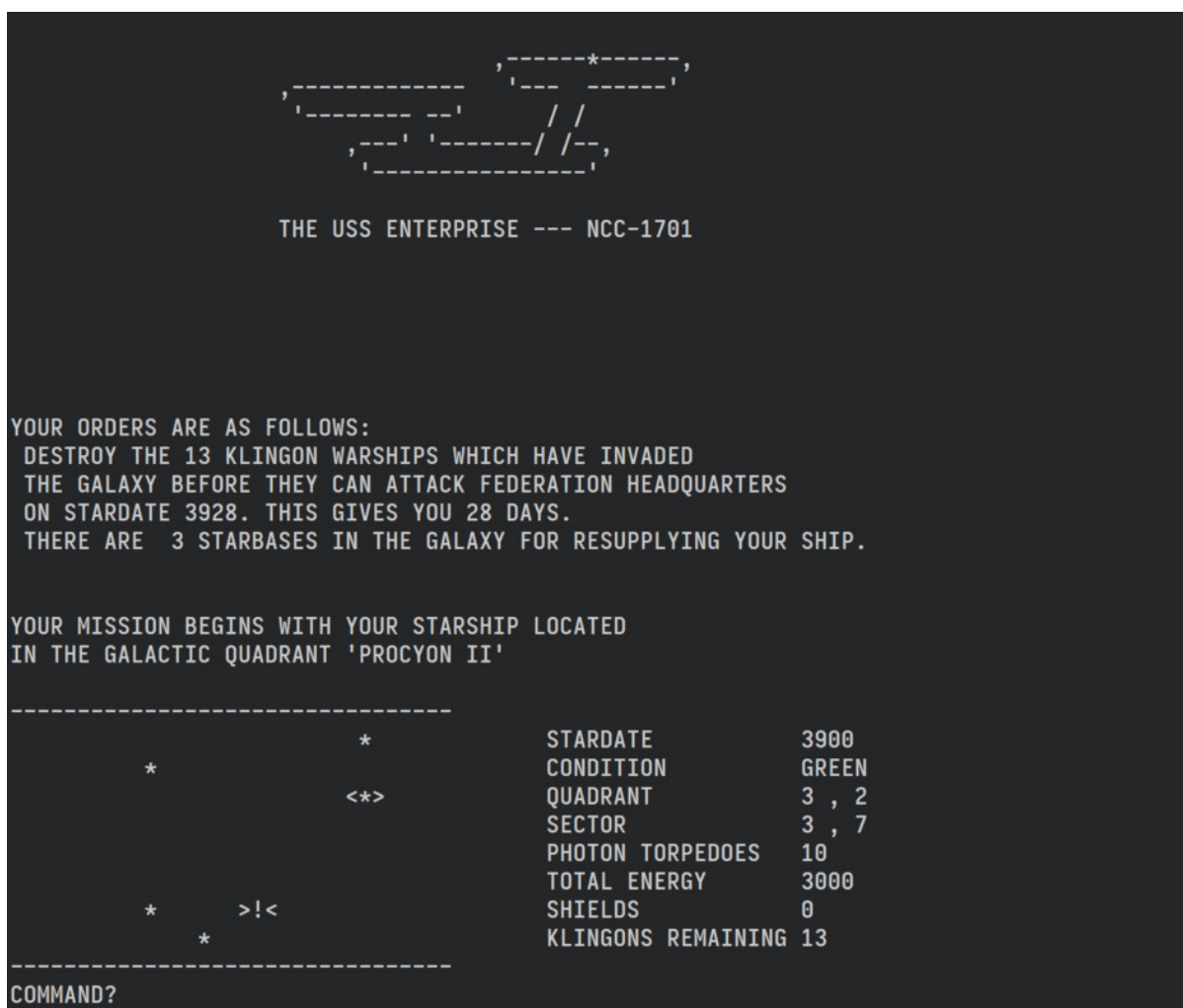


Figure 2 – Super Star Trek (1978)

The book published by Creative Computing cost \$7.95, but all the games contained in it were not commercial titles.

Starfleet Orion, instead, an early space wargame for two players created by *Jon Freeman* and *Jim Connelley*, was a commercial game. It was [developed in BASIC](#) for the Commodore PET and then ported to TRS-80 and Apple II. They started to sell the game in December 1978 with their newly founded company.

The game didn't become so famous. But the company founded by Freeman and Connelley, *Automated Simulations*, later rebranded as *Epyx*, would become one of the most important publishers of the '80s. During the "Commodore 64 years", I played most of their games, but we'll discuss them in the following chapters.

Another title released in December 1978 was **Adventureland**, the first of a long series of text adventures created by *Scott Adams*.

The genre of text-based adventures was not new; as I said, it started with *Colossal Cave Adventure*, a game created in 1975-76 by Will Crowther. However, developing an adventure game for a mainframe with 1MB of memory is not like making it for a home computer. Adventure games are complex programs because they need to store a lot of rooms, objects, and characters. Plus, they need to include a *parser*, a way for the computer to understand the commands typed by the players on the keyboard. All of this was not easy with the limited resources of a home computer.

Adventureland is the first text adventure explicitly created for a home computer. It was not very sophisticated; it only accepted commands made of 2 words, and the story was almost non-existent. But if you consider that Adams programmed the game in BASIC on his TRS-80, with just 16K of RAM, it was an impressive achievement.

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*** WELCOME TO ADVENTURE LAND. (<#4.2>) ***

UNLESS TOLD DIFFERENTLY YOU MUST FIND *TREASURES*
AND-RETURN-THEM-TO-THEIR-PROPER-PLACE!

I'M YOUR PUPPET. GIVE ME ENGLISH COMMANDS THAT
CONSIST OF A NOUN AND VERB. SOME EXAMPLES...

TO FIND OUT WHAT YOU'RE CARRYING YOU MIGHT SAY: TAKE INVENTORY
TO GO INTO A HOLE YOU MIGHT SAY: GO HOLE
TO SAVE CURRENT GAME: SAVE GAME

YOU WILL AT TIMES NEED SPECIAL ITEMS TO DO THINGS, BUT I'M
SURE YOU'LL BE A GOOD ADVENTURER AND FIGURE THESE THINGS OUT.

HAPPY ADVENTURING... HIT ENTER TO START? _
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Figure 3 - Adventureland (1978)

Computer owners appreciated it. The game was a success, and Adams continued to develop new titles. Initially, he distributed his games through Softside Magazine, but later, he founded *Adventure International*, his own publishing company.

Another company born in 1978 was Muse Software, co-founded by Ed Zaron and computer games pioneer *Silas Warner*. The small studio released four games for the Apple II in the same year. The most popular was **Escape!**, probably the first example of a 3D first-person view in computer games.



Figure 4 – *Escape!* (1978)

They say the game was so popular that it [impacted productivity](#) at Apple because everybody was playing it. It also heavily influenced *Richard Garriott*, the creator of *Akalabeth* and the *Ultima* Series. We will return to Muse Software and Richard Garriott in the following chapters.

1979

In 1979, Automated Simulations realized that their fan base would have preferred a fantasy role-playing game rather than a sci-fi simulation like *Starfleet Orion*. So they developed their first dungeon-crawling cRPG: **Dunjonquest: Temple of Apshai**. They advertised the game in *Dragon* magazine, the magazine created by TSR for tabletop RPG players. It was a smart move because the game became a hit.



Figure 2 - Dunjonquest (1979)

Dunjonquest was a simple cRPG. There was no story, just dungeons to explore, monsters to kill, and treasures to collect: pure dungeon crawling with randomly generated levels. The graphics were simple, but technically speaking, the game was admirable.

To make the program more portable, Jim Connelley designed an engine that could be used to create different games. The data of the dungeons were stored separately and could be reused on all the other platforms. This brilliant solution allowed them to release Dunjonquest in 1979, both for the PET and the TRS-80. The Apple II version would be released one year later.

Automated Simulation decided to move to fantasy RPGs, but somebody else was still interested in sci-fi strategy games.

In 1979, *Doug Carlston*, a lawyer who started programming at Harvard, wrote a strategy game called **Galactic Empire** on his 16KB TRS-80. Who knows, probably he did it because he was bored of being a lawyer. In any case, he invented a new genre.



Figure 2 – Galactic Empire (1979)

His game is considered the precursor to a genre later named 4x (eXplore, eXpand, eXploit, and eXterminate) – a term invented for *Master of Orion*, but the concept started with Galactic Empire. You start on a small planet and must conquer the other 19 galaxy planets. Once you occupy a new world, you must manage the resources to build new fleets and become more powerful. Sounds familiar?

Like Scott Adams, Carlston initially distributed the game on Softside Magazine but soon realized he would have made more money with his own company. One year later, Doug and his brother founded *Brøderbund*. It would become one of the most prestigious publishers of the '80s. You have probably heard about *Carmen Sandiego* or *Prince of Persia*, but Galactic Empire was Brøderbund's first release.

Another fantastic title released in 1979 is **Flight Simulator I**. Bruce Artwick, an engineering student and pilot, conceived the idea of a flight simulator for his thesis. After graduation, he founded his company, subLOGIC, and released the first **Flight Simulator** for the Apple II in 1979. It was one of the best-selling titles at the time. As you probably know, Microsoft later purchased it.

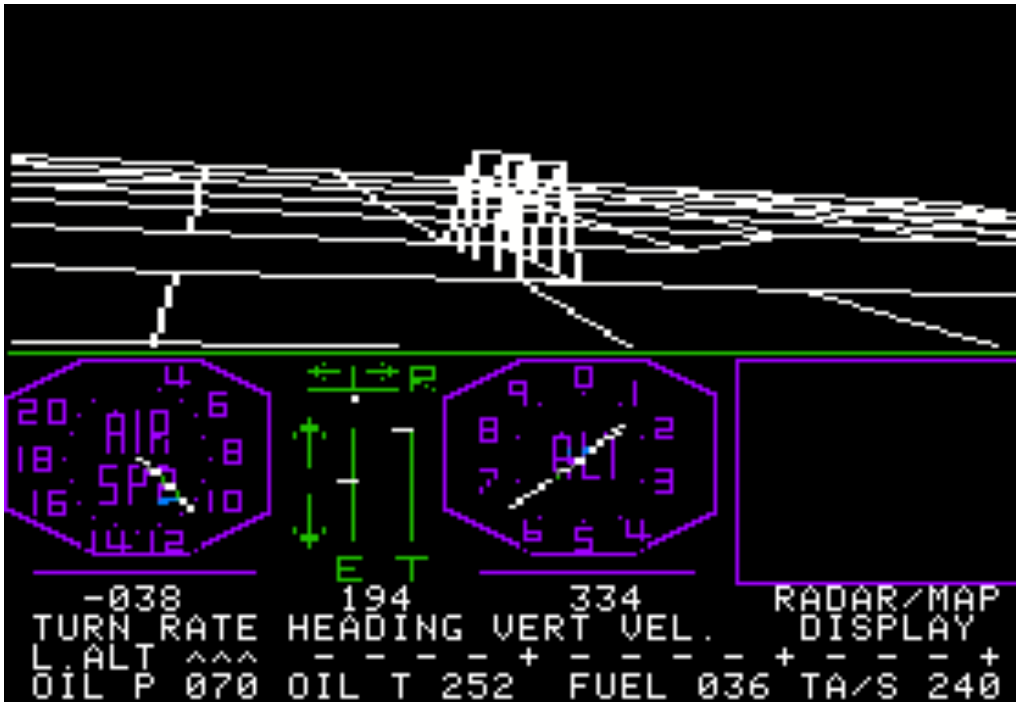


Figure 3 – *Flight Simulator I* by Bruce Artwick (1979)

A 3D flight sim in 1979, running on an 8-bit computer, is pretty impressive. Clearly, the Apple II was the only one of the three Trinity machines able to do this, thanks to the bitmap graphics.

However, at the end of 1979, there was a new entry into the home computer market. Atari released the first computers of the 8-bit series - *Atari 400* and *Atari 800* - designed by a team that included *Jay Miner*, a legendary engineer who would help create the Amiga, a few years later. These machines were much more advanced than the ones of the Trinity.

The Atari 800 had a 6502B microprocessor (2x faster than the Apple II/PET chip), a sound generator, and separate chips called ANTIC, CTIA, and POKEY supporting graphics, colors, hardware sprites, scrolling, and sound. In fact, the hardware was not so different from some arcade cabinets.

The Atari 800 is often compared to the Commodore 64, released almost three years later, but it is even more powerful in some aspects.

The Atari 400 was similar, but the 800 had 48 KB of RAM and a proper mechanical keyboard, while the 400 had 16KB of RAM and a membrane keyboard.

Unfortunately, I never played Star Raiders at the time. It was an Atari exclusive, and I never had the chance to own an Atari 8-bit computer (they were too expensive in Italy). But I played it recently, and honestly, I could not believe it is an 8-bit software created in 1979.

Star Raiders is one of the most influential video games ever made. It inspired Elite, Wing Commander, and all the other space combat sims.

Let's check the numbers before closing this chapter. According to MobyGames, more than 300 games were released for the PET between 1977 and 1979, a bit more for the TRS-80, and around 200 for the Apple II. It's difficult to say which platform was more influential during those initial years. Probably the TRS-80. But the Apple II was destined to grow.

When I started doing this research, I realized that even before the '80s began, computer game creators had already invented flight simulators, 4x strategy games, space combat sims, chess games, text adventures, and more. It's not bad, considering it was just the beginning, but it's nothing compared to what would happen in the '80s.

1980

Looking at the total number of games, it seems that 1980 was not so different from 1978 or 1979, but there was a significant difference: most titles were commercial releases. The computer games business had begun.

In the previous chapters, I mentioned two famous companies, Brøderbund and Automated Simulations, but other names entered the arena in 1980.

Strategic Simulations Inc., a company that would become popular for RPG games, released its first game, **Computer Bismarck: A Wargame for Your Home Computer**, in 1980. The company was founded in 1979 by a wargame enthusiast, *Joel Billings*. It's no surprise the studio initially focused on realistic strategy games. Computer Bismarck, an unofficial adaptation of a famous Avalon Hill tabletop game, sold at the incredible price of \$60, is considered the first computer wargame.

Avalon Hill itself, probably after having seen what SSI was doing, decided to open a Microcomputer Games division. The idea was to port their best titles to the new electronic devices. In 1980, they released five games: **B-1 Nuclear Bomber**, **Midway Campaign**, **Nukewar**, and other titles. They also sued SSI for trademark and copyright infringement, by the way.

Most Avalon Hill games were released for all the computers available: TRS-80, Apple II, Atari 400/800, and Commodore PET. The PET was almost at the end of its life, but in 1980, it reached its peak in terms of games: more than 150 titles were released for the Commodore model, including the sequel to *Dunjonquest*. Many were clones or variants of famous arcades, like *Space Invaders*.

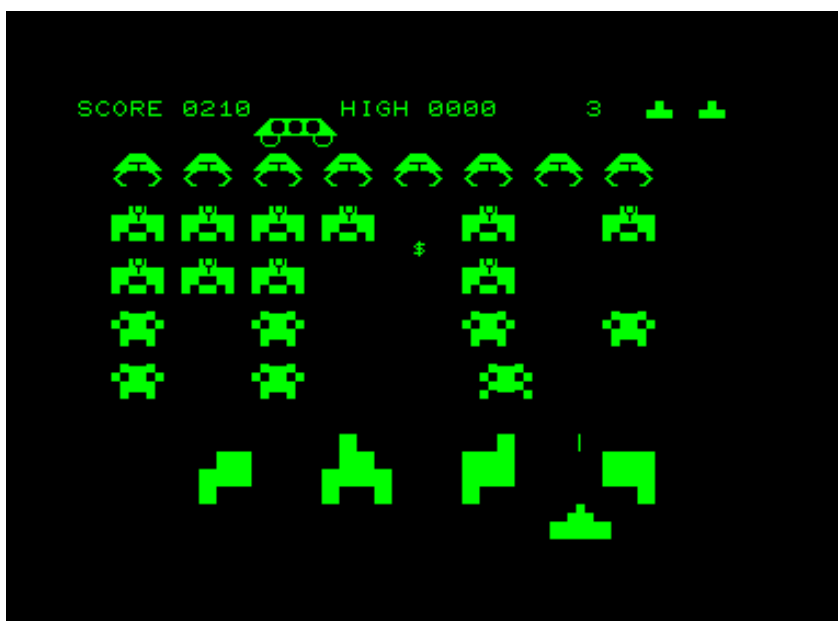


Figure 1 – *Space Invaders* on the Commodore PET (1980)

What is interesting about these games released during the early 80s is how the graphics are created. As mentioned, the TRS-80 and the PET didn't have a graphics mode, only text mode. But if we see a screenshot of the PET version of *Space Invaders*, the game is quite faithful to the original arcade despite the lack of bitmap graphics. This was possible thanks to the excellent use of the graphics characters - called PETSCII, on the PET.

But what are precisely **PETSCII characters**? This topic deserves a brief discussion.

As many know, the images we see on a computer screen are composed of pixels, the smallest point that can be drawn on the screen. In the case of the Commodore PET, the screen had 320 pixels in width and 200 in height. However, the PET did not have a graphics mode, meaning drawing pixels at a specific position was impossible. The PET only had a text mode, which allowed characters to be printed at fixed positions. Since each character required 8x8 pixels, the PET screen could contain 40x25 characters ($8 \times 40 = 320$ and $8 \times 25 = 200$). Similarly, the TRS-80 also had only a text mode, with 64 columns and 16 rows, while the Apple II, as we know, also had graphics modes, which we'll discuss later.

So, to develop a game on the PET, programmers could use only characters. Games that used text to create visuals were not strange in that era. On the already mentioned Star Trek, the game map was rendered using asterisks to represent stars, the characters K or E to represent the Klingon and the Enterprise, and so on. It was a solution that worked well for simple games. The problem arose when attempting to convert famous video games, like Space Invaders, or other titles with more complex graphics. How do you create them using only text?

The engineers at Commodore had a brilliant idea. A set of 8-bit characters could contain 256 elements (including special and control characters), but only a portion of the entire set was used. So why not create new characters that were not letters or numbers but small graphic elements? For example, lines, straight angles, rounded corners, filled or empty blocks, playing card symbols, and more.



Figure 2 – Example of PETSCII characters shown on a PET 2001 emulator

The symbols were shown on the PET keyboard so the user would know how to type them without checking the manual.

PET owners could type these glyphs by pressing SHIFT and the corresponding key. By creatively combining PETSCII characters (but also regular letters like Y or O), graphics could be composed, creating walls, castles, starships, and everything else. For example, typing UQI while holding SHIFT would result in a sort of little man, seen from above, with arms pointing downwards.



Figure 3 – The Commodore PET keyboard shows the PETSCII characters above the normal ones

If you carefully check the Space Invaders screenshot above, you can try to guess how each alien ship has been created.

Obviously, this was in no way comparable to a proper graphics mode. Besides being limited to choosing from available characters, the other problem was that each character had to be placed at a specific position in the 40x25 grid. In short, there was no way to make games like *Flight Simulator* or *Star Raiders* in text-only mode. However, PETSCII characters represented great fun for those with a Commodore PET or VIC-20 (which, like the PET, did not have bitmap graphics). I spent much time drawing things on my VIC-20 using the PETSCII glyphs.

If you want to learn more, I refer you to [this document](#).

The TRS-80, which also lacked bitmap mode, used a different type of glyph characters. Each graphic character was drawn in a grid of 2x3 blocks, so they were less defined than the text characters. Since the total characters on the screen were 64x16, the total effective resolution on the TRS-80 was 128x48 big pixels. If you compare the Space Invaders on the TRS-80 with the PET version shown above, you will notice the PET version has some more creative aliens, made of little curves or

thin lines, while the TRS-80 version has sprites made of little squares only. But still, it was a good approximation.

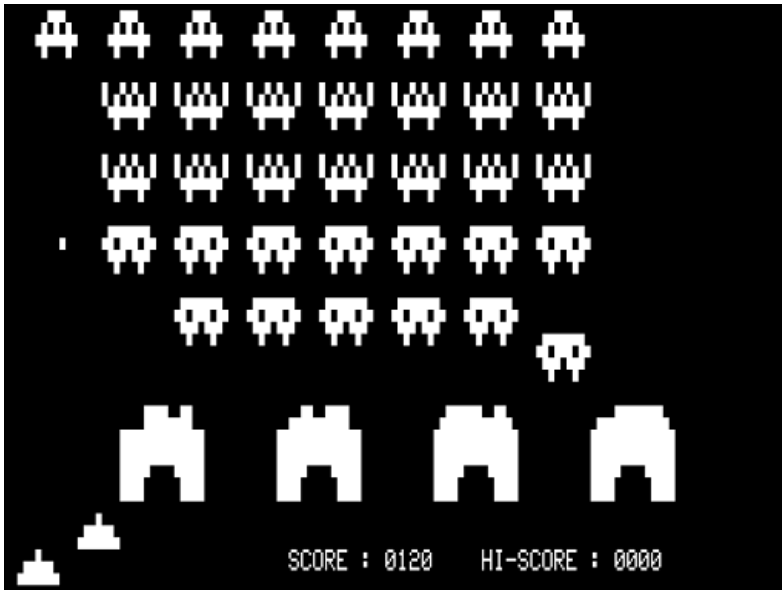


Figure 4 – Space Invaders on the TRS-80 (1980)

A brilliant use of the TRS-80 graphics characters is shown in **Olympic Decathlon** by *Timothy W. Smith*. The sports simulation was published in 1980 by Microsoft, and it is often considered the best game ever made for the TRS-80.

Smith spent nine months researching and studying the ten sports events comprising the Decathlon. He wanted to build a realistic physics simulation. The result was terrific; no surprise Creative Computing named it the best game of the year. To understand the complexity of the Simulation, consider that the game came with a manual of 50 pages.



Figure 4 – Olympic Decathlon on the TRS-80 (1980)

In terms of graphics, despite the limit mentioned above of the machine, the visuals are impressive. I can only imagine the surprise when TRS-80 users played this game for the first time.

The game was published by Microsoft and sold for \$24.95.

As already mentioned, during the '70s, the TRS-80 was the most popular computer of the Trinity, so it should not surprise that despite the simple graphics capabilities, the TRS-80 was the number one platform for games released in 1980. Almost 230 games.

However, three years after the release of the first three personal computers, the PET and the TRS-80 were at the end of their career, while the Apple II was only at the beginning. With games like *Flight Simulator*, the Apple II already demonstrated its potential, but it was in 1980 that the Apple II started to shape the history of computer games. The first example is the adventure game created by a young couple on their Apple II. But before talking about it, I need to go back to the graphics capabilities of the Apple computer.

As we have seen, the PET and the TRS-80 didn't have colors and could not display bitmap graphics, only text.

Instead, the genius of *Steve Wozniak* blessed the Apple II, from the beginning, with 280x192 pixels bitmap graphics in monochrome or 140x192 pixels with four colors. This fact would have given an immense advantage to the Apple II in terms of gaming. However, the first version of Woz and Jobs' computer had other problems, such as the lack of a proper BASIC language, not to mention the very high price. But in 1979, the *Apple II Plus* was released, and this model was much more mature, with an impressive 48K of RAM, floating-point BASIC (called AppleSoft Basic), six colors (2 more than the original version), and a fast 5 1/4 floppy drive available as an expansion.

The Apple II Plus became, almost immediately, the preferred platform of game developers.

One of them was *Ken Williams*, a young programmer who, in 1980, with his wife Roberta, decided to create a new adventure game: **Mystery House**. Not just a typical text adventure game because Roberta, apparently a massive fan of *Colossal Cave*, wanted to add something new: she had the idea of mixing text with illustrations. Ken and Roberta decided to use the graphics mode of the Apple II to create an adventure game with pictures. In short, they invented a new genre: *graphic adventures*. Interestingly, since the Apple II graphics mode with 280x192 pixels was

known as high-resolution (hi-res), they didn't define their game as a graphic adventure; they used the term *hi-res adventure*.

But in 1980, there were several technical problems to do what they had in mind. For example, Roberta volunteered to create the illustrations, but how can hand-made drawings be translated into in-game graphics?

Ken decided to use an Apple II peripheral called [VersaWriter](#). This device allowed users to create technical drawings and diagrams and save them into an Apple II. Free-hand drawing was not possible, but it was better than nothing.

The first problem was solved, but in 1980 computers lacked the memory or disk storage to store all these images pixel-by-pixel. The solution found by Ken was brilliant: instead of saving the final illustrations, the game contained the instructions required to replicate the movements of Roberta's hand. Each time the player entered a new location, the picture was drawn from scratch.

This is how *Mystery House*, the first graphic adventure ever, was developed. The game uses a basic text parser; players must type simple commands of two words, and the game cannot understand many common verbs. But for the first time, players could type a command and see the result on the screen. It was incredibly advanced.



Figure 5 – *Mystery House* on the Apple II (1980)

As you probably know, Ken and Roberta Williams founded one of the most prestigious companies in the games industry: *Sierra On-Line* (initially known as *On-Line Systems*). The game was released as *Hi-Res Adventure #1: Mystery House*, and the series continued with other titles. Roberta would continue designing graphic adventures, including the famous *King's Quest* series.

Another owner of an Apple II Plus was *Richard "Lord British" Garriott*. Richard was a high school student passionate about D&D. He wrote his first computer role-playing games on the school computer, which had only a teletype, not even a screen. But then, in 1979, his father bought him an Apple II plus, and, like Ken & Roberta, he decided to use the Hi-Res mode of his new device to make a computer game. He was a fan of the 3D maze game written by *Silas Warner* for the Apple II, *Escape!*, and he decided to bring this first-person perspective to his computer RPG. He wrote **Akalabeth: World of Doom** in AppleSoft Basic, another proof of this programming language's influence during those years.

It was the first time a computer role-playing game used this perspective. It's the same you will find later in *Dungeon Master*, *Eye of the Beholder*, *Lands of Lore*, and an infinite number of games, including the first-person shooter *Doom*. Ironically, Akalabeth was the only first-person view RPG created by Garriott because his popular Ultima series would use a more traditional top-down view.

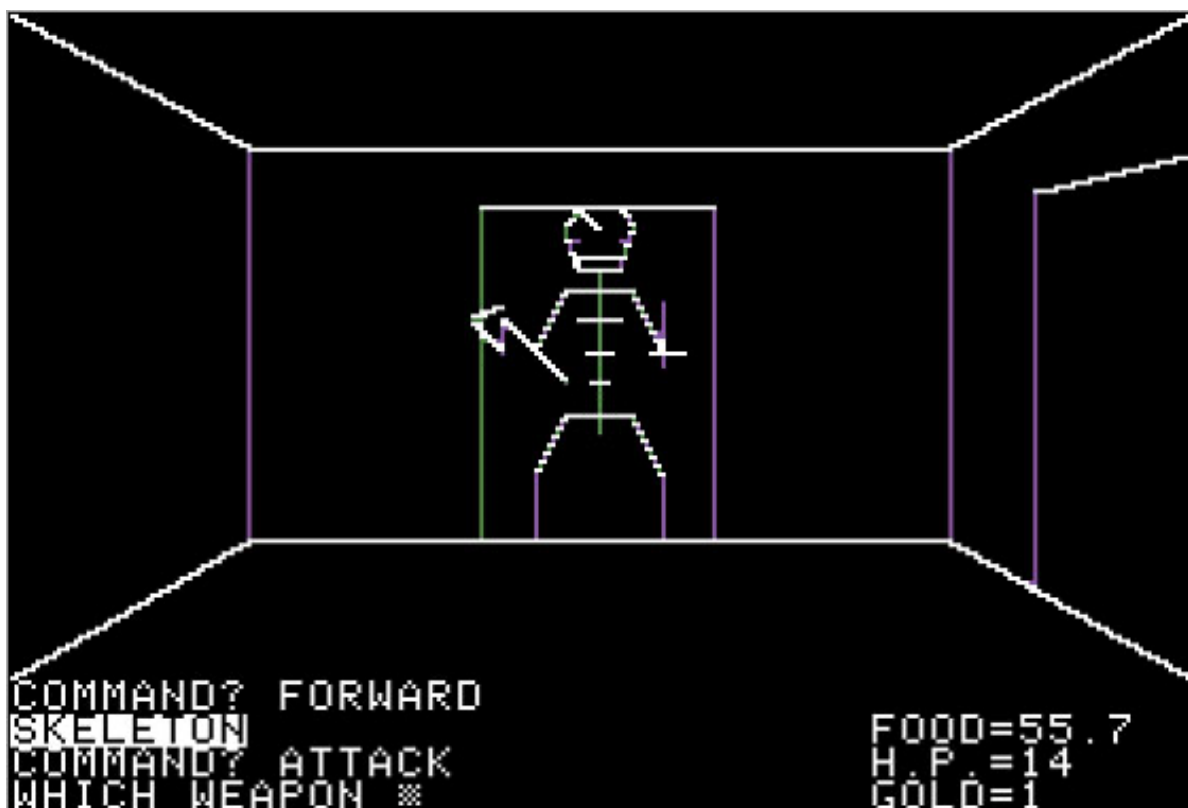


Figure 6 – Akalabeth: World of Doom on the Apple II (1980)

The 3D view is not the only interesting aspect of Akalabeth. The lack of storage and memory was a problem in those early years, so designing all the maps, levels, and monsters of an RPG and storing them in a disk was impossible. Garriott decided to adopt a random generation of the dungeons, something we would see years later in many other games (such as Blizzard's *Diablo*, just to mention one). However, it was not entirely random because the game asked players to enter a number at the beginning. Based on this number (the seed), all the player stats, dungeons, monsters, and even dice rolls are generated. By entering the same number, players could replay the same game again. Considering there was no way to save the game, this idea was brilliant.

As you probably know, Garriott would continue developing RPGs, creating the famous Ultima series, of which Akalabeth is the precursor.

Talking about procedurally generated dungeons, in 1980, *Michael Toy* and *Glenn Wichman* wrote *Rogue: Exploring the Dungeons of Doom*, a text-based dungeon-crawler developed for Unix mainframes. Epyx would release several home versions of Rogue starting in 1983, so in 1980, it was yet to be available for home computers. Anyway, it's essential to mention it because it gave birth to a genre called *roguelike*. This term defines hack and slash, turn-based, procedurally generated RPG with some specific features such as permadeath. Rogue would heavily influence the dungeon crawler's genre.

If you want to know more about Rogue, see the full story [here](#).

Finally, in 1980, Infocom released their famous **Zork: The Great Underground Empire** on microcomputers.

MIT students *Dave Lebling*, *Marc Blank*, and *Tim Anderson* created *Zork* on a mainframe, the PDP-10, using a language called MDL. The development of Zork started in 1977, and they continued working on it, with the help of several contributors, until 1979, when Zork had become a vast game with more than 190 rooms.

At that point, the success of the home computers and the first commercial games convinced Anderson, Lebling, Blank, and other programmers to create a company called *Infocom* and release Zork for the home computers. However, the PDP-10 had a massive 1MB of memory, a size you could not find in a home computer. So, to port Zork to the TRS-80 and Apple II, Infocom heavily reduced the size of the game.

But this was not enough because Zork was written in the MDL language, which could only run on the mainframe. So, they developed a new programming language called ZIL, inspired by MDL but restricted to the features required to run adventure games. The reduced version of Zork was then converted to ZIL.

Thanks to this, porting Zork to different computers was a matter of developing a ZIL interpreter (called *virtual machine*) for the target platform. Not so easy, of course, but they just needed to do it once. After that, Infocom could use it for many more games, not just Zork.

```
WEST OF HOUSE                                SCORE: 0/4
>GET LEAFLET
TAKEN.
>READ LEAFLET
WELCOME TO ZORK
      ZORK IS A GAME OF ADVENTURE,
DANGER, AND LOW CUNNING. IN IT YOU WILL
EXPLORE SOME OF THE MOST AMAZING
TERRITORY EVER SEEN BY MORTALS.

      NO COMPUTER SHOULD BE WITHOUT ONE!

      THE ORIGINAL ZORK WAS CREATED BY TIM
ANDERSON, MARC BLANK, BRUCE DANIELS, AND
DAVE LEBLING. IT WAS INSPIRED BY THE
ADVENTURE GAME OF CROWTHER AND WOODS.
THIS VERSION WAS CREATED BY MARC BLANK,
DAVE LEBLING, JOEL BEREZ, AND SCOTT
CUTLER.

      (C) COPYRIGHT 1979 & 1980 INFOCOM,
INC. ALL RIGHTS RESERVED.

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Figure 6 – Zork: The Great Underground Empire running on Apple II

In December 1980, Infocom released Zork for the TRS-80, and in February 1981, as soon as the virtual machine was ready, they published it for the Apple II. Many other versions would arrive in the following years.

Thanks to the ZIL virtual machine, Infocom was the only company not tied to a single platform and able to simultaneously release its titles to several home computers.

You can consider 1980 the year when the computer games business really started, but also the year of the “precursors”: Akalabeth was the precursor of Ultima, a series that would continue for almost 20 years, just like Zork, while Mystery House started the long series of graphic adventure created by Sierra, including King’s Quest, Space Quest, and many others.