Computer Science

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Introduction

These rules are designed for high tech and computer intensive chronicles. Games which only intend a casual approach to computing should use the standard rules and fudge where appropriate. All of the systems within this section should be modified and expanded upon as the players and game masters see fit. Computer science changes on a daily basis and it is impossible to include rules for every possibility. We have tried to keep the rules loose enough to accommodate new trends and technologies.

Hardware Components

All computers will always have these four attributes: Power, Capacity, Stability, and Breakage Points. Each is a reflection of the Information Technologies resource purchased. We have kept away from real-life terms as the pace of technology would quickly make any real numbers a humorous exercise; instead we use esoteric terms and concepts to describe the technologies involved.

The Power rating is the ability of the computer to process information and run programs. It is equal to the IT resource rating of the character and is normally listed from 1-10, although some ultra powerful systems will go above 10. The maximum program rating that can be run by the computer is equal to the Power rating. Multitasking programs will reduce the effectiveness of each until they fit within the total rating.

Capacity is the rating that describes the storage memory of the device. The base capacity of the device is equal to the resource rating times five. In tech levels where removable storage media is plentiful this may not be as limiting as it may at first appear. Additional media capacities are often equal to 3, but varying size media is often available in later tech levels. The operating system (OS) of a computer will always require an amount of capacity equal to the Power rating. Additional programs often average 1 to 2 points of capacity for retail software.

Stability is a rating of how well the software and operating system processes under stress. Similar to sanity points for characters, the fewer that a computer has remaining the stranger and more insane the programs will operate. All computers will have a base Stability of 100% before any tweaking or modifications. When a computer's stability reaches zero the computer must be re-booted. Users may tweak the stability of their system by increasing the total stability by 1/10th the Computer science skill rating. This may increase the total stability of the system above 100%. This may never be stacked; only the largest bonus may be applied to the total stability of a system. Any other form of tweaking such as over-clocking a system may not be in simultaneous use.

The Breakage Points for a system are dependant upon the size and durability of the case. Small devices such as PDAs will have about 10 BP. Medium sized systems such as laptops will have 20 BP. Large computers such as desktops will have 20 BP and a PV of 5. Huge systems include mainframes and will have 50 BP and 5 PV. Networked computers will have a separate value for every system within and requires additional consideration.

Programs & Constructs

Programs are the heart of computer science. Without a program, your computer is nothing but a fairly ugly paperweight. Programs have components that are limited by the computer system being used. All programs will have a Program rating, Experience Cost, Capacity cost, and current Stability rating. The Program rating cannot exceed the IT rating of the system. The base Stability rating is always 100%.

The character will begin the game with a number of programs with a value of option points equal to the IT resource rating times three. Professional programs and programs such as virus scan with a rating of less than three may be selected without an expenditure of option points. The Game Master must decide what is fair for a character to begin the chronicle with.

All programs will grant either a modifier to the skill assisted by the program, or an effective skill rating based upon the Program rating times ten. Many skills in the modern age will require computer assistance to accomplish. Attempting to handcraft such products will often incur massive penalties. Bleeding edge programs may become available to the character. Such programs will enjoy a temporary modifier of +1 to the effective Program rating. This will not require an increase in the IT rating to run, but the bonus will eventually fade as other software packages continue their relentless march.

Rating	Skill Modifier
1	- 20
2	- 10
3	+ 0
4	+ 10
5	+ 15
6	+ 20
7	+ 25
8	+ 30
9	+ 35
10	+ 40

Construct

Constructs are basic artificial intelligences that do not have self awareness or true independent thought. They may be able to pass a Turing test and be able to self-repair their Stability, but they are not sentient in any meaningful way. Constructs are designed to assist users in using the computer or skills programmed for a specific end result. Constructs may also be able to access other programs on the same system to run in place of the user.

Constructs that utilize skills may have a maximum skill rating no greater than the Program rating times ten. The capacity cost for a construct is equal to the skill rating of the skill known divided by five. The option point cost for a skill based construct is equal to the capacity cost.

Data

Data is not a program, but instead is a media file or other information locked into a digital format. One point of capacity can store a sizable amount of information, depending upon the form of the media and the current technology level. Game Masters and players must determine the proper balance of cost and storage for their chronicle.

Decryption

This program will attempt to decrypt any message, file, or other form of cryptography. The capacity for decryption programs is equal to the Program rating. Most decryption actions will be based upon a contested action with the skill and program assistance of an encryption program. This program will require Capacity equal to the Program rating. The option point cost is equal to the Program rating.

Destroy Hardware

This program will cause physical damage to the internal components of the system. Each successful attack using this program will inflict a number of Breakage Points equal to one-half the Program rating rounding down. The Protective Value of the case does not apply. The outer shell is unharmed, but the circuit boards are a melted mess. When the BP reaches zero, the computer is unusable until repairs are performed. Spare parts may be readily available with a successful IT rating roll. This program will require Capacity equal to the Program rating plus two. The option point cost of this software is equal to the required Capacity. This program is often considered Gray or Black I.C.

Destroy Software

This program will destabilize a single program within a system. This program cannot affect the Operating System. Each successful skill check will reduce the program's Stability by 1d10 + Program rating. When the program's stability drops below 30 the program will begin to suffer bugs and glitches. This program will require Capacity equal to the Program rating. The option point cost is also equal to the Program rating. This program is considered White I.C. since it does no harm to people or property.

Drivers

All operating systems are installed with the necessary drivers to operate their internal components and common external hardware. Driver programs are those drivers that are not commonly used by computers. External camera systems, surveillance, vehicles, and automated machinery are all examples of systems that require an additional driver program. The Program rating times ten of a driver program is the chance for that program to be compatible with the specific device. Every broad grouping of machinery will require a separate driver program. This program will require Capacity equal to ½ the Program rating rounded down. The option point cost is equal to ½ the Program rating rounded down.

Encryption

This program will attempt to encrypt any message, file, or other form of media or data. The capacity for encryption programs is equal to the Program rating. Most encryption actions will be based upon a contested action with the skill and program assistance of a decryption program. The option point cost is equal to the Program rating. This program will require Capacity equal to the Program rating.

Firewall

Firewalls are special security measures designed specifically to keep out unwanted guests. These programs are designed to detect, locate, block, and eject unauthorized users. Firewalls have a value equal to their Program Rating to passively detect an intruder. This is often a contested skill roll against the hacker's Computer Hacking + IT Resource modifier. This program will require Capacity and an option point cost equal to the Program rating.

Injure User

This Black I.C. can only be used in campaigns that have Direct Neural Interfaces. These programs are designed to physically or emotionally injure the user. This program will not affect Constructs, Programs, or Artificial Intelligences. A program can only deal injury or sanity loss, not both. Programs that inflict Sanity Loss will deal 1d10 + the Program Rating in Sanity Loss with each successful skill check. True injury inflicted to a user will only inflict ½ this amount rounded to the nearest whole number. This program will require Capacity equal to the Program rating multiplied by two. The option

point cost of this software is equal to the required Capacity.

Intrusion

This program will allow a hacker to infiltrate a system without being detected. A contested roll against the Firewall software of the system is required for access. Once within a system the intrusion program will continue to shield the hacker from discovery or tracing. The intrusion software may also be used to damage the remote system's operating system. Each successful skill check will reduce the program's Stability by 1d10 + Program rating. When the program's stability drops below 30 the program will begin to suffer bugs and glitches. This program will require Capacity and an option point cost equal to the Program rating.

Operating System

There are often only a few major operating systems in any setting. The operating system for a computer allows the computer to read, write, display, and organize files. Operating systems will feature all of the most basic features of a computer such as writing to a storage medium, displaying media files, copying files, playing media, communications, and other simple actions. The more advanced the tech level and the IT rating of the system, the more robust the OS will be.

Operating Systems may be used to repair Stability of a program or system. Each average action may be used to repair Stability 1d10 + 1/10th the user's Computer Science. This can be repeated as often as necessary to fully repair the program or operating system.

Operating systems are free with the computer and will require one point of capacity for every point of Power rating. The program rating of the OS is normally equal to the Power rating of the computer. Operators may choose not to use the latest OS, but will only be able to use programs with a rating equal or less than the OS.

Professional Programs

These programs include a wide variety of software such as word processors, photo-editing, music editing, spreadsheets, and video composition. Many retail outlets sell these programs and are very commonly available. Each professional program will require one point of capacity, although office suites may require two or three. Professional programs rarely exceed a program rating of 4, and are often included as part of a character's basic equipment.

Search

Search programs are designed to be used externally of the local system to find information or trace other users. The information must be present within the network in order to be discovered. The required amount of time involves the number of links between the local and remote system being searched. Most obscure information or loosely defined search parameters will also lengthen searches. This program will require Capacity and an option point cost equal to ½ the Program rating.

Virus

Viruses are similar to constructs. Both have stability ratings and both are automated programs that have specific code to accomplish tasks. Viruses are far simpler than Constructs and often have only a few set goals that cannot be altered. Game Masters must determine the Capacity and option point requirements for viruses based upon the Program Rating and the intent of the virus. Viruses are inherently stealthy and require a Virus Scan to detect and destroy. Spyware and Worms are all viruses.

Virus Scan

These programs are designed to be used internally of the local system to find viruses, spyware, and worms. The required amount of time involves the capacity of the system being searched. Every point of capacity will require one minute of searching. Most searches will involve a contested action between the virus and the scanning program. This program will require Capacity and an option point cost equal to ½ the Program rating.

Rule Systems

Most uses of computer hacking will involve two skilled users using programs to out think and manipulate the systems of the other. Keep it simple and just have players make skill checks! Common actions and the required skills and programs are listed below.

Action	Skill Used	Program
Damage System	C. Hacking	Intrusion
Decrypt Data	Cryptography	Decryption
Eject User	C. Science	Firewall
Encrypt Data	Cryptography	Encryption
Hack System	C. Hacking	Intrusion
Investigate System	C. Hacking	Intrusion
Online Research	Research	Search
Over-clock	C. Science	Operating System
Override Control	C. Hacking	Intrusion
Protect System	C. Science	Firewall
Repair Hardware	C. Hardware	N/A
Repair Stability	C. Science	Operating System
Search System	C. Science	Search
Trace Hacker	C. Science	Search
Tweaking	C. Science	Operating System
Use RL Device	Varies by Device	Drivers

It requires time to input commands and for the computer to process the information. While very realistic, this fact can get very boring for the poor hacker typing away in the middle of a fire-fight while his friends have all the fun. In order to simplify this all simple commands will require a total of three phases (one round / six seconds) to accomplish. Average commands will require five rounds (15 phases / 30 seconds) to fully complete. Complex commands also require a minimum of three phases to begin the command but unfortunately any number for the computer to process.

Accessing a remote system may be accomplished using a variety of methods. The most common method is by use of a modem and a network. In order to simplify a very complex system of differing connection times, transmission distance, switching speed, server speeds, and network interference this game uses Links. Each link is an arbitrary unit of measurement that slows down the rate of flow and may lag the local system. The Game Master should determine the number of links between the two systems. The IT Resource rating of the computer is the maximum number of links that may be negotiated each phase.

Hackers may purposely increase the number of links between themselves and the target server. Each link will decrease the reaction time of the hacker, but will increase the time require for any tracing programs. Depending upon the number of physical telecommunication switches that compose the links between the two systems, the Game Master may rule that a number of extra Intrusion rolls are required to secretly navigate through. A search program that is tracing a hacker will require two rounds per link. Once a trace is accomplished, 2d10 + 5 minutes is required for a quick governmental response. Unprepared or unconcerned police departments may require much longer if they even bother to appear.

Initiative for most computers that use verbal, mouse, or keyboard input devices is standard and will not change. More advanced eye-tracking systems will have an initiative bonus of +2 for the computer scientist. Electronic electrodes that monitor the brain activity of the user will have an initiative bonus of +3. Direct Neural Interfaces should be treated as supernatural speed and will always have initiative against other non-DNI computer users. Every two links between the remote system and the local system will decrease the initiative bonus by -1.

Writing code for programs is a long dedicated process. Writing programs is a craftwork process that will require a number of man-hours equal to the experience cost of the program multiplied by one hundred. Simple applets, widgets, and simple programs may be designed with fewer man-hours as determined by the Game Master.

Supplemental Systems

Bots

Robots are your friends. They are machines crafted to perform various tasks ranging from dusting and sweeping to unleashing mini-gun fire upon intruders. Robots count as computers as well as creatures, and thus have Stability and an IT Resource rating. The Stability Points, if eliminated, makes the robot temporarily worthless. Of course, a rocket will also usually do the trick. This also means, though, a clever hacker could not only take out a robot squad with his computer, but get the robot squad reprogrammed and use them to escort his party through the building, shooting upon formerly allied guards.

If a robot is reduced to 1/10th Stability and has taken any Breakage Points of damage, he goes Haywire. His actions are determined completely randomly. He could spin around, fire aimlessly, or just bump into a wall. Try and be creative.

Direct Neural Interface

The advanced prospect of using one's mind to directly interact with computers allows one to perform thousands of times faster and more efficiently than a user interfacing with such devices as key inputs and pointing devices. Those equipped with Direct Neural Interfaces never go through the operating system of the computer with which they are interfacing; the DNI has its own built-in OS.

These interfaces can create a virtual environment for the linked character. The DNI interprets the data produced and stored in programs as sensory information. Complete virtual worlds may be created for the character including sight, sound, smell, taste, and even touch. Unless the virtual simulation has been created for manipulation, it will only respond with the appropriate programs and commands.

A DNI can manipulate the emotions, thoughts, and the senses of the wielder. On command, a DNI user can change his emotions with a successful Computer Science skill. This requires a driver program designed to modify the emotional state of the recipient. Re-programming the brain is a long complicated process that will require many man-hours to accomplish.

Also, DNI runs off of the body's own personal energy, with an advanced system that gains electricity from movement, breathing, and blinking. This is much like modern motion-powered watches, but far more effective. The only time a DNI will run out of electricity is in a special null field of sorts, if it is drained, if the user is hit by an EMP (Electromagnetic Pulse), or if the person is frozen somehow and cannot charge the unit. But this must be extreme, as the DNI can run off minute amounts of kinetic energy.

A DNI has a special mental HUD (Heads-Up Display) that gives all its information directly into the mind of the owner, where this information is "seen" and can be processed for use. A Direct Neural Interface counts as having 100% Stability. The IT resource must be purchased separately for the DNI computer.

DNI users suffer no penalties for using computers with foreign operating systems. DNI users automatically gain a +10 bonus to everything they do with either Computer Science or Computer Hacking except linked skills such as CS Math or CS Set Snares, etc. DNI users suffer only -5 per multitasked action.

DNI users also have the consequence of being vulnerable to both physical and mental damage from the equipment, which is intertwined through their brain and spine. DNI users may suffer injury from certain programs that may affect their physical body or their sanity. This loss may be healed normally.

Most DNI units are cybernetic; some options may allow psychic or magical versions of this ability. In these cases the character will not have the Information Technologies resource to draw upon. Their IT rating for all required actions is equal to their current level of experience. This may be improved by +1 for every additional 30 Option Points expended. They may purchase programs as normal, treating these as procedures and maneuvers they have learned instead.

- For +15 option points, the DNI can be hardened to become immune to EMP and other such technologies.
- For +15 option points, a speedy reboot system can be implemented into the DNI. This can effectively shut down, power out, power up, and reboot to console the entire DNI within six seconds (one round). Normally, a reboot takes three rounds with a DNI.
- For +30 option points, the character will enjoy a +1 bonus to Initiative when using the DNI for computer programming, operation, and hacking.
- For +30 option points, the DNI is now wireless and can access a compatible device within 10'.
- For +30 option points, a cybernetic computer may be implanted inside the character. This allows the character to not require a separate external computer to store programs or use as an interface. Purchase Information Technology resource separately for this computer.
- For +50 option points, the DNI can store a complete and comprehensive database on a single skill. The person replaces the skill (for example, Set Snares) with CS Set Snares. The user can now roll Computer Science instead of rolling his Set Snares skill in order to try and set a snare effectively. The DNI will automatically allow its owner to use Computer Science to replace the skill of Mathematics without paying this option points cost.

For the truly experimental DNI users, wires can run from their computer to themselves and their equipment. Each upgrade costs an additional +30 option points.

- The eyes can be wired to include a targeting system that incorporates target recognition, placement, and efficiency. There is no penalty for called shots if the weapon is also wired in. If the arm is wired in, results of hitting targets other than the one aimed at (with fumbles) are ignored.
- The ears can be wired to include sound dampening, amplification, and filtering. Hearing gets a + 15 bonus. Also, voices can be recognized and instantly associated with names, even with distortion. Wave analysis can even replace deafness and give some sort of cold, monotone level of hearing to those hearing-impaired. This, however, is far from perfect.
- The arms can be wired to calculate positioning and help make their overall existence more functional. Touch with the hands will yield information such as temperature, surface type, electric currents if any and their voltage, and more.
- A Weapon can be wired in. If this is done, such things as the weapon's condition, ammunition quantity remaining, temperature, and more become known to the user. Calculations for accuracy are made automatically by the gun, and the wielder gets a +5 bonus to hit.
- If the eyes, arms, and weapon are all wired in, the user can substitute his Computer Science skill for whatever appropriate weapon skill he would need otherwise. Essentially, he's the legs moving and the computer regulating an otherwise automated gun.
- Shields can be wired in. Their durability, as well as varied analysis of the types of things hitting them and other vital statistics are known. One bullet hitting the shield will give the user enough information to know trajectories, the bullet type, velocity on impact and possible opponent range, and more.
- If the ears, arms and shield are wired, the shield can automatically adjust its position based upon hearing the discharge of a weapon, resulting in an automatic blocking system of sorts. This adds +20 to the Defensive Tactics skill.
- The body itself can be wired into the DNI. This gives observers a complete knowledge of all their vital signs (EKG, blood pressure, heart rate, cholesterol level, BMI, health factor, etc. They know, in character, their Injury Points. Exact injuries can be located and dictated for later notice. For example, the unit can detect not only where you were hurt, but how, where, and what methods might want to be used to restore the area, as well as warnings, vital notices, and other useful functions.
- You may also wire a single vehicle into your DNI. The vehicle drives itself automatically, with the skill equal to your Computer Science skill. In addition, the user can get calculated statistics such as mileage and tire life. This is useful and can leave the DNI user open to do such things as operate guns.

Foreign Operating Systems

Everyone is assumed, if they have a Computer Science skill, to be somewhat functional in an environment with a public or common operating system with a nice, graphical user interface ("GUI"). However, some networks and systems have cold, unfamiliar text-only operating systems or are completely different from what the person would be useful. If the user has the Computer Science specialty Operating Systems, he may make a check against it (the GM should add modifiers as he sees fit) to try and "familiarize" himself with it. A success means the user suffers no penalties with this operating system THIS TIME, and a critical success means the user will never again suffer from using this operating system. A hefty penalty of -60% is tagged on to all attempts to use a computer with an unfamiliar operating system.

Modern Defense Systems

Modem buildings are tied into security matrix systems and laser-point defenses, optical and sensory cameras, and more. This means that any intrusion from computers can activate the defenses of the building, or any attempt to breach the building can set off alarms and prevent the computers from becoming accessible. The two work in harmony.

However, this unison can be abused as well. A good hacker could shut down all the defenses of the building from afar with a series of tricks, enabling his friends to get inside and blow away the mainframes before they get back at their hacker ally. Many variations and trade-offs of both groups' skills are used to result in victory for either side.

Modem defense systems are run by mainframes. Anything on an MDS must be electronic in some way -even the sprinklers that go on in the event of a fire are controllable, and thus can be manipulated. To simplify this, the system itself has an IT Resource rating and Stability. If the Stability reaches 0%, the system crashes and nothing on it works. If it is taken over, everything connected to it can be remotely operated to the hacker's whim.

Over-clocking

By changing system settings a user may increase the speed and power of a computer. This increase in power will raise the effective IT Resource by 1/100th the Computer Science of the user rounded up. The stability of the machine will suffer a permanent penalty equal to -20. This may never be stacked, only the largest bonus may be applied. Computer Science and Computer Hacking skill rolls will have a chance of critical failure with results between 90-100 while using that machine. Critical failures while using an over-clocked computer may result in further stability or hardware damage.