Yags Modern

Yags can be used for games set in pretty much any kind of setting, from stone age hunter gatherers to star travelling mercenaries. The availability of skills and equipment is broadly controlled by the tech level of the campaign. Modern day Earth is considered to be TL 8.

TL	Technology
0	Stone age
1	Bronze age
2	Iron age
3	Medieval
4	Renaissence (1400-1700)
5	Enlightenment (1700-1900)
6	Mechanisation (1900-1945)
7	Atomic (1945-1980)
8	Digital (now)
9	Microtech (2020+)

Tech level is not a perfect description of a setting, since alternate histories and science fiction settings will vary immensly with what is available. Historical settings are somewhat easier since they can follow the suggestions given above. Alternative history settings (such as Steam Punk) may differ greatly however, and will have to be detailed in specific world books.

The *Technology Level* concept is more a rough guide to make things easier. If trying to fit things to it is making it harder to design a setting, then drop or modify them as you need to.

Skills and Technology

Not all skills are available at all technology levels, but for the most part it is fairly obvious what should or should not be available. There's a few skills however which change in use as civilisation advances.

Science

Science wasn't invented as a concept until late TL 4, early TL5. Before that, those who studied how the world worked were *Natural Philosophers*.

Natural Philosophy was the closest thing they had to *Science*, but was firmly rooted in the ancient Greek view of the world. The study of the heavens was *Astrology*, which was consisered part of mathematics, logic and geometry - all covered by the skill of *Artes Liberalas* (the seven classical knowledges).

Science will begin to complement *Natural Philosophy* by late TL 4 (an academic character will have both), and academics will have both. By TL 5, *Science* will gain ascendance, *Mathematics* and *Astronomy* will branch out into their own skills, and the old astrological knowledges will become the rather useless *Astrology*.

2 Yags Modern

Vehicles and Constructs

For the most part, adventures in Yags will revolve around people and sometimes animals. Objects such as vehicles and buildings exist, but only as part of the backdrop, or as mechanisms to get from one event to another.

Occassionally however, such things become a focal point of the game, and it becomes useful to know a bit more about how vehicles and buildings fit into the world as described by *Yags* - especially if the are used in combat situations.

These rules cover the description and use of vehicles within the game. Also covered are buildings and other non-living things. The generic term used is *Construct*. Also covered are the use of large vehicle mounted and infantry support weapons. Most characters will never need to worry about these, even in modern campaigns, but the occassional scenario will call for their use.

Scaling Vehicles

Yags uses a generic *Size* attribute for all creatures within the game, and this is extended to cover vehicles as well. Since *Size* is logarithmic, it will rarely get above 20 for ground vehicles, it will generally be below 100 (even objects such as the *Death Star* or *Skylark of Valeron*). This does lead to a degree of imprecision at the higher levels, but at that point a large level of abstraction is probably a good thing.

Vehicle Scale

Vehicles are treated somewhat differently to characters and creatures, and are considered to be at a different *Scale* for purposes of damage. If this wasn't done, then vehicle weapons and armour would be in the 100+ level, and the d20 wouldn't provide much in the way of randomness.

It also doesn't make sense for a vehicle to suffer from *Stuns* or *Fatigue*, so damage tracks are taken slightly differently as well.

A *Size* of 10 is considered to be a vehicle of 10m^3, and each +5 *Size* increases this by a multiple of 10. *Size* 10 is more than enough for a family car, *Size* 15 is adequate for a large tank and a WWII battleship would be in the high twenties. Some example sizes are shown in the list below, to give an idea of how sizes increase.

Vehicle	Size
Motorbike.	5
Family car.	10
T-34 Tank.	11
X-Wing (Star Wars).	14
Train carriage.	16
F-16.	17
200t Free Trader (Traveller).	22
Boeing 747.	26
Bismark.	28
USS Enterprise CVN-65.	32
Star Destroyer (Star Wars).	44
Death Star (Star Wars).	80
Skylark of Valeron (EE 'Doc' Smith).	94
Earth.	110

Weapons and armour have a special *Vehicle* property - Vc - which mark them as being of Vehicle Scale. Standard weapons do considerably less damage to vehicles, and vehicle weapons pretty much ignore the armour and soak of people.

Soak

A construct will normally have a base soak equal to its size. If it is stronger or weaker than usual then this can vary. The following guide can be used to determine the base soak of a vehicle or building. These are guidelines only, and any values inbetween (or outside) those given can be used.

Soak	Type of construct
x0.5	**Weak.** A very weak object, normally poorly constructed or delibrately designed to be light.
x1	**Average.** Any typical building or vehicle will have a base soak equal to its size.
x1.5	**Reinforced.** If the object has been reinforced, such as a rally car, SUV or heavily constructed building. About the strongest most flying vehicles will be.
x2	**Strong.** Object has been designed from the start to be tough and durable. A tank, battleship or bunker will tend to be this strong.
x3	**Very strong.** A heavily built vehicle, such as the strongest tanks, or a heavily toughened bunker. The entire design of the construct is geared towards making it strong, rather than pretty or fast.
x4	**Super strong.** A heavily built vehicle made from ultra-tech materials (TL10+), or one which is designed to do little more than resist damage at the expense of being very space inefficient.
x5	**Ultra strong.** Ultra-tech object which does little more than resist damage which is also very space inefficient, but also highly resistant to damage.

This is the base soak of the construct, and is not affected by heavy weapons or other effects.

As for characters, vehicles and buildings may be armoured. Many heavily armoured vehicles will have two armour ratings - one for the heavy front armour, and the second for the lighter sides and rear. Most armour on vehicles is considered to be *Light vehicle*. *Heavy vehicle* weapons (normally armour piercing weapons, such as HEAT) halve such armour.

Armour	Examples of armour
5-30	**Armoured vehicle.** Armoured vehicles (such as APCs, armoured limo) will tend to have armour in the 5-20 range.
20-30	**Light tank.** Heavily armoured vehicles, such as tanks, will tend to have up to 30 points of front armour.
30-50	**Heavy tank.** The toughest of tanks will have armours in this sort of range.
40-60	**Battleships.** Heavy battleships.
-10	**Tech -6.** At tech levels prior to 7, materials are limited so reduce armour values by 10.
-5	**Tech 7.** For tech level 7 era vehicles, reduce armour levels by 5.
+5	**Tech 9-10.** At tech levels 9-10, increase armour by +5.
+10	**Tech 11+** At tech levels above 10, increase armour by +10.

Damage

Vehicles have a single damage track, with a number of states: *Okay*, *Superficial*, *Medium*, *Critical* and *Destroyed*. The latter is equivalent to *Fatal* wounds for characters, and results in the vehicle being rendered

completely inoperable.

All damage is applied to this track, and is of two types - *Major* and *Minor*. All vehicle scale weapons cause *Major* damage to vehicles. Such damage is equivalent to *wounds* against characters, and is additive.

Character scale weapons may cause *Minor* damage to vehicles. This is treated like stuns, in that it is non-cumulative. If the damage caused is less than half the current damage, then the attack is ignored. If it is more than half, but not more than the current damage, then one level of damage is caused. If the damage is greater than the current damage, then the total damage is equal to the damage caused.

Major damage may cause critical hits against the vehicle. Minor damage is normally superficial.

The damage levels for a vehicle are split equally between *Superficial*, *Medium* and *Critical*, with extra levels going to the lower bands first. A size 10 car would have 4 levels of Superficial, 3 of Medium and 3 of Critical.

Hitting Vehicles

Most vehicles tend to be much larger than normal human targets, and so are easier to hit. Vehicles suffer the normal penalty to their 'to be hit' number, of -3 per point of size about 5. A size 20 vehicle for instance will have a 'to be hit' number of -30. This makes vehicles very easy to hit at long range.

Vehicle weapons are also affected by this, and suffer a penalty to their attack bonus based on their size - larger weapons are harder to aim, and generally no good for shooting at people. A vehicle which is 'size 10' for example will have a penalty of -15 to its attack bonus, which may give it a negative attack bonus. This will be factored into the weapon's statistics.

Vehicle Attributes

All vehicles have the following attributes.

Acceleration: How quickly the vehicle accelerates, in metres per round per round.

Critical: The threshold at which the vehicle suffers criticals. It is equal to the number of damage levels the vehicle has in its Superficial level.

Move: How fast the vehicle can move, in metres/round. This is normally the top speed of the vehicle in metres per round. This is about 2.2 times (or twice) the miles per hour speed.

Size: The general size of the vehicle, normally based on the volume. Volume is used instead of Mass (which animal Size is based on) because this is normally easier to obtain for real world vehicles.

Soak: How good the vehicle is at resisting damage. This normally defaults to the Size of the vehicle.

Using Vehicles

Generally, driving or piloting a vehicle will use *dexterity x Drive* or a *dexterity x Pilot* skill check, depending on the type of vehicle. In either case, your *Dexterity* is capped to the *Agility* of the vehicle, meaning big and slow vehicles generally don't require fast reactions, just skill, and even that doesn't make much difference.

Very large vehicles, such as battleships for example, won't have a 'pilot' as such, and tend to be controlled by a number of people down in engineering, or a group of computer operators. In this case, controlling the vehicle uses an *operation* skill, such as *Ship operation* or *Spaceship operation*.

When making a manouevre, a pilot or drive check is often required, and the difficulty depends on the speed that the manouevre is performed at.

Speed of manouevre	Target
Careful. A slow and safe speed.	-10
Moderate. A safe speed.	+0
Quickly. A bit faster than is advised.	+10
Fast. Somewhat fast.	+20
Very fast. Dangerously fast.	+30

You're generally better off slowing down before making a tricky manouevre, however you can try to force a persuer to crash or lose you by taking a bend at high speed.

Spaceships

Spacecraft movement is given as an acceleration and a delta-vee. The acceleration is in metres per second per second, and the delta-vee is the maximum velocity the ship can attain in km/s if it were to accelerate for as long as possible.

Example Vehicles

Listed below are some sample vehicles, showing a range of sizes and capabilities from the modern day and recent history.

Modern

Family Car

5 door hatch back.
Legality: 4; **TL:** 8; **Mass:** 750kg ; **Cost:** 15,000 Cr
Speed: 180 km/h; **Accl:** 10 km/h/s; **Range:** 600 km

Siz	Str	Hea	Agi	Per	Soak	Move	Accl
10	14	3	3		10	165	20

Damage track
+0 : O O O O
-10: O O O
-25: O O O
-40: O (Disabled)

Land Rover

Sports Utility Vehicle
Legality: 4; **TL:** 8; **Mass:** 3t ; **Cost:** 25,000 Cr
Speed: 220 km/h; **Accl:** 15 km/h/s; **Range:** 500 km

Siz	Str	Hea	Agi	Per	Soak	Move	Accl
12	25	4	3		14	300	25

Damage track
+0 : O O O O
-10: O O O O
-25: O O O O
-40: O (Disabled)

Motorbike

Typical average motorbike.
Legality: 4; **TL:** 8; **Mass:** 250kg ; **Cost:** 5,000 Cr

Speed: 160 km/h; **Accl:** 20 km/h/s; **Range:** 360 km

Siz	Str	Hea	Agi	Per	Soak	Move	Accl
4	6	3	5		8	220	30

Damage track
+0 : O O
-10: O
-25: O
-40: O (Disabled)

An typical good performance motorcycle from the late 20th century.

SUV

Sports Utility Vehicle
Legality: 4; **TL:** 8; **Mass:** 1.25t ; **Cost:** 35,000 Cr
Speed: 220 km/h; **Accl:** 15 km/h/s; **Range:** 500 km

Siz	Str	Hea	Agi	Per	Soak	Move	Accl
12	18	4	3		14	300	25

Damage track
+0 : O O O O
-10: O O O O
-25: O O O O
-40: O (Disabled)

WWII Tanks

M-3 Halftrack APC

Light infantry transport.
Legality: 2; **TL:** 6; **Mass:** 10.2t ; **Cost:** 2,600 Cr
Manufacturer: US; **In-Service:** 1942
Speed: 64 km/h; **Accl:** 3 km/h/s; **Range:** 450 km

Siz	Str	Hea	Agi	Per	Soak	Move	Accl
12	56	4	3		18	65	10

Damage track
+0 : O O O O
-10: O O O O
-25: O O O O
-40: O (Disabled)
Armour: 33 *(Half: 25)*
Heavy machine gun
Atk: 15; **Dmg:** 45 (Hv Fi Au)
Inc: 30m; **Ranges:** 1,000m / 2,000m / 4km
Capacity: 700; **RoF:** 10; **Recoil:** -10
Light Machine Gun
Atk: 15; **Dmg:** 35 (Hv Fi Au)
Inc: 25m; **Ranges:** 750m / 2,000m / 4km
Capacity: 7000; **RoF:** 10; **Recoil:** -5

A half-tracked armoured personel carrier with an open top.

Panzer IV

German medium tank.
Legality: 1; **TL:** 6; **Mass:** 27.5t ; **Cost:** 26,000 Cr
Manufacturer: Germany; **In-Service:** 1939
Speed: 46 km/h; **Accl:** 3 km/h/s; **Range:** 280 km

Siz	Str	Hea	Agi	Per	Soak	Move	Accl
8	44	3	2		16	65	10

Damage track
+0 : O O O
-10: O O O
-25: O O
-40: O (Disabled)
Armour (Front): 41 *(Half: 28)*
Armour (Side): 31 *(Half: 23)*
75mm long tank gun
Atk: 28; **Dmg:** 50 (Fi Ex-2 Vc)
Inc: 40m; **Ranges:** 1,500m / 6km / 15km
Capacity: 87; **RoF:** 1; **Recoil:** 0
Light Machine Gun (x2)
Atk: 15; **Dmg:** 35 (Hv Fi Au)
Inc: 25m; **Ranges:** 750m / 2,000m / 4km
Capacity: 1500; **RoF:** 10; **Recoil:** -5

German tank common at the start of the war, over ten thousand were constructed, with varying models being based on the standard design.

Panzer VI - Tiger

WWII German heavy tank.
Legality: 1; **TL:** 6; **Mass:** 62.6t ; **Cost:** 56,000 Cr
Manufacturer: Germany; **In-Service:** 1942
Speed: 46 km/h; **Accl:** 3 km/h/s; **Range:** 140 km

Siz	Str	Hea	Agi	Per	Soak	Move	Accl
10	51	3	2		20	65	10

Damage track
+0 : O O O O
-10: O O O
-25: O O O
-40: O (Disabled)
Armour (Front): 55 *(Half: 37)*
Armour (Side): 40 *(Half: 30)*
88mm medium tank gun
Atk: 25; **Dmg:** 50 (Fi Ex-2 Vc)
Inc: 30m; **Ranges:** 1,500m / 6km / 15km
Capacity: 92; **RoF:** 1; **Recoil:** 0
Light Machine Gun (x2)
Atk: 15; **Dmg:** 35 (Hv Fi Au)
Inc: 25m; **Ranges:** 750m / 2,000m / 4km
Capacity: 2000; **RoF:** 10; **Recoil:** -5

The best of the German tanks.

Sherman M4

Medium tank.
Legality: 1; **TL:** 6; **Mass:** 33.2t ; **Cost:** 31,000 Cr
Manufacturer: US; **In-Service:** 1941
Speed: 45 km/h; **Accl:** 3 km/h/s; **Range:** 330 km

Siz	Str	Hea	Agi	Per	Soak	Move	Accl
9	45	4	2		18	65	10

Damage track
+0 : O O O
-10: O O O
-25: O O O
-40: O (Disabled)
Armour (Front): 38 *(Half: 28)*
Armour (Side): 33 *(Half: 25)*
75mm medium tank gun
Atk: 25; **Dmg:** 45 (Fi Ex-2 Vc)
Inc: 30m; **Ranges:** 1,000m / 4km / 10km
Capacity: 90; **RoF:** 1; **Recoil:** 0
Light Machine Gun (x2)
Atk: 15; **Dmg:** 35 (Hv Fi Au)
Inc: 25m; **Ranges:** 750m / 2,000m / 4km
Capacity: 2000; **RoF:** 10; **Recoil:** -5

The standard US tank, which was used throughout the war by the US and her allies.

T-34

WWII Russian heavy tank.
Legality: 1; **TL:** 6; **Mass:** 28.6t ; **Cost:** 65,000 Cr
Manufacturer: Russia; **In-Service:** 1940
Speed: 58 km/h; **Accl:** 3 km/h/s; **Range:** 180 km

Siz	Str	Hea	Agi	Per	Soak	Move	Accl
11	40	4	2		22	80	15

Damage track
+0 : O O O O
-10: O O O O
-25: O O O
-40: O (Disabled)

Armour (Front): 57 *(Half: 39)*
Armour (Side): 42 *(Half: 32)*
75mm medium tank gun
Atk: 25; **Dmg:** 45 (Fi Ex-2 Vc)
Inc: 30m; **Ranges:** 1,000m / 4km / 10km
Capacity: 77; **RoF:** 1; **Recoil:** 0
Light Machine Gun (x2)
Atk: 15; **Dmg:** 35 (Hv Fi Au)
Inc: 25m; **Ranges:** 750m / 2,000m / 4km
Capacity: 2000; **RoF:** 10; **Recoil:** -5

Russian heavy tank.

WWII Ships

Bismark

German Battleship
Legality: 0; **TL:** 6; **Mass:** ; **Cost:**
Water Speed: 30km/h; **W Accl:** 1km/h/s; **W Range:** 17200 km

Siz	Str	Hea	Agi	Per	Soak	Move	Accl
28	50	5	1		70	80	15

Damage track
+0 : O O O O O O O O O O
-10: O O O O O O O O O
-25: O O O O O O O O O
-40: O (Disabled)
Armour (Front): 120 *(Half: 95)*
Armour (Top): 100 *(Half: 85)*
15in Naval Gun (x8)
Atk: 50; **Dmg:** 110 (Fi Ex-5 Vc)
Inc: 100m; **Ranges:** 3km / 10km / 40km
Capacity: 77; **RoF:** 1; **Recoil:** 0

Vehicle Weapons and Armour

Weapons which have a property of *Vehicle (Vc)* completely ignore the *Soak* of standard targets unless they are in Heavy armour. This means that the total soak roll is always zero for these targets. Standard targets with heavy armour have their total soak roll halved.

Heavy vehicle weapons always ignore the soak of character scale targets, regardless of the armour they are wearing.

Any target which has Vehicle armour halves the damage from standard weapons, and all damage done is Minor.

Big Guns

From the point of view of large vehicles, pretty much any weapon that is considered man-portable is *tiny*. This includes heavy machine guns and similar weapons which may be vehicle mounted but which are used and pointed by people. *Tiny* weapons are considered to be *Size* 5, and do less damage against anything of *Size* 15 or more. Effectively, *Major* damage becomes *Minor* damage, and *Minor* damage is ignored.

A *Tiny* weapon cannot effectively harm any vehicle (or creature) of *Size* 20 or greater. However, they may be able to harm individual turrets or other surface points.

Dedicated anti-armour weapons, such as the main gun of a tank, are considered to be *Small*. For *Size* purposes they have a *Size* of 10.

Naval guns and artillery weapons are considered to be *Medium* weapons, and have a *Size* of 20.

Really Big Guns

The descriptive terms for most vehicle weapons are kept deliberately small for a reason - there are situations where even bigger weapons are possible. Normally, these occur in *science fiction* settings, though larger artillery peices or naval weapons may available in the modern world.

In terms of *Traveller*, small point defence systems are *Tiny*, and standard turret weapons are *Small*. Bay weapons (both 50t and 100t) are *Medium*. Spinal mount weapons are *Large*, and are considered to be *Size* 30 or bigger. The largest ship in *Traveller*, the *Tigress*, is only *Size* 39. Most of the large ships in *Star Wars* will also have *Large* weapons.

The size of the gun affects the size of target it is designed to hit. The base difficulty to hit a target is 15, modified by +5 per point of *Size* the target is smaller than the weapon. A *medium* naval gun base a base difficulty of 90 (15 + 75) to hit a person. Of course, a near miss is probably going to be good enough.

Starship Combat

If a battle is being fought between large vehicles, such as battleships or spaceships, it is suggested that a *turn* of 5 minutes is used instead of the usual 5 second rounds. Most weapons which are of use at this scale will tend to have very slow rates of fire, comparable to 1 per 5 minute *turn*.

How well a spacecraft moves is measured by its *acceleration*, which is given in 'g'. Every 'g' of acceleration allows the ship to accelerate up to (roughly) 1000km/turn/turn. For this reason, all ranges are measured in multiples of 1000km.

6 Yags Modern

Guided Missiles

Guided missiles start to become common in TL7, and increase in effectiveness, range and cheapness as technology progresses. They are rated according to how 'smart' they are.

Guidance Systems

The main distinction between *missiles* and *rockets* is that the latter lack any means of guidance after launch. A missile is, in theory, able to track its target as it tries to evade. The capability of the guidance system is an important feature of any missile.

In a missiles weapon description, it will be described as Gu(X/n), where X is the type of guidance system, and n is the 'skill' of the system.

Manual

Very basic missiles are manually guided, being controlled remotely by an observer (normally the firer) with a simple joystick. The missile has no guidance system of its own. Such a missile always uses the *Heavy weapons* skill of the controller.

Homing (H)

A *homing* missile locks onto its target using very simple criteria, such as heat signature or noise. Once fired, the target cannot be changed, and they can be confused very easily, by sending out decoys which are brighter/noisier than the target itself.

Smart (S)

A *smart* missile is remote controlled by an observer, or locks onto some targetting signal. It has no intelligence itself, and the observer must maintain control until the last moment.

In some ways they aren't as good as a homing missile, since they aren't fire-and-forget. However, they can lock onto any target, not just those giving out heat or noise, and the human operator is often harder to fool with decoys than a simple homing missile is.

Brilliant (B)

Brilliant missiles are capable of homing in on a designated target. Designation is by a human operator, but after the missile is fired, no further designation is required (unlike for smart missiles). Brilliant missiles may use a number of techniques for recognising the target, but are mostly based on visual or signature recognition.

Clever (C)

Clever missiles are capable of making their own choices about targets. Once a target has been selected, they are capable of following that target themselves without outside aid. Note that a *clever* missile actively recognises its target, it does not rely on a simple criteria such as heat for tracking.

Clever missiles may be fired in the general direction of the enemy, and is capable of choosing a target itself based on a pre-defined profile.

Genius (G)

Genius missiles are capable of selecting a target based on many criteria, using strategy to select not only the best target, but also the best route to the target.

The most effective genius missiles are capable of working together in swarms, deciding between themselves how to divide up the targets, and changing targets as conditions change.

Contra-grav genius missiles have the capability to lay in wait for targets, dodge counter measures and generally behave like living attackers.

Usage

Guided missiles are treated as missile weapons. They generally have a range increment of 0 (distance to target does not affect accuracy). Self guided missiles (normally *clever* and *genius*) use their own skill in an attack.

A missile cannot hit a target at *short range*. It is within the weapon's arming distance.

At *medium range*, the missile behaves as normal, attacking with its attack score and doing full damage.

At *long range* the missile is nearing the end of its capability, and is less able to manouevre to hit the target. It's attack score is halved.

Computers

Computers, in the form of machines that could think and store information, first became possible at TL6, but in the real world they didn't start to actually be produced until early TL7. Early computers were mostly mechanical, and it wasn't until the advent of good electronics that they really started to develop.

Computer technology is currently improving at a rate which makes it difficult to predict where things will end up.

Thinking Machines

The author subscribes to Strong AI - the belief that there is nothing magical about the human mind, and that reproducing how it works in a machine is merely a hard problem we haven't yet solved. These rules assume that true AI is possible, and any difficulties with uploading a human mind into a computer are merely engineering issues.

Computers in Yags may provide bonuses to attempts to solve problems and search for data. Computer systems between tech levels are difficult to compare, so they aren't. It is assumed that as computers get more powerful, the sort of problems they are expected to deal with get more complex as well.

Type of computer	Complexity
Micro PDA	-10
PDA	-5
Desktop (TL8)	0
Large server	+5
Mini-cluster	+10
Mainframe	+20
Data cluster	+30
NSA Super cluster	+50

Using a computer

The *Computer operation* skill covers basic use of a computer. This covers everything that is needed to be known at the current tech level in order to interface with such a machine. At TL6, it will be little more than how to load punch cards and how to interpret basic mechanical errors. Through TL7, information becomes more readily available until actual interactive use of the computer is possible, in the form of running queries and using word processors and simple programs.

By TL8, most people can be trained to use a word processor, spread sheet or to perform simple queries. By the middle of this period, *computer operation* covers advanced usage of software - such as writing macros, finding information on the internet, installing software and a little knowledge of networks and viruses.

Beyond TL8, most computer interfaces will probably be of the form of voice or mind control, making it far easier for unskilled people to control them. With the advent of true AIs, the skill may become completely redundant.

Hacking a computer

Computer hacking is the skill of doing stuff with computers - from programming to advanced networking, system design and of course breaking its security. Whilst *Computer operation* covers using programs, *hacking* covers actually understanding how they work.

Hacking Terminology

As used here, the term *hacking* refers to the term as it is used by old school hackers, originally those at MIT during the 1960s. Recently, it has come to mean 'breaking illegally into a computer system' for many people. A hacker is someone who plays with computers because they are fun, and because they want to understand how they work. Since the best way to understand a security system is to break it, hackers would often go places they shouldn't. However, once a system is cracked, most would make sure they didn't cause any damage, or let the owners know what the flaws were. Most, but not all. Many people who call themselves *hackers* however simply enjoy pushing computers to their limits, and would never break into a computer system they didn't have permission to access.

Further, not all people who break into computer systems are *Hackers*. There are some - generally known as *Script Kiddies* - who simply want to cause damage. They have little or no knowledge of how things work, but simply run scripts written by those who do.

Hacking includes programming, networking, installing and configuring. Many of these tasks are techniques which must be purchased as specialisations. For the most part, the differences between different operating systems is ignored, since this starts to get complex. If this level of detail is required, then assume that there is a *Computer hacking* skill for every type of computer system (UNIX/Linux, VMS, OS360, Microsoft etc). The same can be done with *Computer operation*.

An alternative approach is to assume a default system when the skill is first learnt, and other systems are represented by a familiarity technique, at level 2. If you aren't familiar with the system, then your roll is halved.

Computer Intrusion

Breaking into a computer system can be very easy, or very hard. Generally, getting access to a computer is very easy if you have physical access to the machine. At the very least, you can take it apart, pull out the hard drive (or holographic memory crystal) and make a copy to peruse at your leisure. If you don't care if the owners knew you were there, then you don't even need to make a copy.

To get access to a machine without pulling it apart, use the following table. The *Computer hacking* skill is used. If you know the *Computer Intrusion* technique, then you can halve these difficulties.

Task	Target
Home system. Most home users know little about security, and tend to run all sorts of software which provide any number of possible security holes.	20
Small business. Small businesses may not have much more knowledge than a home user, but run fewer apps and have probably paid to keep their anti-virus uptodate.	40

Task	Target
Corporate system. Typically a large business will have a dedicated staff of IT people (or outsource such a role) who know what they are doing. Systems will be locked down, with firewalls and restricted access.	60
Secure system. A high tech firm or important government system, where the focus is on security rather than usability. Users may be heavily restricted in what they can do, since security is seen as higher priority than productivity.	80
Military. Any system which is locked down tight, with security being the one focus of the design. Such systems are often even harder to penetrate than the difficulty would suggest, since they may not actually have access from the outside world - or at least it is restricted via dedicated lines to a few secure locations. Finding those locations will be required before any attempts are made.	100
Uptodate security Latest patches are installed.	+10
Out of date The system is badly out of date, and hasn't had any patches installed.	-10
Compromised If the system is already compromised (by trojans, viruses and the like), then it is generally easier to access.	-10

As standard, a failure to gain access will be logged, though whether anybody looks at the logs will depend on the site being attacked. A successful intrusion will also be logged, though a good success can ensure that the logs are removed.

On your first attempt to hack a system, you may if you wish make a check at twice the normal difficulty after one hour. If that fails, then a second check may be made after a day. This assumes 24 hours elapsed time, with about half that time requiring effort on the part of the intruder (the rest is running scripts, or waiting for replies on hacker's mailing lists).

Exploits and scripts

The above table mostly abstracts the frequency of patches and updates to a system, the sort of software being run and how standard the installation is. Breaking into a home system is often easy because there are plenty of scripts available that can be used to automate the intrusion. More secure systems will have the exploits that the scripts make use of patched.

Computer systems of an earlier technology may be much easier, or much harder, to crack. If you are not prepared for the lower tech, then there is no change in difficulty, since trying to understand the long since deprecated protocols balances out any advantages gained from having better tools. If you have time to prepare however, and have access to the correct documentation and earlier toolsets, then all difficulties are halved for each drop in TL. Breaking a computer system above the TL you are used to is impossible.

If an earlier TL crosses a paradigm shift (from electronics to vacuum tubes, or AI run systems to standard programmed systems) then you also need a different skill in order to do anything with such a museum piece.

Encryption

Secure computer systems will ensure that data is stored in an encrypted form. Generally, anyone with access to tools and knowledge of a later TL, is able to crack the encryption of an earlier TL without much effort. Divide the difficulty by 5 for each difference in TL.

The exception will be data properly encrypted with a one time pad - such data is generally perfectly safe unless access to the pad is possible, or a mistake has been made. One time pads are difficult to manufacture for large amounts of data however, so such encryption is rare.

An attempt to break modern encryption can be made using *Computer hacking*. Most such attempts involve brute force techniques, using software to do most of the work. If you have the *Encryption* technique, you can halve the difficulties.

Task	Target
Very basic encryption. A custom encryption system for a proprietry system, written by someone with no cryptographic background. Many programs may store passwords or license keys in this form.	20
Standard encryption. The sort used by common off the shelf encryption software, assuming that no major effort has been made to keep it secure.	100
Secure encryption. The best commonly available encryption. This is often used for financial data or security tools.	150
Military encryption. The very best levels of encryption, where cost (in time, effort and computing power) is no limit when securing data. The military will rarely use this level of encryption, especially for real time communications, since it is too expensive unless there is a dedicated mainframe at each end.	200

The standard time to break the encryption on a document is 100 days for a desktop of the equivalent TL. If a more powerful, or less powerful, computer system is available then add the computer system's rating to the attempt. Each level of success above the required difficult reduces the time required by 90% (e.g., 10 days for a good success, 1 day for excellent etc).

If a more random approach is desired, then assume that the base time is d20 x 10 days. This makes it harder for a player to know how long it's going to take. As with intrusion, it is assumed that about half the time is waiting for scripts to complete, and half the time requires the cryptographer to be working on the problem.

Breaking encryption

Breaking encryption can be hard, and often it can only be done by either brute force, or finding a mistake in the process. Here, it is assumed that most of the work is in trying to exploit flaws in the implementations rather than trying to break the mathematics behind the algorithm.

Generally, any real encryption system is designed so that brute force methods take longer than any reasonable time to work.

If you have *Cryptography*, then you can attempt to find a shortcut to reduce the amount of computer time required. How difficult this is depends on the amount of data available, whether there are known flaws in the encryption system used, or if common mistakes have been made. Each type of shortcut can be attempted, and each level of success means that the decryption difficulty is reduced by 10 (minimum 10).

Task	Target
Known flaws. If the encryption system has some known flaws, then it may be possible to exploit these. Will tend to apply to older software.	20
Type of data is known. If the type of data being encrypted is known, then this information can be used to decrypt it. For example, if the data is a document in a common word processor format, which always has the same header information, then this can be used to help crack the protection. The cracking of the German Enigma system in WWII was helped by German weather reports always starting with the same text.	30
Large amount of data. If there is a large amount of similar data, then this can help find patterns, and lead to a shortcut.	30

All attempts stack, so if there is a large amount of data and known plain text, then it can be very easy to decrypt documents. Note that the above attempts can only be made if they are applicable.

Artificial Intelligence

AIs are self-aware intelligences implemented as software. There are a number of different types of AIs, and they range considerably in their capabilities.

Turing Personality

A *Turing Personality* is simply a software program that is able to convince people that it is human. It does not have full consciousness however, and is only capable of operating in a narrow field. They are often used on support desks or in service roles such as shop assistants or performing basic servant duties. Outside of their realm of expertise, then rapidly lose competence, and have only limited learning capability.

TPs become available around Tech Level 9, and by TL 10 may be commonly available as the interface to PDAs or specialist software programs.

Virtuals

Full virtual personalities are available from TL10 (or higher, depending on the background). These are fully conscious and self-aware entities, who have all the capabilities of a human mind. At the TL that they are introduced, they are about as capable as a human, but with better recall and data retrieval. Working out answers to 'tricky' problems takes about as much time as a human does. They are assumed to run on a mainframe class of machine.

Each extra TL beyond introduction, assume that they can run on a machine of one lower class with about the same level of ability, or they can run about 10 times as quickly on the same level of hardware.

Mind Interfaces

Basic mind-machine interfaces become available at TL8, though it isn't until TL9 that they really start to become useful. Basic PDA functionality can be accessed (map, contact or appointment information overlayed onto the optic nerve), and it becomes possible for a mind interface to be used to operate a computer (in much the same way a keyboard or mouse is at TL8).

At late TL9, early TL10, it is possible to record everything that a person sees.

At TL10, it becomes possible to access enough information to allow full body immersion into virtual realities, with sound and images from surface thoughts being accessable to the machine.

At TL11, it is possible to read some memories out of a mind, and writing is possible but flaky. The main issue is accessing the memories, since they need to be brought to the fore and read. Every mind is different, so a large amount of time must be spent adapting to an individual before there is any hope of searching memories. Trawling memories is slow, and is effectively limited to real time. Even then, false memory syndrome is a very real possibility.

By TL12 a lot of the adaption problems have been sorted, but downloading a person's mind is slow and difficult. Brain taping is possible, but it is traumatic, and can result in lost or damaged memories. It can take about a month to fully brain tape someone.

Cyberware

Most cyberware is limited to providing physical enhancements to a person - making them faster and stronger for example. Enhancements to senses tend also to be limited to doing what they say on the box and no more. As soon as cyberware is available it is possible to network such addons to each other and to external interfaces, but doing so is a security risk which most people aren't willing to take. The possible law suits that could result if someone is damage due to a cyberlimb contracting a virus means most companies are unwilling to sell them with any form of connectivity.

As TL9 progresses, sensory devices begin to be able to store and forward data, increasing the advantages of linking them up with external interfaces. Some will require a wired interface, and tend to be secure. Those that have wireless interfaces are less secure and can be hacked as if they were a *Secure system*.

10 Yags Modern

Modern Equipment

The following lists some weapons and armour types which are commonly available in a late 20th/early 21st century campaign.

Pistols	Atk	Dfn	Dmg	Load	Str	Rch	RoF	Cap	Rcl	Inc	Sh	Md	Lg	Class	TL	LC	Notes

Rifles	Atk	Dfn	Dmg	Load	Str	Rch	RoF	Cap	Rcl	Inc	Sh	Md	Lg	Class	TL	LC	Notes

SMG	Atk	Dfn	Dmg	Load	Str	Rch	RoF	Cap	Rcl	Inc	Sh	Md	Lg	Class	TL	LC	Notes