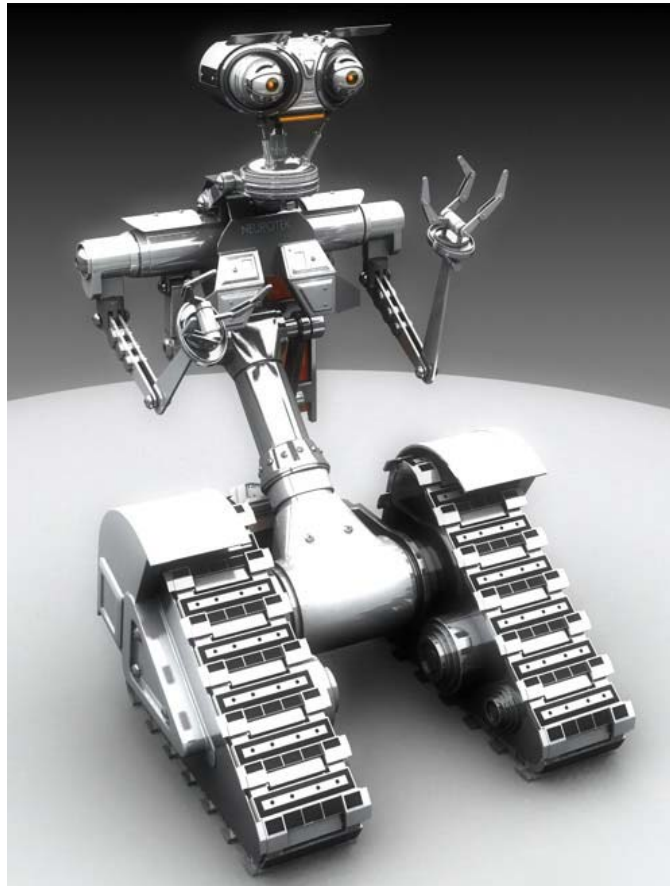


Detailed Pitch – Lobot & Belfry

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Lobot & Belfry

It's Ico meets Short Circuit, in an action-puzzle-exploration game!

In the game 'Lobot & Belfry', the player plays a loading and maintenance robot nicknamed Lobot, the only robot in a robotics factory who is unaffected by a malicious virus. Infected robots have taken over the factory and it's Lobot's job to protect Tech Belfry, his sole ally, as the pair make their way to the main control room so they can shut down the infected robots and regain control of the factory.

The player's job is to explore the robotics factory and find a way through environment puzzles, while at the same time protecting Tech Belfry from the crazed robots that want to kill him.

Although AI controls Tech Belfry's exact actions, the player is in ultimate control of the pair. As Lobot, they lead the way, telling Tech Belfry when to stop, stay, follow, etc. Lobot and Tech Belfry have a sibling-style relationship, with a mutual need to protect each other. Neither of them can do the job alone, so they have to rely on each other to keep moving forwards.

The game should have a very 'us against the world' feel to it, with the player experiencing underdog optimism – the two allies are outnumbered but undaunted. With nothing but wits and determination on their side, they'll make their way through a hostile environment to their goal, and save the day!

Lobot is a lighthearted exploration/puzzle game. Although the game does include aggressive NPCs, battles are fought not in real-time, but by playing a mini-game. Because the player can win upgrades for Lobot from successfully defeating enemies, the game can be played multiple times, each time customising Lobot in a different way.

Story

You are Lobot XKZ171, general maintenance and loading robot. You've been in service for several years now, loading and repairing hoverdrones. Recently, you malfunctioned and the onsite Tech couldn't fix you, so you were sent back to the Ace Robotics factory for a full repair and tune-up.

Unfortunately, when you got there, you were put into the care of Tech Belfry. Tech Belfry was originally part of Ace Robotics R&D group, but after blowing more things up than he actually managed to invent, he was bumped down to maintenance and repair. Belfry is brilliant, but forgetful and easily distractable, so you figured it might be a couple of days before you got back into service. It's not really the delay that worries you – you're just hoping you manage to get out of the lab with all your nuts and bolts still in the right places.

But while you were in the basement, waiting to be repaired, something happened.

Professor Markov, evil genius, managed to hack into the network at Ace Robotics, and secretly load a virus into the mainframe. That night, when all the robots hooked into the network to upload their day's work schedules and receive their programs for the following day, the virus was downloaded into every last one of them.

But you never hooked in that night, which means *you* are the only uninfected robot in the place.

The virus makes robots aggressive and unstable. It disables the safetyguards that make sure robots don't damage people or property. The robots have taken control of the Ace Robotics factory and have driven all

humans from the building, with those who resisted being killed. Belfry, distracted by his latest invention, missed the morning meeting and was unaware of what was going on until it was too late. Now the robots have gone into the “shoot humans on sight” phase of the takeover, and Belfry is in mortal danger.

Game Goal

But you've come up with a plan. You think that if you can get to the control room of the factory, you can wipe the mainframe and load a complete backup, to get rid of the virus. Unfortunately, the mainframe is locked and can only be unlocked by a retinal scan of someone with the appropriate authorisation. That's where Tech Belfry comes in. If you can get him there alive, the two of you just might be able to pull this off.

There's several problems with this plan. The first is that there's an entire factory of infected robots that will try to kill Tech Belfry on sight between you and your goal. Many of the bots in the factory are armed, and won't hesitate to shoot at Belfry - or you, if you try and help him. Secondly, parts of the factory have been damaged and destroyed in the fighting, so the main route to the control room is blocked.

So it's become your job to find a path for Belfry to take, and make sure that he's protected all the way to the mainframe. Being completely outnumbered would make this task near impossible, but you have one advantage that the other robots don't know about - Tech Belfry has a special device that he's been working on in his spare time. It's a portable personal shield, and creates a spherical forcefield around the user. Unfortunately, it only works if the user is standing still. This means, however, that you can tell Tech Belfry to stay put while you go ahead to scout or disable robots, and know that he'll probably be safe until you get back.

Gameplay

At its core, Lobot is a puzzle/exploration game, in the vein of Ico or Tomb Raider. But unlike these games, Lobot can't defeat his enemies with real-time combat. Instead, confrontations with other robots are played out through the combat mini-game, in the style of Puzzle Quest. Lobot needs to fight other robots in order to clear the way for Belfry. Like to the two main characters in Ico or Primal, Lobot and his human ward are dependent upon each other, and many puzzles will require their co-operation in order to solve.

Player actions available are:

- Moving/exploring
- Picking up items
- Interacting with items in the environment, eg, pushing buttons/switches
- Accessing information panels
- Speaking to Belfry
- Deactivating other robots using combat mini-game

Player Goals

The player's primary goal is to reach the mainframe control room. To this end, the player must successfully attain a series of sub-goals, in the form of level objectives. The player may also choose other goals for themselves, for example, to explore as much of the map as they can, or to deliberately seek out combat with other robots in order to increase Lobot's stats and abilities.

Many of the level goals will be in the form of tasks that the player needs to figure out how to perform,

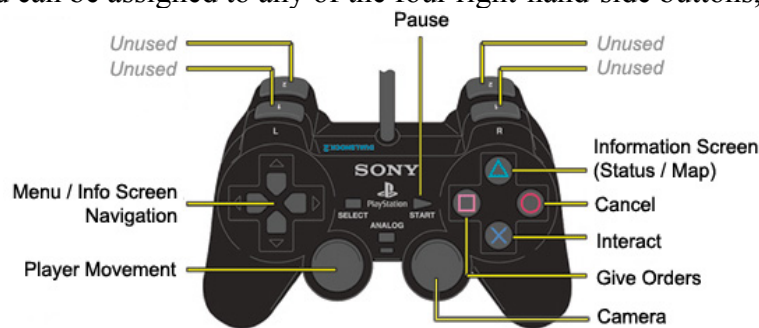
usually by breaking them down into smaller steps. The player's job is to progress efficiently through these environment puzzles, while minimizing the danger to Belfry along the way. This may involve, for example, getting him to a safe location and telling him to stay there while Lobot searches for an alternate way forwards, or asking him to press a switch at the top of a flight of stairs which Lobot is unable to ascend.

Each of these elements will contribute to the player's attachment to Lobot and his human companion, reinforcing their need for each other, as well as challenging the player to overcome the increasingly difficult levels and outwit the other robots.

Control System

The game is designed for a console controller with at least four buttons (not counting the direction pad); in this case a PS2 controller. The following function/button combinations are fixed: Lobot's movement is controlled using the left analogue stick, as is standard for a third-person game; the right analogue stick lets the player control the camera; the directional pad is used to navigate menus and information screens; and the start button pauses the game.

There are four other functions which are tied to the following buttons by default: X is interact, O is cancel, Δ is Information Screen and □ is Give Orders. These buttons these four functions are linked to may be changed by the user, and can be assigned to any of the four right-hand-side buttons, or the shoulder buttons.



Default Controller Settings
(Image source: <http://www.trublu.com.au>)

The player can interact with items or entities in the environment by getting close to them and pressing the 'interact' button. This enables Lobot to activate buttons or switches, pick up small items, push or pull large items, speak to Belfry, initiate combat with other robots, and so on. The interact button also functions as 'select/accept' when there are multiple actions to choose from.

The 'information screen' button accesses Lobot's two information screens – the status screen and the map (pressing this button toggles between the two options). The status screen shows his current state and stats, as well as items in his inventory. The map screen shows the areas that Lobot has already explored. The map begins dark, but is uncovered as Lobot explores. Once Lobot has been to a particular location, it will always be shown on the map.

Finally, the cancel button cancels the current action, or closes the map/status screen.

Interaction with Belfry

Lobot can speak to Tech Belfry by moving close to him and pressing the 'interact' button. When spoken to,

Belfry may give reminders of Lobot's current goal, suggest advice, or occasionally just ramble. If Lobot is physically damaged, Belfry will repair him.

Lobot can also use his 'give orders' button to give Belfry specific types of instructions. Basic orders include 'stay', 'follow me', and 'come here'. Orders can be given from a distance, as long as Belfry is within sight range.

In some situations, Belfry will attempt to act independently. Sometimes he will give Lobot a say in these sorts of decisions. For example, he may ask "Shall I activate the switch now?" and the player will be able to select 'Yes' or 'No'.

Interaction with other robots

If Lobot is alone and not behaving suspiciously, most other robots will ignore him, which makes it relatively easy for Lobot to sneak up on them and attempt to deactivate them.

Robots will become suspicious in four different circumstances: Lobot tries to deactivate them, fails, and chooses not to retry; they see Lobot deactivate another robot; they see Lobot assisting Belfry, or they are told to go into 'alert' mode by another robot. This last method is only used by guard robots.

Robots will perform different actions when in 'alert' mode, depending on their type. Small robots may run away. Larger robots, especially guard robots, may attack or try to shoot Lobot. Robots without any means of doing damage might grace Lobot's audio receptors with a few choice bleeps. Whatever the reaction, Lobot cannot attempt to deactivate a robot that is already in alert mode, with one exception: if a robot is in attacking Tech Belfry's shield, then Lobot can try and deactivate them from behind, since they are not currently focusing on him as a threat.

Most robots will calm down and return to normal mode when Lobot has been out of sight for a short period. Some robots, however, will chase Lobot, which means he must keep running until he loses them, or manages to hide somewhere, unnoticed.

The Deactivation Mini-Game

The combat mini-game is a 2D real-time puzzle game. When Lobot attempts to deactivate another robot, the main game will freeze, and the deactivation puzzle will begin.

The gameplay area is a top-down view of a board resembling a stylised electrical circuitboard. The circuit has a framework of wires with a number of components built in to it, such as switches, obstacles and bonuses. The aim of the mini-game is to send a deactivation code from the beginning point to the end point – the enemy robot's infected CPU – of the circuit.

The deactivation code is initially stationary, but will begin to move automatically after a few seconds (once the player has had a few moments to study the layout of the board). The player cannot control or stop the deactivation code, but can guide its path by flipping switches to avoid obstacles, pass over bonuses, etc.

Some robots will actively fight against Lobot by sending out mobile traps and hazards. These increase the difficulty of the puzzle, because the player may need to modify the path they have chosen on the fly.

Example obstacles:

Viral fog/ viral skull – viruses are hazards that will corrupt the deactivation code. Once the code is corrupted, the mini-game has failed. Viral fog is a stationary hazard, while viral skulls may move around, under the control of enemy AI.

Example bonuses:

Overclock gate – if the code goes through an overclock gate Lobot's processor is temporarily given a boost in speed. This has the effect of slowing down the speed that the code travels (the speed being relative to observer), which gives the player more time to think about which is the best path to the goal.

Invulnerability gate – if the code goes through an invulnerability gate it is temporarily unable to be affected by hazards or traps.

If Lobot fails the deactivation mini-game, he may re-try immediately with no penalty, or choose to disengage. If he chooses to disengage, the robot he failed to deactivate, as well as any other robots in the room that witnessed it, will go into alert mode. Lobot will need to leave the area and allow the robots to return to normal before trying to deactivate them again.

Upgrading Lobot

When Lobot manages to deactivate another robot, he may choose to take a module from them and integrate it into his own system. Different robots will have different types of modules available. Modules can increase Lobot's physical stats (for example, strength or speed) or his intelligence, which will give him advantages when playing the deactivation mini-game. Upgrade modules generally only have very minor effects, but are cumulative, which means Lobot can become more powerful over time.

Taking Damage

If Lobot is directly hit by a robot shooting at him, he will take damage. Fortunately, Lobot is tough, so the damage is mostly superficial and never completely disabling. When damaged, Lobot may have minor physical impairments – a joint may shoot sparks, which makes it impossible to sneak up on other robots, or one of his tracks might come loose, causing him to curve slightly to one side when trying to go straight ahead.

This kind of damage can be repaired by Tech Belfry.

Using Items

Lobot is able to pick up small items (for example, tools, keys, etc) from the environment by moving close to them and pressing the 'interact' button. Items will then disappear from the screen and be moved to Lobot's virtual 'inventory'. These items can be accessed and used at a later time by going to the status screen and selecting them.

An example of a usable item might be a small packet of fireworks. When activated by selecting the item from the inventory screen, the fireworks will appear in Lobot's hand, with the fuse lit. The player can move around while carrying the fireworks, and then throw them using the 'interact' button (hopefully before the wick runs out!) Fireworks may be useful to distract a guard, set something on fire, or light up a dark room, for example.

Tutorial Section

The initial stage of the game will be a tutorial section. Belfry, realising he is trapped in the building by crazed robots, has repaired Lobot quickly in the hope of gaining an ally. The game will begin with Belfry testing Lobot to ensure he's fully functional, by getting the player to do simple tasks like move around, pick up an item, flick a switch, push a crate, etc.

Once Belfry is certain that Lobot is physically functional again, he explains to Lobot that he's installed the latest version of his AI software into him. This software should enable Lobot to deactivate other robots, by sending a deactivation program directly to their CPU. Belfry tells Lobot that other robots will resist being disabled, so his best chance is to try and catch them unawares.

Belfry has a test robot in his lab that is currently 'sleeping', and will ask Lobot to try and deactivate it. This first deactivation mini-game will include a tutorial where Belfry will explain each of the elements of the mini-game: the wires, switches, deactivation code, the enemy CPU and bonuses and hazards. The sleeping robot will not fight back, and the deactivation code will move relatively slowly. When Lobot wins the mini-game, Belfry will explain how Lobot can take a module from the defeated robot and use it to upgrade himself.

Next, Belfry will explain that it will be harder to deactivate robots that are currently active. A small sentry robot has positioned itself in the main doorway of the repair section. Fortunately, this robot is facing away from Belfry's lab, not expecting anything to come from behind him. Lobot will need to deactivate this robot to get to the next room.

In the following section, a robot is standing in an intersection that Lobot and Belfry need to get through, but is facing the direction that they are coming from. Belfry explains that many robots will respond to sound, and dropping a noisy item near them will often cause them to turn around to try and locate the source of the sound, or in some cases, actually move to the location of the noise. A box full of nuts and bolts will be sitting on a desk in Belfry's lab, which, when picked up, will trigger a tutorial given by Belfry on how to use items in Lobot's inventory.

By distracting the sentry robot, Lobot can approach him from behind and attempt to deactivate him. Alternatively, he can try to lure the robot away from the intersection, and then sneak Belfry past while the sentry is away. This kind of choice will be repeated as the game goes on – the player can choose between sneaking around and avoiding other robots, or initiating combat more frequently to build up Lobot's stats.

The tutorials will progress in a similar manner, with Lobot being given small tasks in order to increase the player's skills and get them familiar with the types of challenges the environment will provide, as well as to start building up a repertoire of methods to work through them.

One example technique might be sequencing – deactivating a set of nearby robots in the right order, so that none of the deactivations can be seen by the other robots and therefore won't trigger their 'alert' modes.

As the game progresses, the environment puzzles will become more and more complex, but can still be solved by combining skills that the player has already acquired.

Level Walkthrough

A very simple environment puzzle might consist of the following:

Lobot and Belfry wish to get through a room in which a pipe has burst, but there are puddles of water on

the floor. Lobot can't risk going through the puddles in case he short-circuits. If he leads Belfry to the door, however, Belfry will realise that Lobot can't go any further, so will go into the room himself while Lobot waits at the door. Inside, Belfry will find a control panel which controls the elevators for this section of the factory, but will tell Lobot he can't re-activate the elevators without a swipe card.

Lobot tells Belfry to stay in the room while he goes to try and find a card. Lobot explores the nearby rooms, and sees a set of keycards hanging on a wall. Unfortunately, there is a guard robot at the door to the room. He won't let Lobot into the area he's guarding, so Lobot will have to deactivate him. Unfortunately, Lobot knows that that particular kind of guard doesn't respond to random noises.

Lobot then remembers that guard robots will react to other robots in alert mode. Lobot returns to a room in which there are several small utility robots. Nearby the room, he activates an item he recently picked up – a packet of fireworks. The utility robots will react to the noise in distress, and the guard will go to investigate. Lobot can then quickly get into the room, grab a card, and then get back to Belfry as fast as he can.

When Lobot gives Belfry the card, he re-activates the elevators. The two can then go around the water-soaked room by taking the elevator up to the next floor, going through the room directly above the water room, and then taking the lift down again on the other side.

Winning

The climax of the game occurs when Lobot and Belfry finally arrive at the control room. There, Lobot will face the most powerful of the combat robots, who is being controlled remotely by Professor Markov himself.

During the final battle, unlike previous battles, the game will keep moving in the background as the player tries to deactivate his opponent. While Lobot fights, Belfry will attempt to wipe the mainframe. If Lobot can stay alive until Belfry achieves his objective, the game is won! The story will wrap up in a similar way to the introduction, most likely with text over still frames.

Game Over

While Lobot himself is never in danger of dying, his companion isn't so lucky. If Tech Belfry's shield runs out, he will start taking direct damage from attacking robots, and will rapidly die. If Belfry dies, the game is over. If this occurs, the player may then choose to restart from the last checkpoint, or quit the game.

What makes the game fun?

The game is a challenge – there goal of the game is clear, but it's up to the player to find the way from the starting point to that goal. The player is in conflict both with the environment and other entities within it.

There is enough threat of danger to be exciting, but with enough puzzle and exploration elements to interest those who aren't solely interested in full-scale slaughter. The player can choose the degree of risk they want to take – the longer they leave Tech Belfry alone, the more robots that may discover him, and the more quickly his shield will decrease.

The game is unusual, because most games have human (or at the very least, living) protagonists. When robots appear as allies, they are usually sidekicks, like Clank from Ratchet and Clank, or Dog from Half Life 2.

This time the robot is the main character – and he's stronger, tougher, and more focussed than his scatterbrained human companion. The interaction between Lobot and Belfry is both serious and lighthearted by turns, and should provide moments of amusement in between the episodes of danger.

To increase the player's attachment to Lobot, the player is able to customise him from the beginning by choosing his colour scheme (players will be able to select from several different 'skins'). Players can also choose which modules to add whenever they deactivate other robots, and therefore which stats to increase, as they progress through the game.

Finally, the player can also choose their own gameplay style, using either stealth and cunning or sheer brute force to obtain their objectives, whatever they find more entertaining.

What would stop the game being fun, and how do we avoid it?

The game is designed to avoid the major annoyances of "escort quests".

Firstly, the other robots don't try and deactivate or destroy Lobot on sight – they have no way of knowing he's not infected too. They will only attack if they see him deactivate another robot or try to help or protect Tech Belfry. This means that the pressure of combat is intermittent, and can be somewhat controlled by the player.

Secondly, Tech Belfry is completely non-aggressive – he won't ever go into kamikaze mode and try to start a fight. He knows there's no way he can win against a robot. Conversely, if he is attacked, he immediately activates his shield instead of trying to fight back.

There are two game modes – normal mode and easy mode. In easy mode, Tech Belfry's shield has no timer limit. Once activated, his shield will remain intact until there are no more visible threats. This gives the player plenty of time to get back to him and help him. While the player will eventually have to get rid of the robots attacking him if they want to move forwards, they have time to think about how to do it – maybe lure one away at a time instead of attacking them all at once.

In normal mode, Tech Belfry's shield has a time limit. When the shield is activated, he will shout for Lobot. A shield timer will then appear in the HUD, and the player must get back to Tech Belfry and deactivate the robots attacking him before the shield runs out. The shield will recharge whenever it is deactivated, at the same rate it drops. This means that the player will need to spend more time protecting Tech Belfry, and be a little more conservative with their exploring.

Either way, the player can't afford to let too many robots build up around Tech Belfry, because they will need to get rid of them all before Belfry can move again.

The normal and easy modes let the player choose the level of challenge, depending on their own level of skill.

And finally, and perhaps most importantly, Belfry will *usually* follow Lobot's orders. Very occasionally, he may get distracted enough to forget that he's in "stay" mode, and wander off to look at something interesting, but for the most part, he's sensible enough to stay put and let you deal with the exploration and combat.

Art Style

Environment

The art and design of the world is semi-realistic but somewhat stylised. The robotics factory is a very detailed, almost cluttered environment, with lots of buttons and panels and crates and robot parts lying around. A lot of it is metallic or has glowing lights, which makes the environment look very 'techy', but it's not a clean, sterile place. The factory is old and should look somewhat ad-hoc in design. The environment is, in general, kind of grungey, at least on the factory levels. Many parts were damaged in the fighting, with smouldering rubble making some corridors and shafts unpassable, and the charred marks of plasma guns decorating the walls.

The machines and other parts of the factory are designed partly for functionality, and partly for cool/fun factor. Not everything in the factory needs to 'make sense' – eg, not all pipes and chambers and mechanical contraptions are required to have an obvious purpose, they may just be interesting to look at. The environmental mix should end up making the factory seem quirky and a little steampunkish, especially in the starting area, Tech Belfry's laboratory.

At the 'realistic, dark and grungey' end of the environment style scale, Black Mesa from Half Life would be a good example. At the other, more cartoony and steampunk end, there would be Max's workshop, from Dark Chronicle. Lobot should be somewhere in between these two extremes.



Black Mesa – Half Life
(Source: <http://screenshots.filesnetwork.com>)



Dark Chronicle
(Source: <http://www.gamershell.com>)

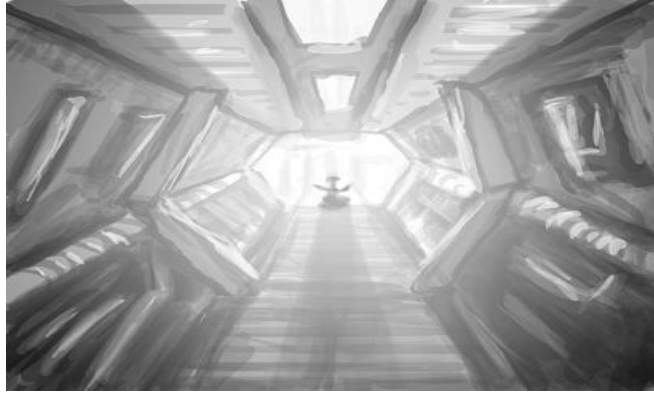
The factory will be split into four main levels. Lobot begins in the basement, in Tech Belfry's repair workshop. There are lots of crazy inventions and tech bits and pieces lying around in this area. The basement also contains storage areas for spare robot parts, etc. Many rooms in the basement have a boiler-room feel to them, with lots of exposed pipes and vents, dangling wires, flickering lights, and so on. Barricades have been set up at certain areas to direct the player to the next stage of the factory.

The main factory takes up the entire ground floor, containing production lines for robot assembly, conveyor belts, etc, giving a very industrial feel. Many of the floors are made from grating. There are more geometric shapes in this level, with boxes and crates lying around, and scrap metal piled into the corners.

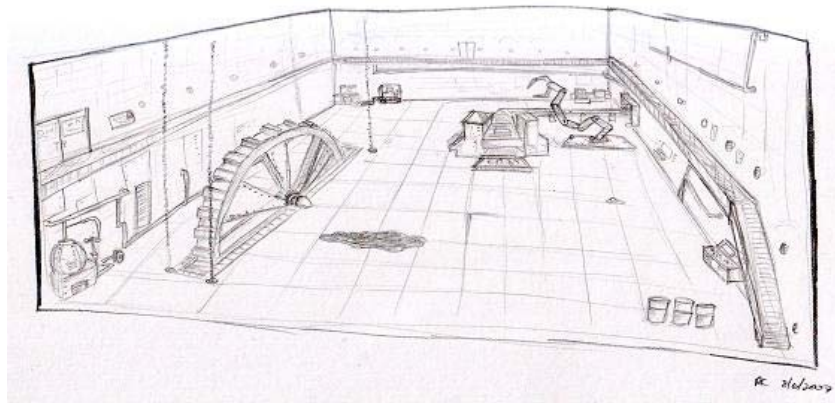
This environment is where the majority of the environment puzzles will be set. This section is more inhabited than the basement, with robots of various kinds wandering around, most of them happy to go about their own business and ignore Lobot. Some sections of the main factory level will be similar to the robot assembly line in Attack of the Clones, although will be smaller in scale. This is the largest area of the

game, and will contain several levels linked together. This level is better lit than the previous level.

The third level has less machinery than the other level, but more electronics. This is where the humans that run the factory work, and where the mainframe (the game goal) is kept. This area is again better lit than the previous two, and is much cleaner on the whole. It has also sustained less damage than the other levels.



Concept art by: Alastair Tait



Concept art by: Richard Cuddy

Robots

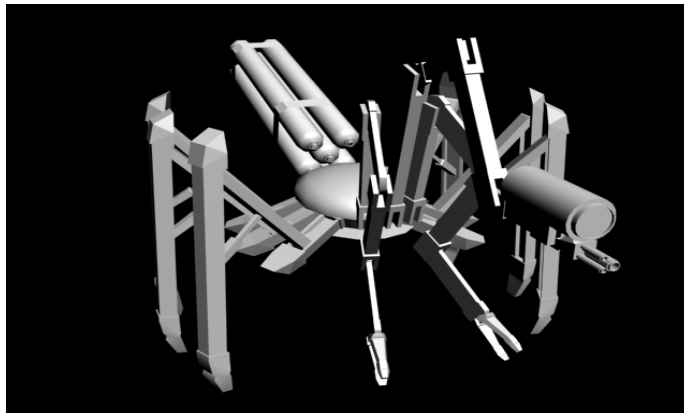
The robots are also designed partly for functionality, partly for cool factor.

There are many different sorts of robots that work in the factory. Some are very specialised, built for one purpose only, eg, welding, or transporting parts. Some, like Lobot, are more general-purpose robots, able to perform a number of different tasks due to their mobility and dexterous appendages. Other robots are more militaristic in design and are equipped with weapons – these sorts of robots are used to guard the factory. Yet other robots are hybrids or experiments (some, especially those in Tech Belfry's lab, being deemed 'failures' and marked 'not for mass production').

Many robots, like Lobot, will have some human-like features, and can change expression, as well as using gestures to communicate and impart personality and mood.



Concept art by: Daniel Shackleton



Concept art by: Reuben Lees

Lobot

Lobot is a little shorter than his human companion. He is humanoid, although he has tracks instead of legs. He has arms with shoulder, elbow and wrist joints, which gives his hands at least three degrees of freedom (more would be preferable for a robot designed to be dexterous and multi-purpose, but for simplicity, Lobot will probably be animated with three or four). Lobot has a gripper type of hand – a thumb on one side and at least two fingers on the other side for stability.

Lobot's face should have some basic level of expressiveness. This may not be particularly relevant for his general movement animations, but will come into play in the story sequences, when he interacts with Belfry.

An example of a robot with this kind of expression is Johnny Five of 'Short Circuit', who uses his eyebrows to express amazement, pleasure, anger, and other emotions. The degree of personality and attitude that he manages to convey in this way is particularly impressive in light of the fact that he is unable to move his eyes or mouth, the usual indicators of emotion.

Lobot also uses body language to convey his opinions and instructions. When making a request to Tech Belfry to “come here”, he will wave Belfry towards him, when telling him to “stay”, he'll hold up a hand. He can also nod and shake his head in answer to questions.



Johnny Five

(Source: <http://www.wikipedia.com>)

(Source: <http://longorshortcapital.com/2006/10>)

Tech Belfry

Belfry has more than a touch of the 'absent-minded professor' about him, although he's still relatively young. He is idealistic, inquisitive, eccentric, scatterbrained, and amiably good-natured. Although he's highly intelligent, he's been relegated to a basement workshop because his ideas and designs are considered unorthodox and impractical, and his experiments frequently have unexpected (and sometimes explosive) results.

Tech Belfry should have a slightly anime-ish style to him, with an open, expressive face and wide eyes that show his enthusiasm. He wears overalls with oil splashed on them, and has a workbelt with various tools and strange devices hooked onto it.



Concept art by: Tien Pham

Game Interface/HUD

The game screen is mostly taken up by the viewing window, with only a strip across the top for the HUD. The HUD shows the amount of damage Lobot has taken, a small subsection of the map centered on Lobot's current location, and a small status window for Tech Belfry.

Belfry has a comm link which he can use to speak Lobot remotely. He'll tell Lobot when he's been discovered by other robots. The panel will also display the length of time Belfry's portable shield has left before the battery runs out.

Technology and game design

Code Base

Being a game played in third-person, Lobot would be able to utilise the core gaming engine of previous AIE projects such as Aporkalypse or Snak Vac. The main game loop, environment framework, player functionality and input system would likely need only minor adjustments.

Frame Rate

The design of the game means that the frame rate should be able to be kept consistently high.

The game is set inside a building, so visual distances will be limited, which keeps the LOD requirements to a minimum. The number of enemies onscreen at any given time is also very low, with it being rare for more than a couple to appear at once.

The game is single-player, so networking isn't an issue. The majority of the processing required for each frame will be graphics, physics, and AI.

Physics

Some simple animations will be done procedurally – for example, objects falling under gravity or bouncing off walls, particle effects like explosions and smoke, etc. The physics engine will also need to deal with collision detection and resolution.

Graphics

The environment itself would have to be replaced entirely, as the setting is completely different from both of the previous years' games. Because the game is set inside a building, the assets required will generally be smaller-scale than those required for a large, outdoor space, although they will probably need to be more detailed. Fortunately, because the setting is a factory, a lot of assets will be able to be cloned or simply re-skinned – re-use of mechanical parts and units is expected.

Lobot, Belfry and the other robots will need to be completely new models.

Combat and AI

The combat mini-game would have to be coded from scratch. Code would need to be written to generate random configurations for each board with varying levels of difficulty, which may become quite complex. This is especially the case because the opposing player, ie, the robot Lobot is trying to deactivate, will be

actively working against the player as they play. AI for other robots' general behaviour will also need to be written.

The most complicated AI required will be for Belfry. While it's fairly simple to have Belfry follow Lobot's explicit commands, Belfry will also need to take the initiative and act independently in certain scenes/locations, without causing himself potential danger, or the player undue annoyance. The steering required for Belfry to follow Lobot around will also be more complicated than general 'wandering', due to the hazardous environment and potential to get 'jammed'.

Camera

The camera setup from the previous games could probably be re-used, but the code will need to be expanded if it doesn't already include player control.

Saving

Because Lobot has a fairly linear sequence of goals, rather than being a free-for-all like Snak Vak or Aporkalypse, saving will be important. Players can customise and guide Lobot's development by choosing upgrades and collecting items, so it will be very important for Lobot's state to be persistent, which means frequent saving. It is also important for the environment's state to be saved, so that doors that have been unlocked stay unlocked, etc.

Saving will use a combination of two methods: save points, to write information to permanent memory; and checkpoint saves, which are stored in temporary memory. If the game is ended prematurely by Belfry's death, the game state will revert to what it was at the last checkpoint. If the game crashes, the game can be reloaded from the last save point. Checkpoint saves will be automatic, while hard drive saves will be at the player's discretion (but will be encouraged).

Save files will probably be written in a custom format developed for this particular game.

Extended Character Animation Techniques

If time permits, it could be interesting to introduce procedural animation into Lobot's movements. This could allow him to move a hand to a precise location to press a switch or pick something up, for example.

Another movement enhancement it would be interesting to try and implement would be free movement in three dimensions, ie, hover/flight, using an item such as a jet pack. Jet packs would have a relatively short timer, and when it has expired, the jet pack is out of fuel and Lobot returns to the ground. This ability would increase the range and types of environment puzzles that could be included.

In addition to simple movement and manipulation, it could also be fun to extend Lobot's abilities to body morphing – for example, the ability to stretch his limbs or neck telescopically, in order to reach something across a gap, look through a hole in a ceiling, etc.

All of these features may prove too complex for the time available, in which case they can be dropped without significant impact to the actual core gameplay.

Animation

Because this is a game with a reasonable amount of backstory, the beginning of the game will need some

kind of exposition. Ideally, this would be done with one or more fully-animated 'cut scenes'. In practice, the time required for this kind of rendering will probably be prohibitive. Instead, the background and story setup will probably be told over the top of still images.

Risks

None of the technology required for this game is likely to be too difficult for us to implement. The biggest limitation on the game is going to be the time available to code, test and produce assets and levels. Fortunately, this particular game does lend itself to scalability – if short on time, the multiple levels could be combined into a single level, and more advanced features could be dropped.

This would diminish the game, especially since the main goal of the game is to work through the environmental challenges, and without reasonably complex and well-planned levels, the game may prove too easy to defeat, but would not render it unplayable.

If time pressures mount, the more complicated aspects of gameplay could also be simplified. Instead of upgrading Lobot when defeating other robots, the player may only receive an item, for example. Opposing AI in the mini-game could also be dropped, with the player simply in conflict with the board.

Breakdown of Tasks

The work will be broken into five main groups: code, graphics, level design, story and sound, with the first three groups being the largest. The code, graphics and level design teams will be further split into design and implementation groups. Initially, more people will be involved in design; as time goes on, most people will switch to implementation. A team leader will be chosen for each of the main teams. This is important to ensure consistency in code design, art style, etc. throughout the game.

The code team will be responsible for:

- Code design
- Extracting usable code from previous projects
- Implementing new sections of code
- Assembling the sections of code
- Testing, bugfixing, and more testing

The graphics team will be responsible for:

- Creating concept art
- Creating assets
- Extracting and modifying assets from previous games
- Animations
- Testing

The level design team will be responsible for:

- Designing the environment
- Designing level puzzles
- Testing

The story team will be responsible for:

- Developing the plot
- Dialogue
- Direction of any animated scenes

- Testing

The sound team will be responsible for:

- Recording or collecting sound effects
- Recording any spoken dialogue
- Testing

As evidenced above, all team members will be involved in the QA phase (testing and bugfinding) of the game, once it is in a playable state.

Sound

Sound has three main components: music, sound effects, and spoken dialogue. The background music should be a little quirky in style, but without being annoying. If possible, different sections of the factory should have different music. Sound effects can either be recorded, or obtained from free sources, such as online repositories.

Although Lobot does not speak, Belfry more than makes up for it. Spoken dialogue would very much enhance his character, however, recording large amounts of dialogue may be beyond the resources of the project. Therefore, dialogue will probably be presented in the form of onscreen text.

Target Market

The game is appropriate for a general audience, but may appeal particularly to younger players, with its combination of action and puzzles.

Comparison to Other Games

The game contains elements similar to a number of other games. In terms of game goals, Ico is most obvious – instead of a young boy trying to lead a distractable girl through a ruined castle, the PC is a malfunctioning robot trying to lead a distractable scientist through a ruined robotics factory. The two main characters' dependence upon each other also has similarities to Primal, although in Primal the player may switch between the two main characters – human and gargoyle – at will.

The game's environment is similar to a lot of other games set in post-apocalyptic futures, notably Half Life or Fallout. Lobot himself is modelled on various different robots with strong personalities, including Johnny 5 from Short Circuit, and Dog from Half Life 2.

The deactivation puzzle is similar to a number of games-within-games, particular the Final Fantasy series. Final Fantasy games usually have various mini-games within the main game, with one in particular that continues to be threaded throughout the entire story. Using a puzzle game as a 'combat' system is a feature of the recently released game Puzzle Quest.