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Recursion

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HERB 1: 2210

Herb looked at the viewing field and felt his stomach tighten in horror. He had been expecting to see a neat cityscape: line after line of silver needles linked by lacy bridges, cool silver skyscrapers shot through with pink-tinted crystal windows; artfully designed to resemble the spread of colours on a petal. Instead he saw . . . bleak nothingness. Cold, featureless, gently undulating wasteland spreading in all directions.

Something had gone badly wrong. Suddenly the cosy white-leather and polished yellow-wood lounge of his spaceship was not the safe cocoon he had grown used to over the past few months. Now they would be coming to prise him from this warm, cushioned shell to cast him shivering into the real world, all because he had made one tiny mistake.

Somehow he had made a mess of the code that should have told the Von Neumann Machines to stop reproducing and start building.

Herb's machines had eaten up an entire planet.

*

But there was nothing to be gained now by crying about it. Herb had known he was on his own when he embarked upon this project. It was up to him to figure out what had gone wrong, and then to extract himself from the situation.

He opened a second viewing field next to the first and called up an image of his prototype Von Neumann Machine. A cylinder, nine centimetres long, with eight silver legs spaced along its body giving it an insectile appearance. Six months ago Herb had dropped out of warp right over this planet, opened the hatch of his spaceship, and stood in solemn silence for a moment before dropping that same machine onto the desolate, rocky surface below.

What had happened next?

Herb liked to pace when he was thinking, and he had arranged his spaceship lounge to allow him room to do so. Two white sofas facing each other occupied the centre of the room. A wide moat of parquet flooring filled the space between the sofas and the surrounding furniture that lined the walls of the room. The smell of beeswax polish and fresh coffee filled the cabin. Herb closed his eyes as he ran through the order of events after he had released the Von Neumann Machine – a mental dry run to try and isolate the problem.

He imagined that first VNM turning on six of its spindly legs, lifting them in a high stepping motion as it sought to orientate itself. The remaining two legs would be extended forward, acting as antennae, vibrating slightly as they read the little machine's

surroundings. It would have walked a few paces, tiny grains of sand sticking to its silver grey limbs, then maybe changed direction and moved again, executing a random path until it found a patch of rock of just the right composition, and then settled itself down, folding its legs around itself to bring its osmotic shell in contact with the surface.

His thoughts on track, Herb began to pace in a circle around one sofa, soft ships' slippers padding on the wooden floor. He was naked except for a pair of paper shorts. Two hairs grew from his sunken chest, whose pallor had caused the ship's computer to steadily increase the UV content of the lighting over the past two days, in order to stimulate vitamin D production. *Okay, what next?*

In his imagination he saw that first machine absorbing matter, converting it, working it, and sending it around that half twisted loop that no human mind could comprehend. Soon there would be two identical machines standing on the rock, their legs waving in an explorative fashion. And then four of them, then eight . . .

The program was perfect, or so the simulations had told him. When they reached the optimum number the machines should have begun constructing his city out of their own bodies, clambering on top of each other using the sticky pads on the ends of their feet. Herb was proud of the design of those pads: each seemingly smooth foot ended in a chaotic branching of millions upon millions of tiny strands. Press one foot down and the hairs would spread out, reaching down and around

to follow the contours of the surface beneath them so perfectly that they were attracted to it at a molecular level.

Not that any of that mattered now. This was the point where the error lay. The machines hadn't paused to build his city. They'd just gone on reproducing, continued eating up the planet to make copies of themselves until there was nothing left. He opened his eyes again to look at the viewing field. Maybe he had only imagined it.

No way. Herb groaned as the view zoomed in on the cold grey shifting sea beneath. He could make out the busy motion of millions of VNMs walking over and under each other, struggling to climb upwards to the surface only to be trodden on and forced down by other VNMs, each equally determined about seeking the light. Wasn't that part of the end program? City spires, growing upwards, seeking the light in the manner of plants? Herb groaned again at the endless perpetual motion beneath his ship. Everywhere he looked, everywhere the ship's senses could reach – out to the horizon, down to the submerged layers of machines – it was the same: frenzied pointless activity.

He paused and felt a sudden thrill of horror. That wasn't quite true. Something was happening directly below. He could see a wave building beneath him: a swelling in the grey, rolling surface. Thousands of pairs of tiny silver antennae were now waving in his direction. They sensed the ship hanging there. They sensed raw materials that could be converted into yet more

silver VNMs. Herb felt a peculiar mix of horror and betrayal.

He croaked out a command. 'Ship. Up one hundred metres!'

The ship smoothly gained altitude and Herb began to pace again. He needed to think, to isolate the error; but he couldn't concentrate because one thought kept jumping in front of all the others.

He was in serious trouble. The EA would have been upset enough by the thought of a private city being built on an unapproved planet. Never mind the fact that the planet was sterile and uninhabited, they would still point out the fact that a city wasn't part of this planet's natural environmental vectors.

'*We are uniquely placed to manipulate not only our environment, but also that of other races as yet unborn. It is our responsibility not to abuse that privilege.*'

The message was as much part of Herb's childhood as the smell of damp grass, the dull brown tedium of Cultural Appreciation lessons and the gentle but growing certainty that whatever he wanted was his for the asking. Everything, that is, but this. Everyone knew the EA's philosophy.

So what would the EA think when they discovered that in failing to build his illegal city he had accidentally destroyed an entire planet instead?

Herb didn't remember setting out a bottle of vanilla whisky on the carved glass slab that served as a side table. Nonetheless, he poured a drink and felt himself relax a little. His next moves began to fall into place.

First he had to try and destroy any evidence linking this planet with himself.

Next he had to get away from here undetected.

Then he had to slot back into normal life as if nothing had happened.

Then, and only then, could he pause to think about what had gone wrong with his prototype.

The first objective should be quite straightforward. The original VNM had been designed with anonymity in mind: standard parts, modular pieces of code taken from public libraries. The thought that someone might accidentally stumble across his planet had always been at the back of his mind. He gulped down some more whisky and an idea seemed to crystallize from the concentrated alcohol. He prodded it gently.

Of course, so far as Herb knew, no one else even knew that this planet existed. He had jumped across space at random and set his ship's senses wide to find a suitable location. What if this planet were just to disappear? What if he dropped a second VNM onto it – one with a warp drive and access to a supply of exotic matter? Set it loose converting all the original machines, and then, when that work was done, just jump them all into the heart of a star?

Could he do it?

Getting hold of enough exotic matter to build the warp drives of the modified VNMs would be a problem; but his father had contacts, so that could come later. He had to get away first.

He could do that. A random series of jumps around the galaxy, eventually returning to Earth. Enough

jumps, executed quickly enough, and nothing would be able to retrace his course.

Good. Now, how about slotting back into normal life? Would anyone suspect him? More to the point, would the EA suspect anything? Their senses were everywhere. They said the EA could look into someone's soul and weigh the good and evil contained therein to twenty decimal places, and yet . . . and yet . . .

Herb was different. He had known it since he was a child. Sometimes it was as if he was merely a silhouette. Like he was there in outline, but they couldn't fill in any of the specific details.

If anyone could get away with it, it was Herb.

A gentle breeze brushed his face and he felt his spirits lift. He took another gulp of whisky and felt its reassuring warmth as he swallowed. Alcohol and the flooding sense of relief made the lounge resume its feeling of comfort and security. The plan was good. He could get away with it.

'I can get away with it,' he whispered to himself, his confidence growing. Another drink of whisky and that familiar sense of his own invulnerability swung slowly back into place. Get back home, and he would be able to examine the design of his VNM and discover what had gone wrong with it. He drained the glass and began to stride around the room, feet padding on the wooden floor, energy suddenly bubbling inside him.

'I'm going to get away with it!' he said out loud, punching at the air with a fist, whisky slopping from the glass held in his other hand. And then, once he

was home, once he had found the error in his design, he could find himself another planet. Build his city there instead.

'I will get away with it!' he cried triumphantly.

'No you won't.'

The glass slipped from Herb's fingers. He spun around and fell into a crouch position; ready to run or fight, though where he would run to in a three-room spaceship his body hadn't yet decided.

A slight, dark-haired man with a wide, white, beaming smile and midnight-black skin stood on the sheepskin rug between the facing sofas. He wore an immaculately tailored suit in dark cloth with a pearl-grey pinstripe. Snowy-white cuffs peeped from the edge of his sleeves; gleaming patent leather shoes were half hidden by the razor-sharp creases of his trousers. The man raised his hat, a dark fedora with a spearmint-green band, to Herb.

'Good afternoon, Henry Jeremiah Kirkham. My name is Robert Johnston. I work for the Environment Agency.'

Herb slowly straightened up. He felt naked and exposed.

'What are you doing on my ship?' he said, the faintest tremor in his voice.

Robert Johnston gave a sad little shrug of his shoulders.

'Oh Herb, I don't like this any more than you do, but, well, I have no choice. You have put me in this position; your actions have led me to this juncture. I'm

afraid that I am going to have to punish you for the destruction of this planet.' He shook his head in regret.

Herb frowned back at him. He felt more confused than angry.

'No, that's not what I meant. I meant, how did you get on my ship? You can't have stowed away; it's too small. I'd have heard the alarms if you tried to come through the airlock.'

He bit his lip in thought. 'Ergo, you can't be here,' he murmured. 'What are you? Externally projected V-R?'

Robert Johnston gave another sad little shake of the head. 'Sorry, Herb, no.' He suddenly became more animated. 'I'm as real as the next man. I'm here in person, in the flesh. Accept no substitutes, the One and Only, the real McCoy, The Cat in the Hat.' At this he skimmed his broad-brimmed hat across the room towards Herb, who ducked quickly to avoid it. The hat spun over his head and hit one of the glass ornaments on the sideboard, knocking it over. It fell to the floor and shattered. Herb ignored the noise. His anger was building, his arrogance asserting itself. He fanned it, forced himself to hold Robert Johnston's gaze and speak with a level voice that belied the tension that was building in his stomach.

'Okay, if you're real, how did you get in here? This ship's integrity has not been breached since we left Earth, or I would have known about it. Every particle of onboard matter will have been tracked by the ship's AI since it was loaded, and you are to be found

nowhere on the manifest. You cannot be here. I can only surmise that I am hallucinating.' He looked thoughtfully for a moment at the bottle that sat on the floor near his feet and murmured to himself, 'Possibly drugged by this vanilla whisky that I don't remember putting out here on the table . . .'

He frowned. Robert Johnston tilted his head back and gave a delighted laugh. His neatly knotted green and pearl tie shimmered in the light.

'The lengths some people will go to to avoid the simple truth! The whisky has been tampered with, but only to the extent of adding a mild sedative. This is what is allowing you to stand there arguing rationally with me, rather than following the more natural urge to crouch shivering in the corner. Anyway, if I'm a hallucination, how could I have put the whisky bottle there in the first place?'

Herb frowned thoughtfully. He did feel a lot calmer than he would have expected to in the circumstances, and yet, there was something so odd about the situation. There was a definite air of unreality hanging around the smartly dressed man with the brilliant smile that had seemingly sprung from the polished wooden floor of Herb's lounge.

'Why have you drugged me?' said Herb, after a pause.

'The EA is concerned about your health. The shock of me suddenly appearing in your ship could have severe consequences.'

'Good for the EA. So how did you get here? Matter displacement?'

'No. Nothing so exotic. I came down the secret passage.'

Herb was silent for a moment as he considered the statement. When he spoke, it was with icy calm.

'You don't have secret passages on spaceships.'

'Yes you do. There's one underneath that armchair. Look.'

At that Robert Johnston walked across the room, the heels of his shoes clicking on the polished, patterned wooden floor as he went. He seized the armchair by its back, his fingers making deep dimples in the soft white leather, and pulled it to one side. The outline of a trapdoor could be seen, a knife line through the contrasting colours of the parquetry. Robert Johnston pressed one corner of the outline with an elegantly manicured finger and the trapdoor popped up with a soft sigh. He pulled it back to reveal a long metal tube dropping away into the distance. Herb felt the gentle pull of air leaving his lounge, sighing its way down the dark, yawning passageway.

'I don't believe it,' whispered Herb softly. 'Are you sure you're not a hallucination?'

'I feel it in my bones,' said Robert Johnston.

They both crouched down by the edge of the secret passageway, staring into its depths.

Robert Johnston stroked his chin. 'The floor of your lounge is built into the port wall of your ship. I attached my ship to yours just after you completed your first jump from Earth. The pipe you can see is the connection between us. A simple deep scan ensured

that the hatch was located for concealment beneath your armchair.'

Herb gazed at Robert Johnston in disgust. 'What are you talking about? How could you attach your ship to mine without me noticing it? I'd have picked it up the first time I scanned any system on reinsertion from warp.'

Robert Johnston shook his head sadly, his wide beaming grin belying this gesture.

'Oh Herb. And you're supposed to be quite intelligent.'

'What do you mean, *quite* intelligent?' snapped Herb.

'Do you find that offensive? I'm sorry.' Robert Johnston gazed at the tips of his fingers for a moment, an enigmatic smile playing around his lips, and then continued.

'What I mean is that I'm surprised you haven't worked it out. Surely you have heard of stealth technology?'

'I have. I don't believe it is sophisticated enough to fool my scanners,' replied Herb shortly.

'Oh, it is,' said Robert Johnston softly. 'It is.'

They crouched by the hole for another moment in silence. Herb's pale-blue eyes locked with Robert Johnston's dark-brown gaze. Herb was used to playing this game, and usually he was the last to look away. Not this time. He blinked and looked back down into the shadows.

'Okay,' he muttered softly, 'I believe you. You attached a stealth ship to mine.'

'I didn't say that,' said Robert Johnston.

Herb jumped to his feet in anger. 'Hell's teeth!' he shouted. 'What is your problem? Why do you keep playing games with me?'

The smile vanished from Robert Johnston's face, and Herb found a very different person looking at him. Without the smile, Robert looked hard and unforgiving. There was no emotion in his face, just the cold certainty that Robert Johnston – and only Robert Johnston – was in charge of the situation. The complete lack of warmth frightened Herb; there were no emotional handles on a man like this.

Robert spoke in the softest of tones. 'I just wanted to establish, right at the beginning of our relationship, that I could. I'm not one of your father's lackeys, paid to be pushed around.'

The smile snapped back onto his face, and Herb felt a rush of relief.

'However, let me explain. I did not say that I used a stealth ship, I merely pointed that out as a possible solution to the problem: namely, how did I attach my ship to yours without you noticing?'

Robert Johnston rose to his feet and walked across to the sofa facing the viewing field that Herb had opened earlier. Herb paused to run his finger along the rim of the hatch Robert had opened in his ship. The parquetry was joined to the metal of the hatch like the crust on a loaf of bread: one material faded into another without any definable boundary. However the join was achieved, Herb had not seen the effect before. Reluctantly, because Robert was waiting, he

pulled the hatch shut and went to sit on the sofa opposite him.

When Herb had designed the lounge of his spaceship he had intended it to be light and airy. White-leather furniture and slabs of glass sat above the non-repeating, tessellating pattern of the parquet floor. The walls were left quite plain, only the occasional tall ornament or sculpture set out around the perimeter of the room acted to relieve their blankness. The ceiling was hung with the fragile white balls of paper lanterns that gently illuminated the room. To Herb's eyes, Robert Johnston, sitting on the white sofa, stood out like a turd in cotton wool. His dark suit may have been immaculately tailored, his sharp starched cuffs may have slid from the sleeves of his jacket as he smoothed a crease on his trousers, but as far as Herb was concerned there was something jarringly wrong about the man sitting opposite. As he was thinking this, the answer to the problem occurred to him.

'You suppressed my ship's AI, didn't you?' Herb said. 'My ship is completely under the control of your ship's AI. Your ship has processed every command I've made, and filtered out any information it didn't want me to see.'

'Very good,' said Robert Johnston. 'You are pretty intelligent, but I knew that. However . . . I want you to understand that everything you have done over the past six months has been catalogued by the EA. We have the proof you destroyed this planet.'

'It was an accident.' Herb narrowed his eyes. 'If you've monitored everything that I've done, you will realize that.'

Robert Johnston gave another sad smile.

'Oh, I realize that. But Herb . . . It's not an excuse. You've still destroyed a planet.'

'It was completely lifeless. I checked first.'

Herb knew that it was the wrong thing to say as soon as the words left his lips. Robert Johnston's eyes darkened, the smile snapped away again to be replaced by an expression of pure anger.

'You checked, did you? Ran a full spectroscopic analysis of the atmosphere for airborne plankton? Performed a high-resolution deep scan in case microbes were clinging onto life beside hot vents deep at the heart of the planet?' He flicked his right hand in a dismissive fashion. 'Or did you just run a five-minute local sweep for Earth-like life forms?'

Herb opened his mouth to speak but Robert Johnston interrupted.

'Don't!' he shouted, holding up a hand. 'We both know the answer to that, don't we?'

Herb cringed at the violence with which the words erupted. Robert Johnston's expression froze. Herb grew tense, wondering what was going to happen next. Robert Johnston remained perfectly still, his arm raised as if to strike, the edge of one perfectly pressed and gleaming white cuff emerging from the sleeve of his jacket, the tide line between the pale and the midnight-black skin that travelled around his hand dead centre in Herb's vision.