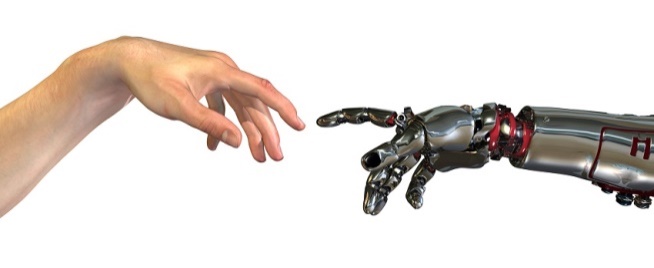
**Sequence N°1 : Robotics and Humanity** 

1. **How much do you know about artificial intelligence? ( Quizz time)**
2. **Comment and analyse these cartoons by groups of 4 .**





Video to help you :

<https://ed.ted.com/lessons/the-turing-test-can-a-computer-pass-for-a-human-alex-gendler>

1. **Robots : How will they help you in 100 years ? Complete this table with your partner. Report to the class .**

|  |  |  |
| --- | --- | --- |
| Robots and …………….. | How they will help | How good will this be and why ? |
| The Home |  |  |
| Medecine |  |  |
| Transportation |  |  |
| Work |  |  |
| Language |  |  |

1. **Listen to the recording , complete the script and comment on the main ideas :**

Driverless vehicles could …………………. the jobs of millions of Americans who drive trucks and taxis. Some experts believe driverless trucks ………………….throughout the United States soon. Others believe it will not happen for years.

In Australia and other countries, driverless trucks move large loads of dirt and …………….. in mines. The trucks can operate in the mines because there are few other vehicles there. But it will be more difficult for vehicles to operate on roads where there are many other vehicles.

Ted Scott is the ………………………… at the American Trucking Association. He says it will be years before rules ………………….., testing …………………….. and other drivers accept driverless vehicles.

The carmaker Volvo and the ……………………… company Uber have announced a plan to test self-driving cars in the eastern city of Pittsburgh, Pennsylvania.

The Ford Motor Company recently announced it …………………………… with a Chinese company to research ……………………………...

Carmaker Audi and other companies are testing robot drivers in more complex environments. These include mountain roads in the United States and in large American cities.

Chan Leiu is a …………………….. official at the National Highway Traffic Safety Administration. He says these tests may help …………………………… the deployment of driverless vehicles.

Leiu says self-driving vehicles …………………….help save lives. He says 94 percent of vehicle crashes ……………………….. human mistakes. These include driving ……………………………tired, writing on a …………………………. or after drinking too much alcohol.

Tim Carone is a professor at Notre Dame University. He says tens of thousands of lives …………………………………… if self-driving vehicles ……………………………………………….

Rogelio Rada ……………………………… a truck for 16 years. He believes it will be a long time before robots take his job.

Barry Waters is also a truck driver. He believes robots …………………………………. trucks for 20 or 30 years.

The Bureau of Labor Statistics says more than 1.7 million people ……………………………. in the trucking industry in 2014.

Many people are concerned about the effect of driverless cars on employment because manufacturing in the United States ………………………………………. for years. The car manufacturing industry is …………………………………………... American carmakers sold a record number of vehicles in 2015, but had far fewer workers than ever.

Carmakers now use robots to …………………., ………………. and …………………………….other tasks, often better than humans.

That is bad news for millions of workers like Holly Stover. She worked in …………………………………… for many years.

“Well I hope to end up working a good, a decent job, ……………………………………..”

Stover is working with an employment counselor to explore new kinds of work. She is also considering going back to school to learn …………………………….

Anthony Carnavale is a …………………………………. at Georgetown University. He says an increase in industrial robots means fewer humans will have ……………………………………. jobs.

“Probably 75 percent of the job loss is ……………………………………., which is to say robots -- machines in general -- are substituting for people.”

Chris Lu is the Deputy Secretary at the United States Department of Labor. He says the ………………………………………….. is creating new opportunities for workers if they have the skills.

Some employers in the United States complain that they cannot find enough workers who have the ability to operate …………………………….. or ……………………………………..

“We’ve also in this country had a remarkable transition to ……………………………. and really wonderful high-paying jobs in IT, for instance. Those are industries that ……………………. 20 or 30 years …………………………...”

Greg Pitoniak is the head of the Southeast Michigan Community Alliance. He says his organization closely records the skills employers need and helps displaced workers ………………………………………..

“Many job seekers look at it as ‘I can’t afford to go to school for a couple of years and not have an income,’” he says. He explains that employers are seeking workers they can train for high-paying jobs like electrician, ……………………., ……………………………, …………………………..and ………………………………………………….

Pitoniak says the American education system does not do enough to prepare some students for ………………………………………...

*Christopher Jones-Cruise.*

*VOA News reported this story from Washington. Christopher Jones-Cruise adapted it for Learning English. George Grow was the editor.*

***5-Read the following text and answer the questions :***

* By Richard Fisher

27 November 2013

Kate Darling likes to ask you to do terrible things to cute robots. At a workshop she organised this year, Darling asked people to play with a Pleo robot, a child’s toy dinosaur. The soft green Pleo has trusting eyes and affectionate movements. When you take one out of the box, it acts like a helpless newborn puppy – it can’t walk and you have to teach it about the world.

Yet after an hour allowing people to tickle and cuddle these loveable dinosaurs, Darling turned executioner. She gave the participants knives, hatchets and other weapons, and ordered them to torture and dismember their toys. What happened next “was much more dramatic than we ever anticipated,” she says.

For Darling, a researcher at Massachusetts Institute of Technology, our reaction to robot cruelty is important because a new wave of machines is forcing us to reconsider our relationship with them. When Darling described her Pleo experiment in [a talk in Boston this month](http://www.ethanzuckerman.com/blog/2013/11/19/kate-darling-on-robot-ethics/), she made the case that mistreating certain kinds of robots could soon become unacceptable in the eyes of society. She even believes that we may need a set of “robot rights”. If so, in what circumstance would it be OK to torture or murder a robot? And what would it take to make you think twice before being cruel to a machine?

Until recently, the idea of robot rights had been left to the realms of science fiction. Perhaps that’s because the real machines surrounding us have been relatively unsophisticated. Nobody feels bad about chucking away a toaster or a remote-control toy car. Yet the arrival of social robots changes that. They display autonomous behaviour, show intent and embody familiar forms like pets or humanoids, says Darling. In other words, they act as if they are alive. It triggers our emotions, and often we can’t help it.

For example, in a small experiment conducted for the radio show Radiolab in 2011, Freedom Baird of MIT asked children to hold upside down [a Barbie doll, a hamster and a Furby robot](http://www.radiolab.org/story/137469-furbidden-knowledge/) for as long as they felt comfortable. While the children held the doll upside down until their arms got tired, they soon stopped torturing the wriggling hamster, and after a little while, the Furby too. They were old enough to know the Furby was a toy, but couldn’t stand the way it was programmed to cry and say “Me scared”.

It’s not just kids that form surprising bonds with these bundles of wires and circuits. Some people give names to their Roomba vacuum cleaners, says Darling. And soldiers honour their robots with “medals” or hold funerals for them. She cites one particularly striking example of a [military robot that was designed to defuse landmines by stepping on them](http://www.washingtonpost.com/wp-dyn/content/article/2007/05/05/AR2007050501009.html). In a test, the explosions ripped off most of the robot’s legs, and yet the crippled machine continued to limp along. Watching the robot struggle, the colonel in charge called off the test because it was “inhumane”, according to the Washington Post.

Killer instinct

Some researchers are converging on the idea that if a robot looks like it is alive, with its own mind, the tiniest of simulated cues forces us to feel empathy with machines, even though we know they are artificial.

Earlier this year, researchers from the University of Duisburg-Essen in Germany used an fMRI scanner and devices that measure skin conductance to track people’s reactions to a video of somebody [torturing a Pleo dinosaur](http://spectrum.ieee.org/robotics/artificial-intelligence/brain-scans-show-humans-feel-for-robots) – choking it, putting it inside a plastic bag or striking it. The physiological and emotional responses they measured were much stronger than expected, despite being aware they were watching a robot.

Darling discovered the same when she asked people to torture the Pleo dinosaur [at the Lift conference in Geneva in February](http://videos.liftconference.com/video/7778257/harming-and-protecting-robots). The workshop took a more uncomfortable turn than expected.

After an hour of play, the people refused to hurt their Pleo with the weapons they had been given. So then Darling started playing mind games, telling them they could save their own dinosaur by killing somebody else’s. Even then, they wouldn’t do it.

Finally, she told the group that unless one person stepped forward and killed just one Pleo, all the robots would be slaughtered. After much hand-wringing, one reluctant man stepped forward with his hatchet, and delivered a blow to a toy.

After this brutal act, the room fell silent for a few seconds, Darling recalls. The strength of people’s emotional reaction seemed to have surprised them.

Given the possibility of such strong emotional reactions, a few years ago [roboticists in Europe argued that we need new set of ethical rules for building robots](http://www.epsrc.ac.uk/research/ourportfolio/themes/engineering/activities/Pages/principlesofrobotics.aspx). The idea was to adapt author Isaac Asimov’s famous “[laws of robotics](http://en.wikipedia.org/wiki/Three_Laws_of_Robotics)” for the modern age. One of their five rules was that robots “should not be designed in a deceptive way... their machine nature must be transparent”. In other words, there needs to be a way to break the illusion of emotion and intent, and see a robot for what it is: wires, actuators and software.

Darling, however, believes that we could go further than a few ethical guidelines. We may need to protect “robot rights” in our legal systems, she says.

If this sounds sound absurd, Darling points out that there are precedents from animal cruelty laws. Why exactly do we have legal protection for animals? Is it simply because they can suffer? If that’s true, then Darling questions why we have strong laws to protect some animals, but not others. Many people are happy to eat animals kept in awful conditions on industrial farms or to crush an insect under their foot, yet would be aghast at mistreatment of their next-door neighbour’s cat, or seeing a whale harvested for meat.

The reason, says Darling, could be that we create laws when we recognise their suffering as similar to our own. Perhaps the main reason we created many of these laws is because we don’t like to see the act of cruelty. It’s less about the animal’s experience and more about our own emotional pain. So, even though robots are machines, Darling argues that there may be a point beyond which the performance of cruelty – rather than its consequences – is too uncomfortable to tolerate.

Feel your pain

Indeed, harm to a victim is not always the only reason we decide to regulate a technology. Consider an altogether different kind of gadget: a few weeks ago the British Medical Association argued that [smoking e-cigarettes should be banned in public indoor spaces](http://www.bbc.co.uk/news/health-24908600) in the UK. It doesn’t matter that the smoker or those nearby face no health risks, the BMA argued. It normalises real smoking in public places once again.

To take another example: if a father is torturing a robot in front of his 4-year-old son, would that be acceptable? The child can't be expected to have the sophisticated understanding of adults. Torturing a robot teaches them that acts that cause suffering – simulated or not – are OK in some circumstances.

Or to take it to an extreme: imagine if somebody were to take one of the [childlike robots](http://www.wired.co.uk/news/archive/2012-06/14/robot-learns-like-babies) already being built in labs, and sell it to a paedophile who planned to live out their darkest desires. Should a society allow this to happen?

Such questions about apparently victimless evil are already playing out in the virtual world. Earlier this year, the [New Yorker described the moral quandaries](http://www.newyorker.com/online/blogs/elements/2013/09/grand-theft-auto-v-how-evil-should-a-video-game-allow-you-to-be.html) raised when an online forum discussing Grand Theft Auto asked players if rape was acceptable inside the game. One replied: “I want to have the opportunity to kidnap a woman, hostage her, put her in my basement and rape her everyday, listen to her crying, watching her tears.” If such unpleasant desires could be actually lived with a physical robotic being that simulates a victim, it may make it more difficult to tolerate.

Somewhere down the line there’s also the possibility of a nasty twist: that machines really could experience suffering – just not like our own. Already some researchers have begun making [robots “feel” pain to navigate the world](http://www.newscientist.com/article/mg21829171.900-consciousness-why-we-need-to-build-sentient-machines.html?full=true#.UpNopScXIyZ). Some are concerned that when machines eventually acquire a basic sense of their own existence, the consequences will not be pleasant. For this reason, the philosopher Thomas Metzinger argues that we should stop trying to create intelligent robots at all. The first conscious machines, says Metzinger, will be like confused, disabled infants – certainly not the sophisticated, malign AI of science fiction – and so treating them like typical machines would be cruel. If robots have a basic consciousness, then it doesn’t matter if it is simulated, he says. It believes it is alive, it can experience suffering. Metzinger puts it like this: “We should refrain from doing anything to increase the overall amount of suffering in the universe.”

What’s clear is that there is a spectrum of “aliveness” in robots, from basic simulations of cute animal behaviour, to future robots that acquire a sense of suffering. But as Darling’s Pleo dinosaur experiment suggested, it doesn’t take much to trigger an emotional response in us. The question is whether we can – or should – define the line beyond which cruelty to these machines is unacceptable. Where does the line lie for you? If a robot cries out in pain, or begs for mercy? If it believes it is hurting? If it bleeds?

1. What is a Pleo robot ? What did Kate darling do with them ?
2. Why does she think robots need rights?
3. Do you know the “ laws of robotics?” Do you agree that the “machine nature of robots must be transparent “ ? Why so ?
4. **Read the short story and write a summary of it .**

Word Processor of the Gods (Stephen King)

  At first glance it looked like a Wang word processor -it had a Wang keyboard and a Wang casing. It was only on second glance that Richard Hagstrom saw that the casing had been split open (and not gently, either ; it looked to him as if the job had been done with a hacksaw blade) to admit a slightly larger IBM cathode tube. The archive discs which had come with this odd mongrel were not floppy at all ; they were as hard as the 45's Richard had listened to as a kid.

"What in the name of God is that ? " Lina asked as he and Mr. Nordhoff lugged it over to his study piece by piece. Mr. Nordhoff had lived next door to Richard Hagstrom's brother's family ... Roger, Belinda, and their boy, Jonathan.

"Something Jon built," Richard said. "Meant for me to have it, Mr. Nordhoff says. It looks like a word processor." "Oh yeah," Nordhoff said. He would not see his sixties again and he was badly out of breath.

"That's what he said it was, the poor kid ... think we could set it down for a minute, Mr. Hagstrom?

l'm pooped."

"You bet," Richard said, and then called to his son, Seth, who was tooling odd, atonal chords out of his Fender guitar downstairs-the room Richard had envisioned as a "family room" when he had first paneled it had become his son's "rehearsal hall" instead.

"Seth!" he yelled. "Come give us a hand!" Downstairs, Seth just went on warping chords out of the Fender. Richard looked at Mr. Nordhoff and shrugged, ashamed and unable to hide it.

Nordhoff shrugged back as if to say Kids! Who expects anything better from them these days?

Except they both knew that Jon-poor doomed Jon Hagstrom, his crazy brother's son-had been better.

"You were good to help me with this," Richard said.

Nordhoff shrugged. "What else has an old man got to do with his time? And I guess it was the least I could do for Jonny. He used to cut my lawn gratis, do you know that? I wanted to pay him, but the kid wouldn't take it. He was quite a boy." Nordhoff was still out of breath. "Do you think I could have a glass of water, Mr. Hagstrom?" "You bet." He got it himself when his wife didn't move from the kitchen table, where she was reading a bodice-ripper paperback and eating a Twinkie. "Seth!" he yelled again.

"Come on up here and help us, okay?" But Seth just went on playing muffled and rather sour bar chords on the Fender for which Richard was still paying.

He invited Nordhoff to stay for supper, but Nordhoff refused politely. Richard nodded, embarrassed again but perhaps hiding it a little better this time.

What’s a nice guy like you doing with a family like that? his friend Bernie Epstein had asked him once, and Richard had only been able to shake his head, feeling the same dull embarrassment he was feeling now. He was a nice guy. And yet somehow this was what he had come out with-an overweight, sullen wife who felt cheated out of the good things in life, who felt that she had backed the losing horse (but who would never come right out and say so), and an uncommunicative fifteen-year-old son who was doing marginal work in the same school where Richard taught ... a son who played weird chords on the guitar morning, noon and night (mostly night) and who seemed to think that would somehow be enough to get him through.

"WeIl, what about a beer?" Richard asked. He was reluctant to let Nordhoff go-he wanted to hear more about Jon.

"A beer would taste awful good," Nordhoff said, and Richard nodded gratefully.

"Fine," he said, and went back to get them a couple of Buds.

His study was in a small shedlike building that stood apart from the house-like the family room, he had fixed it up himself. But unlike the family room, this was a place he thought of as his own-a place where he could shut out the stranger he had married and the stranger she had given birth to.

Lina did not, of course, approve of him having his own place, but she had not been able to stop it-it was one of the few little victories he had managed over her. He supposed that in a way she had backed a losing horse-when they had gotten married sixteen years before, they had both believed he would write wonderful, lucrative novels and they would both soon be driving around in Mercedes-Benzes. But the one novel he had published had not been lucrative, and the critics had been quick to point out that it wasn't very wonderful, either. Lina had seen things the critics' way, and that had been the beginning of their drifting apart.

So the high school teaching job which both of them had seen as only a stepping-stone on their way to fame, glory, and riches, had now been their major source of income for the last fifteen years-one helluva long stepping-stone, he sometimes thought. But he had never quite let go of his dream. He wrote short stories and the occasional article. He was a member in good standing of the Authors Guild. He brought in about $5,000 in additional income with his typewriter each year, and no mat ter how much Lina might grouse about it, that rated him his own study ... especially since she refused to work. "You've got a nice place here," Nordhoff said, looking around the small room with the mixture of old-fashioned prints on the walls.

The mongrel word processor sat on the desk with the CPU tucked underneath. Richard's old Olivetti electric had been put aside for the time being on top of one of the filing cabinets.

"It serves the purpose," Richard said. He nodded at the word processor. "you don't suppose that thing really works, do you ? Jon was only fourteen." "Looks funny, doesn't it?" "It sure does," Richard agreed.

Nordhoff laughed. "You don't know the half of it," he said. "I peeked down into the back of the video unit. Some of the wires are stamped IBM, and some are stamped Radio Shack. There's most of a Western Electric telephone in there.

And believe it or not, there's a small motor from an Erector Set." He sipped his beer and said in a kind of afterthought : "Fifteen. He just turned fifteen. A couple of days before the accident." He paused and said it again, looking down at his bottle of beer. "Fifteen." He didn't say it loudly.

"Erector Set?" Richard blinked at the old man.

"That's right. Erector Set puts out an electric model kit. Jon had one of them, since he was ... oh, maybe six. I gave it to him for Christmas one year. He was crazy for gadgets even then. Any kind of gadget would do him, and did that little box of Erector Set motors tickle him? I guess it did. He kept it for almost ten years. Not many kids do that, Mr. Hagstrom."

"No," Richard said, thinking of the boxes of Seth's toys he had lugged out over the years discarded, forgotten, or wantonly broken. He glanced at the word processor. "It doesn't work, then." "I wouldn't bet on that until you try it," Nordhoff said. "The kid was damn near an electrical genius."

"That's sort of pushing it, I think. I know he was good with gadgets, and he won the State Science Fair when he was in the sixth grade-"

"Competing against kids who were much older-high school seniors some of them," Nordhoff said. "Or that's what his mother said." "It's true. We were all very proud of him." Which wasn't exactly true. Richard had been proud, and Jon's mother had been proud; the boy's father didn't give a shit at all. "But Science Fair projects and building your very own hybrid word-cruncher-" He shrugged.

Nordhoff set his beer down. "There was a kid back in the fifties," he said, "who made an atom smasher out of two soup cans and about five dollars" worth of electrical equipment. Jon told me about that. And he said there was a kid out in some hick town in New Mexico who discovered tachyons-negative particles that are supposed to travel backwards through time-in 1954.

A kid in Waterbury, Connecticut-eleven years old-who made a pipe-bomb out of the celluloid he scraped off the backs of a deck of playing cards. He blew Up an empty doghouse with it. Kids're funny sometimes. The supersmart ones in particular. You might be surprised." "Maybe. Maybe I will be." "He was a fine boy, regardless." "You loved him a little, didn't you?" "Mr. Hagstrom," Nordhoff said, "I loved him a lot. He was a genuinely all-right kid." And Richard thought how strange it was-his brother, who had been an utter shit since the age of six, had gotten a fine woman and a fine bright son. He himself, who had always tried to be gentle and good (whatever "good" meant in this crazy world), had married Lina, who had developed into a silent, piggy woman, and had gotten Seth by her. Looking at Nordhoff's honest, tired face, he found himself wondering exactly how that had happened and how much of it had been his own fault, a natural result of his own quiet weakness.

"Yes," Richard said. "He was, wasn't he?" "Wouldn't surprise me if it worked," Nordhoff said. "Wouldn't surprise me at all." After Nordhoff had gone, Richard Hagstrom plugged the word processor in and turned it on.

There was a hum , and he waited to see if the letters IBM would come up on the face of the screen. They did not. Instead, eerily, like a voice from the grave, these words swam up, green ghosts, from the darkness:

HAPPY.BIRTHDAY, UNCLE RICHARD! JON.

"Christ," Richard whispered, sitting down hard. The accident that had killed his brother, his wife, and their son had happened two weeks before-they had been coming back from some sort of day trip, and Roger had been drunk.

Being drunk was a perfectly ordinary occurrence in the life of Roger Hagstrom. But this time his luck had simply run out and he had driven his dusty old van off the edge of a ninetyfoot drop. It had crashed and burned. Jon was fourteen-no, fifteen. Just. turned Eifteen a couple of days before the accident, the old man said.

Another three years and he would have gotten free of that hulking, stupid bear. His birthday ... and mine coming up soon.

A week from today. The word processor had been Jon's birthday present for him.

That made it worse, somehow. Richard could not have said precisely how, or why, but it did. He reached out to turn off the screen and then withdrew his hand.

Some kid made an atom smasher out of two soup cans and five dollars' worth of auto electrical parts.

Yeah, and the New York City sewer system is full of alligators and the V.S. Air Force has the body of an alien on ice somewhere in Nebraska. Tell me a few more. It's bullshit. But maybe that's something I don't want to know for sure.

He got up, went around to the back of the VDT, and looked through the slots. Yes, it was as Nordhoff had said. Wires stamped RADIO SHACK MADE IN TAIWAN. Wires stamped WESTERN ELECTRIC and WESTREX and ERECTOR SET, with the little circled trademarker. And he saw something else, something Nordhoff had either missed or hadn't wanted to mention. There was a Lionel Train transformer in there, wired up like the Bride of Frankenstein.

"Christ," he said, laughing but suddenly near tears. "Christ, Jonny, what did you think you were doing?" But he knew that, too. He had dreamed and talked about owning a word processor for years, and when Lina's laughter became too sarcastic to bear, he had talked about it to Jon.

"I could write faster, rewrite faster, and submit more," he remembered telling Jon last summer-the boy had looked at him seriously, his light blue eyes, intelligent but always so carefully wary, magnified behind his glasses. "It would be great ... really great." "Then why don't you get one, Uncle Rich?" "They don't exactly give them away," Richard had said, smiling.

"The Radio Shack model starts at around three grand. From there you can work yourself up into the eighteen-thousand-dollar range." "Well, maybe I'll build you one sometime," Jon had said.

"Maybe you just will," Richard had said, clapping him on the back. And until Nordhoff had called, he had thought no more about it.

Wires from hobby-shop electrical models.

A Lionel Train transformer.

Christ.

He went around to the front again, meaning to turn it off, as if to actually try to write something on it and fail would somehow defile what his earnest, fragile (doomed) nephew had intended.

Instead, he pushed the EXECUTE button on the board. A funny little chill scraped across his spine as he did it-EXECUTE was a funny word to use, when you thought of it. It wasn't a word he associated with writing; it was a word he associated with gas chambers and electric chairs ...

and, perhaps, with dusty old vans plunging off the sides of roads.

EXECUTE.

The CPU was humming louder than any he had ever heard on the occasions when he had window-shopped word processors; it was, in fact, almost roaring. What’s in the memory-box, Jon? he wondered. Bed springs ? Train transformers all in a row ? Soup cans?

He thought again of Jon's eyes, of his still and delicate face. Was it strange, maybe even sick, to be jealous of another man's son?

But he should have been mine. I knew it... and I think he knew it, too. And then there was Belinda, Roger's wife. Belinda who wore sunglasses too often on cloudy days. The big ones, because those bruises around the eyes have a nasty way of spreading. But he looked at her sometimes, sitting there still and watchful in the loud umbrella of Roger's laughter, and he thought almost the exact same thing : She should have been mine.

It was a terrifying thought, because they had both known Belinda in high school and had both dated her. He and Roger had been two years apart in age and Belinda had been perfectly between them, a year older than Richard and a year younger than Roger. Richard had actually been the first to date the girl who would grow up to become Jon's mother. Then Roger had stepped in, Roger who was older and bigger, Roger who always got what he wanted, Roger who would hurt you if you tried to stand in his way.

I got scared. I got scared and I let her get away. Was it as simple as that ? Dear God help me, I think it was. I’d like to have it a different way, but perhaps it’s best not to lie to yourself about such things as cowardice. And shame.

And if those things were true-if Lina and Seth had somehow belonged with his no-good of a brother and if Belinda and Jon had somehow belonged with him, what did that prove ? And exactly how was a thinking person supposed to deal with such an absurdly balanced screw-up ?

Did you laugh ? Did you scream ? Did you shoot yourself for a yellow dog ?

Wouldn't surprise me if it worked. Wouldn’t surprise me at all.

EXECUTE.

His fingers moved swiftly over the keys.

He looked at the screen and saw these letters floating green on the surface of the screen :

MY BROTHER WAS A WORTHLESS DRUNK.

They floated there and Richard suddenly thought of a toy he had had when he was a kid. It was called a Magic Eight-Ball. You asked it a question that could be answered yes or no and then you turned the Magic Eight-Ball over to see what it had to say on the subject-its phony yet somehow entrancingly mysterious responses included such things as lT IS ALMOST CERTAIN, I WOULD NOT PLAN ON IT, and ASK AGAIN LATER.

Roger had been jealous of that toy, and finally, after bullying Richard into giving it to him one day, Roger had thrown it onto the sidewalk as hard as he could, breaking it. Then he had laughed. Sitting here now, listening to the strangely choppy roar from the CPU cabinet Jon had jury-rigged, Richard remembered how he had collapsed to the sidewalk, weeping, unable to believe his brother had done such a thing.

"Bawl-baby, bawl-baby, look at the baby bawl," Roger had taunted him. "It wasn't nothing but a cheap, shitty toy anyway, Richie. Lookit there, nothing in it but a bunch of little signs and a lot of water." "I'M TELLING !" Richard had shrieked at the top of his lungs. His head felt hot His sinuses were stuffed shut with tears of outrage. "I'M TELLING ON YOU, ROGER! I'M TELLING MOM!"

"You tell and I'll break your arm," Roger said, and in his chilling grin  Richard had seen he meant it. He had not told.

MY BROTHER WAS A WORTHLESS DRUNK.

Well, weirdly put together or not, it screen printed. Whether it would store information in the CPU still remained to be seen, but Jon's mating of a Wang board to an IBM screen had actually worked. Just coincidentally it called up some pretty crappy memories, but he didn't suppose that was Jon's fault.

He looked around his office, and his eyes happened to fix on the one picture in here that he hadn't picked and didn't like. It was a studio portrait of Lina, her Christmas present to him two years ago. I want you to hang it in your study, she'd said, and so of course he had done just that. It was, he supposed, her way of keeping an eye on him even when she wasn't here. Don't forget me, Richard. I'm here. Maybe I backed the wrong horse, but l'm still here.And you better remember it.

The studio portrait with its unnatural tints went oddly with the amiable mixture of prints by Whistler, Homer, and N.C. Wyeth. Lina's eyes were half-lidded, the heavy Cupid's bow of her mouth composed  in something that was not quite a smile. Still here, Richard, her mouth said to him. And don't you forget it.

He typed :

MY WIFE'S PHOTOGRAPH HANGS ON THE WEST WALL OF MY STUDY.

He looked at the words and liked them no more than he liked the picture itself. He punched the DELETE button. The words vanished. Now there was nothing at all on the screen but the steadily pulsing cursor.

He looked up at the wall and saw that his wife's picture had also vanished.

He sat there for a very long time-it felt that way, at least-looking at the wall where the picture had been. What finally brought him out of his daze of utter unbelieving shock was the smell from the CPU-a smell he remembered from his childhood as clearly as he remembered the Magic Eight-Ball Roger had broken because it wasn't his. The smell was essence of electric train transformer. When you smelled that you were supposed to turn the thing off so it could cool down.

And so he would.

ln a minute.

He got up and walked over to the wall on legs which felt numb. He ran his fingers over the Armstrong paneling. The picture had been here, yes, right here. But it was gone now, and the hook it had hung on was gone, and there was no hole where he had screwed the hook into the paneling.

Gone.

The world abruptly went gray and he staggered backwards, thinking dimly that he was going to faint. He held on grimly until the world swam back into focus.

He looked from the blank place on the wall where Lina's picture had been to the word processor his dead nephew had cobbled  together.

You might be surprised, he heard Nordhoff saying in his mind. You might be surprised, you might be surprised, oh yes, if some kid in the fifties could discover particles that travel backwards through time, you might be surprised what your genius of a nephew could do with a bunch of discarded word processor elements and some wires and electrical components. You might be so surprised that you'll feel as if you're going insane.

The transformer smell was richer, stronger now, and he could see wisps of smoke rising from the vents in the screen housing. The noise from the CPU was louder, too. It was time to turn it off-smart as Jon had been, he apparently hadn't had time to work out all the bugs in the crazy thing.

But had he known it would do this?

Feeling like a figment of his own imagination, Richard sat down in front of the screen again and typed:

MY WIFE'S PICTURE IS ON THE WALL.

He looked at this for a moment, looked back at the keyboard, and then hit the EXECUTE key.

He looked at the wall.

Lina's picture was back, right where it had always been.

"Jesus," he whispered. "Jesus Christ." He rubbed a hand up his cheek, looked at the keyboard (blank again now except for the cursor), and then typed:

MY FLOOR IS BARE.

He then touched the INSERT button and typed:

EXCEPT FOR TWELVE TWENTY-DOLLAR GOLD PIECES IN A SMALL COTION SACK.

He pressed EXECUTE.

He looked at the floor, where there was now a small white cotton sack with a drawstring top.

WELLS FARCO was stenciled on the bag in faded black ink.

"Dear Jesus," he heard himself saying in a voice that wasn't his. "Dear Jesus, dear good Jesus-" He might have gone on invoking the Savior's name for minutes or hours if the word processor had not started beeping at him steadily.

Flashing across the top of the screen was the word OVERLOAD.

Richard turned off everything in a hurry and left his study as if an the devils of hell were after him.

But before he went he scooped up the small drawstring sack and put it in his pants pocket.

When he called Nordhoff that evening, a cold November wind was playing tuneless bagpipes in the trees outside. Seth's group was downstairs, murdering a Bob Seger tune. Lina was out at Our Lady of PerpetuaI Sorrows, playing bingo.

"Does the machine work?" Nordhoff asked.

"It works, all right," Richard said. He reached into his pocket and brought out a coin. It was heavy-heavier than a Rolex watch. An eagle's stern profile was embossed on one side, aIong with the date 1871. "It works in ways you wouldn't believe." "I might," Nordhoff said evenly. "He was a very bright boy, and he loved you very much, Mr. Hagstrom. But be careful. A boy is only a boy, bright or otherwise, and love can be misdirected. Do you take my meaning ?" Richard didn't take his meaning at all. He felt hot and feverish. That day's paper had listed the current market price of gold at $514 an ounce. The coins had weighed out at an average of 4.5 ounces each on his postal scale.

At the current market rate that added up to $27,756. And he guessed that was perhaps only a quarter of what he could realize for those coins if he sold them as coins.

"Mr. Nordhoff, could you come over here?

Now ? Tonight ?" "No," Nordhoff said. "No, I don't think I want to do that, Mr. Hagstrom. I think this ought to stay between You and Jon." "But-" "Just remember what I said. For Christ's sake, be careful." There was a small click and Nordhoff was gone.

He found himself out in his study again half an hour later, looking at the word processor. He touched the ON/OFF key but didn't turn it on just yet. The second time Nordhoff said it, Richard had heard it. For Christ's sake, be careful. Yes. He would have to be careful. A machine that could do such a thing –

How could a machine do such a thing?

He had no idea ... but in a way, that made the whole crazy thing easier to accept. He was an English teacher and sometime writer, not a technician, and he had a long history of not understanding how things worked: phonographs, gasoline engines, telephones, televisions, the flushing mechanism in his toilet.

His life had been a history of understanding operations rather than principles. Was there any difference here, except in degree?

He turned the machine on. As before it said :

HAPPY BIRTHDAY, UNCLE RICHARD! JON. He pushed EXECUTE and the message from his nephew disappeared.

This machine is not going to work for long, he thought suddenly. He felt sure that Jon must have still been working on it when he died, confident that there was time, Uncle Richard's birthday wasn't for three weeks, after all. But time had run out for Jon, and so this totally amazing word processor, which could apparently insert new things or delete old things from the real world, smelled like a frying train transformer and started to smoke after a few minutes.

Jon hadn't had a chance to perfect it. He had been –

Confident that there was time?

But that was wrong. That was all wrong.

Richard knew it. Jon's still, watchful face, the sober eyes behind the thick spectacles ...

there was no confidence there, no belief in the comforts of time. What was the word that had occurred  to him earlier that day ? Doomed. It wasn't just a good word for Jon; it was the right word. That sense of doom had hung about the boy so palpably that there had been times when Richard had wanted to hug him, to tell him to lighten up a little bit, that sometimes there were happy endings and the good didn't always die young.

Then he thought of Roger throwing his Magic Eight-Ball at the sidewalk, throwing it just as hard as he could; he heard the plastic splinter and saw the Eight-Ball's magic fluid-just water after all-running down the sidewalk.

And this picture merged with a picture of Roger's mongrel van, HAGSTROM'S WHOLESALE DELIVERIES written on the side, plunging over the edge of some dusty, crumbling cliff out in the country, hitting dead squat on its nose with a noise that was, like Roger himself, no big deal. He saw-although he didn't want to-the face of his brother's wife disintegrate into blood and bone. He saw Jon burning in the wreck, screaming, turning black.

No confid

ence, no real hope. He had always exuded a sense of time running out. And in the end he had turned out to be right.

"What does that mean?" Richard muttered, looking at the blank screen.

How would the Magic Eight-Ball have answered that? ASK AGAIN LATER? OUTCOME IS MURKY ? Or perhaps IT IS CERTAINLY SO?

The noise coming from the CPU was getting louder again, and more quickly than this afternoon. AIready he could smell the train transformer Jon had lodged in the machinery behind the screen getting hot.

Magic dream machine.

Word processor of the gods.

Was that what it was? Was that what Jon had intended to give his uncle for his birthday? The space-age equivalent of a magic lamp or a wishing well?

He heard the back door of the house bang open  and then the voices of Seth and the other members of Seth's band. The voices were too loud, too raucous. They had either been drinking or smoking dope.

"Where 's your old man, Seth?" he heard one of them ask.

"Goofing off in his study, like usual, I guess," Seth said. "I think he-" The wind rose again then, blurring the rest, but not blurring their vicious tribal laughter.

Richard sat listening to them, his head cocked a little to one side, and suddenly he typed:

MY SON IS SETH ROBERT HAGSTROM.

His finger hovered over the DELETE button.

What are you doing? his mind screamed at him. Can you be serious? Do you intend to murder your own son?

"He must do something in there," one of the others said.

"He's a goddam dimwit," Seth answered.

"You ask my mother sometime. She'll tell you.

He-" l'm not going to murder him. l'm going to ... to DELETE him.

His finger stabbed down on the button.

"-ain't never done nothing but\_" The words MY SON IS SETH ROBERT HAGSTROM vanished from the screen.

Outside, Seth's words vanished with them.

There was no sound out there now but the cold November wind, blowing grim advertisements for winter.

Richard turned off the word processor and went outside. The driveway was empty. The group's lead guitarist, Norm somebody, drove a monstrous and somehow sinister old LTD station wagon in which the group carried their equipment to their infrequent gigs. It was not parked in the driveway now. Perhaps it was somewhere in the world, tooling down some highway or parked in the parking lot of some greasy hamburger hangout, and Norm was also somewhere in the world, as was Davey, the bassist, whose eyes were frighteningly blank and who wore a safety pin dangling from one earlobe, as was the drummer, who had no front teeth. They were somewhere in the world, somewhere, but not here, because Seth wasn't here, Seth had never been here.

Seth had been DELETED.

"I have no son," Richard muttered. How many times had he read that melodramatic phrase in bad novels? A hundred? Two hundred? It had never rung true to him. But here it was true. Now it was true. Oh yes.

 The wind gusted, and Richard was suddenly seized by a vicious stomach cramp that doubled him over, gasping. He passed explosive wind.

When the cramps passed, he walked into the house.

The first thing he noticed was that Seth's ratty tennis shoes-he had four pairs of them and refused to throw any of them out-were gone from the front hall. He went to the stairway banister and ran his thumb over a section of it.

At age ten (old enough to know better, but Lina had refused to allow Richard to lay a hand on the boy in spite of that) , Seth had carved his initials deeply into the wood of that banister, wood which Richard had labored over for almost one whole summer. He had sanded and filled and revarnished, but the ghost of those initials had remained.

They were gone now.

Upstairs. Seth's room. It was neat and clean and unlived-in, dry and devoid of personality. It might as well have had a sign on the doorknob reading GUEST ROOM.

Downstairs. And it was here that Richard lingered the longest. The snarls of wire were gone; the amplifiers and microphones were gone; the litter of tape recorder parts that Seth was always going to "fix up” were gone (he did not have Jon's hands or concentration).

Instead the room bore the deep (if not particularly pleasant) stamp of Lina's personality heavy, florid furniture and saccharin velvet tapestries (one depicting a Last Supper at which Christ looked like Wayne Newton, another showing deer against a sunset Alaskan skyline), a glaring rug as bright as arterial blood.

There was no longer the faintest sense that a boy named Seth Hagstrom had once inhabited this room. This room, or any of the other rooms in the house.

Richard was still standing at the foot of the stairs and looking around when he heard a car pull into the driveway.

Lina, he thought, and felt a surge of almost frantic guilt. It's Lina, back from bingo, and what's she going to say when she sees that Seth is gone?

What ... what ...

Murderer! he heard her screaming. You murdered my boy!

But he hadn't murdered Seth.

"I DELETED him," he muttered, and went upstairs to meet her in the kitchen.

Lina was fatter.

He had sent a woman off to bingo who weighed a hundred and eighty pounds or so.

The woman who came back in weighed at least three hundred, perhaps more; she had to twist slightly sideways to get in through the back door. Elephantine hips and thighs rippled in tidal motions beneath polyester slacks the color of overripe green olives. Her skin, merely sallow three hours ago, was now sickly and pale. Although he was no doctor, Richard thought he could read serious liver damage or incipient heart disease in that skin. Her heavy-lidded eyes regarded Richard with a steady, even contempt.

She was carrying the frozen corpse of a huge turkey in one of her flabby hands. It twisted and turned within its cellophane wrapper like the body of a bizarre suicide.

"What are you staring at, Richard ?" she asked.

You, Lina. l'm staring at you. Because this is how you turned out in a world where we had no children. This is how you turned out in a world where there was no object for your love-poisoned as your love might be. This is how Lina looks in a world where everything comes in and nothing at all goes out. You, Lina. That's what I'm staring at. You.

"That bird, Lina," he managed finally. "That's one of the biggest damn turkeys I've ever seen." "Well don't just stand there looking at it, idiot!

Help me with it!" He took the turkey and put it on the counter, feeling its waves of cheerless cold. It sounded like a block of wood.

"Not there !" she cried impatiently, and gestured toward the pantry. "It's not going to fit in there! Put it in the freezer!" "Sorry," he murmured. They had never had a freezer before. Never in the world where there had been a Seth.

He took the turkey into the pantry, where a long Amana freezer sat under cold white fluorescent tubes like a cold white coffin. He put it inside along with the cryogenically preserved corpses of other birds and beasts and then went back into the kitchen.

Lina had taken the jar of Reese's peanut butter cups from the cupboard and was eating them methodically, one after the other.

"It was the Thanksgiving bingo," she said. "We had it this week instead of next because next week Father Philips has to go in hospital and have his gall-bladder out. I won the coverall." She smiled. A brown mixture of chocolate and peanut butter dripped and ran from her teeth.

"Lina," he said, "are you ever sorry we never had children?" She looked at him as if he had gone utterly crazy. "What in the name of God would I want a rug-monkey for?" she asked. She shoved the jar of peanut butter cups, now reduced by half, back into the cupboard. ''I'm going to bed. Are you coming, or are you going back out there and moon over your typewriter some more?" "I'll go out for a little while more, I think," he said. His voice was surprisingly steady. "I won't be long." "Does that gadget work?" "What-" Then he understood and he felt another flash of guilt. She knew about the word processor, of course she did. Seth's DELETION had not affected Roger and the track that Roger's family had been on. "Oh. Oh, no. It doesn't do anything."

She nodded, satisfied. "That nephew of yours. Head always in the clouds. Just like you, Richard. If you weren't such a mouse, I'd wonder if maybe you'd been putting it where you hadn't ought to have been putting it about fifteen years ago." She laughed a coarse, surprisingly powerfuI laugh-the laugh of an aging, cynical bawd-and for a moment he almost leaped at her. Then he felt a smile surface on his own lips-a smile as thin and white and cold as the Amana freezer that had replaced Seth on this new track.

"I won't be long," he said. "I just want to note down a few things." "Why don't you write a Nobel Prize-winning short story, or something?" she asked indifferently. The hall floorboards creaked and muttered as she swayed her huge way toward the stairs. "We still owe the optometrist for my reading glasses and we're a payment behind on the Betamax. Why don't you make us some damn money ?" "Well," Richard said, "I don't know, Lina. But I've got some good ideas tonight. I really do." She turned to look at him, seemed about to say something sarcastic-something about how none of his good ideas had put them on easy street but she had stuck with him anyway-and then didn't. Perhaps something about his smile deterred her. She went upstairs. Richard stood below,listening to her thundering tread.

He could feel sweat on his forehead. He felt simultaneously sick and exhilarated.

He turned and went back out to his study.

This time when he turned the unit on, the CPU did not hum or roar ; it began to make an uneven howling noise. That hot train transformer smell came almost immediately from the housing behind the screen, and as soon as he pushed the EXECUTE button, erasing the HAPPY BIRTHDAY, UNCLE RICHARD ! message, the unit began to smoke.

Not much time, he thought. No ... that's not right. No time at all. Jan knew it, and now I know it, too.

The choices came down to two: Bring Seth back with the INSERT button (he was sure he could do it; it would be as easy as creating the Spanish doubloons had been) or finish the job.

The smell was getting thicker, more urgent.

ln a few moments, surely no more, the screen would start blinking its OVERLOAD message.

He typed:

MY WIFE lS ADELINA MABEL WARREN HAGSTROM.

He punched the DELETE button.

He typed:

I AM A MAN WHO LIVES ALONE.

Now the word began to blink steadiIy in the upper right-hand corner of the screen: OVERLOAD OVERLOAD OVERLOAD.

Please. Please let me finish. Please, please, please... The smoke coming from the vents in the video cabinet was thicker and grayer now. He looked down at the screaming CPU and saw that smoke was also coming from its vents ... and down in that smoke he could see a sullen red spark of fire.

Magic Eight-Ball, will I be healthy, wealthy, or wise? Or will I live alone and perhaps kill myself in sorrow ? Is there time enough?

CANNOT SEE NOW. TRY AGAIN LATER.

Except there was no later.

He struck the INSERT button and the screen went dark, except for the constant OVERLOAD message, which was now blinking at a frantic, stuttery rate.

He typed:

EXCEPT FOR MY WIFE, BELINDA, AND MY SON, JONATHAN.

Please. Please.

He hit the EXECUTE button.

The screen went blank. For what seemed like ages it remained blank, except for OVERLOAD, which was now blinking so fast that, except for a faint shadow, it seemed to remain constant, like a computer executing a closed loop of command. Something inside the CPU popped and sizzled, and Richard groaned.

Then green letters appeared on the screen, floating mystically on the black:

I AM A MAN WHO LIVES ALONE EXCEPT FOR MY WIFE, BELINDA, .AND MY SON, JONATHAN.

He hit the EXECUTE button twice.

Now, he thought. Now I will type: ALL THE BUGS IN THIS WORD PROCESSOR WERE FULLY WORKED OUT" BEFORE MR. NORDHOFF BROUGHT IT OVER HERE. Or I'll type : I HAVE IDEAS FOR AT LEAST TWENTY BEST-SELLING NOVELS. Or I’ll type : MY FAMILY AND I ARE GOING TO LIVE HAPPILY EVER AFTER. Or I'll type –

But he typed nothing. His fingers hovered stupidly over the keys as he felt-literally felt - all the circuits in his brain jam up like cars gridlocked into the worst Manhattan traffic jam in the history of internaI combustion.

The screen suddenly filled up with the word:

LOADOVERLOADOVERLOADOVERLOADOVERLOADOVERLOADOVERLOAD There was another pop, and then an explosion from the CPU. Flames belched out of the cabinet and then died away. Richard leaned back in his chair, shielding his face in case the screen should implode. It didn't. It only went dark.

He sat there, looking at the darkness of the screen.

CANNOT TELL FOR SURE. ASK AGAIN LATER.

"Dad?"

He swiveled around in his chair, heart pounding so hard he felt that it might actually tear itself out of his chest.

Jon stood there, Jon Hagstrom, and his face was the same but somehow different-the difference was subtle but noticeable. Perhaps, Richard thought, the difference was the difference in paternity between two brothers. Or perhaps it was simply that that wary, watching expression was gone from the eyes, slightly overmagnified by thick spectacles (wire-rims now, he noticed, not the ugly industrial horn-rims that Roger had always gotten the boy because they were fifteen bucks cheaper).

Maybe it was something even simpler: that look of doom was gone from the boy's eyes.

"Jon?" he said hoarsely, wondering if he had actuaily wanted something more than this. Had he ? It seemed ridiculous, but he supposed he had. He supposed people always did. "Jon, it's you, isn't it?" "Who else would it be?" He nodded toward the word processor. "You didn't hurt yourself when that baby went to data heaven, did you?" Richard smiled. "No.I'm fine." Jon nodded. ''I'm sorry it didn't work. I don't know what ever possessed me to use all those cruddy parts." He shook his head. "Honest to God I don't. It's like I had to. Kid's stuff."

"Weil," Richard said, joining his son and putting an arm around his shoulders, "you'll do better next time, maybe." "Maybe. Or I might try something else!' "That might be just as well." "Mom said she had cocoa for you, if you wanted it." "I do," Richard said, and the two of them walked together from the study to a house into which no frozen turkey won in a bingo coverall game had ever come. "A cup of cocoa would go down just fine right now." "I'll cannibalize anything worth cannibalizing out of that thing tomorrow and then take it to the dump," Jon said.

Richard nodded. "Delete it from our lives," he said, and they went into the house and the smell of hot cocoa, laughing together.

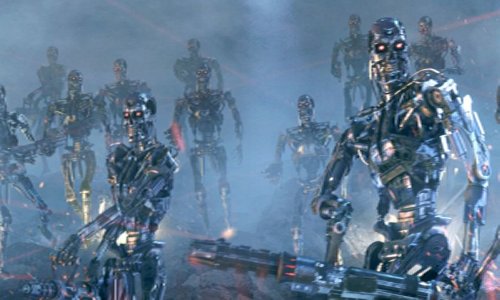
1. **Now , up to you !**

**It's the year 2142...**

**You've just stepped outside and the world is overrun by robots! Humanity as you know it is in a constant fight for survival. Robots are controlling everything. The human race is slowly being phased out of existence as robots now control and operate over 90% of the world economy and infrastructure.**

**"If only somebody had forseen this day coming", you think to yourself, "maybe the world would be different".**

**You sit and wonder how it all came to this. How these robots, a creation of man, came to be more powerful than the world combined. This thought sends a chilling tingle down your spine...**



**Your Mission...**

**The Task**

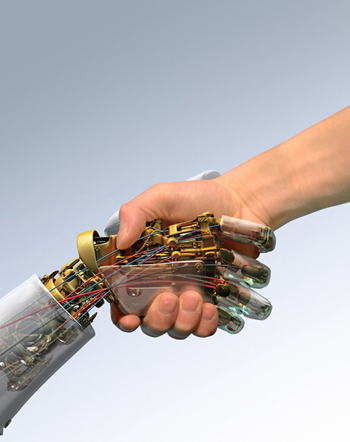
Your mission, being a student in the 21st century, is to determine "how likely it is that robots will one day replace the human race". You will take those first steps to prevent the future that could be, and present your findings to world at the next United Nations summit...

With the aid of a select few classmates, you will form a group of 4 and tackle this mission from different angles to achieve the best outcome. Each student will be given a specific role in order to best determine how to prevent this future.

**Role 1 - Know your enemy:** One student will take on the role of determining "what is a robot?"

**Role 2 - Know its weakness:** One student will determine "how robots work?"

**Role 3 - Know its purpose:** One student will take on determining "what are robots used for?" in today society.



Once enough intel has been gathered on robots, you will be required to research the ethics and laws that govern robots and their creation. This will provide you some insight into ways that robots could take over the world and how it is possible.

After you have researched and consolidated all of your intelligence, as a group you are to decide "How likely it is that robots will one day replace the human race". Once your decision is reached, you must prepare a presentation for the UN summit on what your verdict is and the research you have done to back this up.

**Process...**

What to do

Step 1: Form a group of 4

Step 2: Give each member a specific role in the group

Step 3: Research what is required for your particular role

Role 1 - "What is a robot?" - Find out what it means to be a robot, how to classify something as one and various examples.

Role 2 - "How do robots work?" - This can include power sources, what is required to make them move, 'think', react etc.

Role 3 - "What are robots used for?" - Look at today society and determine how robots are currently being used. What purposes do they serve and in what areas?

Step 4: Research the ethics involved in robot creation and what they can be used for as well as the laws that were specially created to govern robots.

Step 5: Now that you have gathered all of your information, come to a group decision to answer the question: "How likely is it that one day robots will replace the human race?"

Step 6: Create a powerpoint presentation that goes for 2-4mins that you will use to present the information you have gathered and justify your response to the question.

Note: Make sure to include what you would do if you had all of the resources of the UN at your disposal and defend this position. What changes to the current laws and ethics would you make to help prevent this possible future from occuring.

Step 7: Practice your presentation and be ready to present at the UN Summit

**Resources...**

Where to go :

Below is a list of resources that you can use to complete the tasks required by your role. All of the information needed to formulate a response to the question can be found amongst these websites.

Note: Some websites will overlap with roles so be sure to check them all out!

[Introduction to Robots](http://schoolscience.rice.edu/duker/robots/robotintro.html) - School Science

[Robotics: Wikipedia](http://en.wikipedia.org/wiki/Robotics) - Wikipedia

[Robonaut](http://robonaut.jsc.nasa.gov/) - NASA Robonaut

[Robot Systems](http://prime.jsc.nasa.gov/ROV/systems.html) - NASA

[Types of Robots](http://www.hobby.net.au/flex/robot/1135/types-of-robots.cfm) - Hobbynet

[Robot Discussion](http://www.buzzle.com/articles/types-of-robots.html) - Buzzle

[Robot Implications](http://www.rogerclarke.com/SOS/Asimov.html) - Roger Clarke

[Advanced Artificial Intelligence](http://www.nickbostrom.com/ethics/ai.html) - Nick Bostrom

**Check list : Please make sure you have the following points covered**

 Haut du formulaire

Clearly defined what it means to be a robot   
Researched how robots move, operate and function  
Found out different uses of robots in today society   
Explain Artificial Intelligence  
How are robots "taught" to do things  
Are Robots capable of 'learning' on their own?  
Key characteristics that define robots  
Are robots capable of higher-level cognitive functions  
What are the latest technological developments in the field of robotics  
Limitations that humans have which are not present in robots and vice versa

Bas du formulaire

**Future tenses exercise: choosing from mixed future tenses**

Complete the following sentences choosing the [correct future tense form](http://www.englishlessonsbrighton.co.uk/choose-correct-future-tense/) for the verb in brackets.

There are many possible future tense forms to choose from, including **simple present**, **present continuous**, **will-future**, **going to-future**, **will+present perfect**, and **will+present perfect continuous**.

1. The train \_\_\_\_\_\_\_\_\_\_ (to arrive) at 12:30.
2. We \_\_\_\_\_\_\_\_\_\_ (to have) dinner at a seaside restaurant on Sunday.
3. It \_\_\_\_\_\_\_\_\_\_(to snow) in Brighton tomorrow evening.
4. On Friday at 8 o’clock I \_\_\_\_\_\_\_\_\_\_ (to meet) my friend.
5. Paul \_\_\_\_\_\_\_\_\_\_ (to fly) to London on Monday morning.
6. Wait! I \_\_\_\_\_\_\_\_\_\_ (to drive) you to the station.
7. The English lesson \_\_\_\_\_\_\_\_\_\_ (to start) at 8:45.
8. Are you still writing your essay? If you \_\_\_\_\_\_\_\_\_\_ (to finish) by 4pm, we can go for a walk.
9. I \_\_\_\_\_\_\_\_\_\_ (to see) my mother in April.
10. Look at the clouds – it \_\_\_\_\_\_\_\_\_\_ (to rain) in a few minutes.
11. When they \_\_\_\_\_\_\_\_\_\_ (to get) married in March, they \_\_\_\_\_\_\_\_\_\_ (to be) together for six years.
12. You’re carrying too much. I \_\_\_\_\_\_\_\_\_\_ (to open) the door for you.
13. Do you think the teacher \_\_\_\_\_\_\_\_\_\_ (to mark) our homework by Monday morning?
14. When I \_\_\_\_\_\_\_\_\_\_ (to see) you tomorrow, I \_\_\_\_\_\_\_\_\_\_ (show) you my new book.
15. After you \_\_\_\_\_\_\_\_\_\_ (to take) a nap, you \_\_\_\_\_\_\_\_\_\_ (to feel) a lot better
16. I’m sorry but you need to stay in the office until you \_\_\_\_\_\_\_\_\_\_ (to finish) your work.
17. I \_\_\_\_\_\_\_\_\_\_ (to buy) the cigarettes from the corner shop when it \_\_\_\_\_\_\_\_\_\_ (to open).
18. I \_\_\_\_\_\_\_\_\_\_ (to let) you know the second the builders \_\_\_\_\_\_\_\_\_\_ (to finish) decorating.
19. Before we \_\_\_\_\_\_\_\_\_\_ (to start) our lesson, we \_\_\_\_\_\_\_\_\_\_ (to have) a review.
20. We \_\_\_\_\_\_\_\_\_\_ (to wait) in the shelter until the bus \_\_\_\_\_\_\_\_\_\_ (to come).
21. I’m very sorry Dr. Jones \_\_\_\_\_\_\_\_\_\_ (not be) back in the clinic until 2pm.
22. This summer, I \_\_\_\_\_\_\_\_\_\_ (to live) in Brighton for four years.
23. I don’t think you \_\_\_\_\_\_\_\_\_\_ (to have) any problems when you land in Boston.
24. The baby should be due soon, next week she \_\_\_\_\_\_\_\_\_\_ (to be) pregnant for nine months.
25. By the time we get home, they \_\_\_\_\_\_\_\_\_\_ (to play) football for 30 minutes.
26. In  three years I \_\_\_\_\_\_\_\_\_\_ (to live) in a different country.
27. When you \_\_\_\_\_\_\_\_\_\_ (to get) off the train, I \_\_\_\_\_\_\_\_\_\_ (to wait) for you by the ticket machine.
28. \_\_\_\_\_\_\_\_\_\_ (to take) your children with you to France?
29. This time next week I \_\_\_\_\_\_\_\_\_\_ (ski) in Switzerland!
30. Now I \_\_\_\_\_\_\_\_\_\_ (to check) my answers.