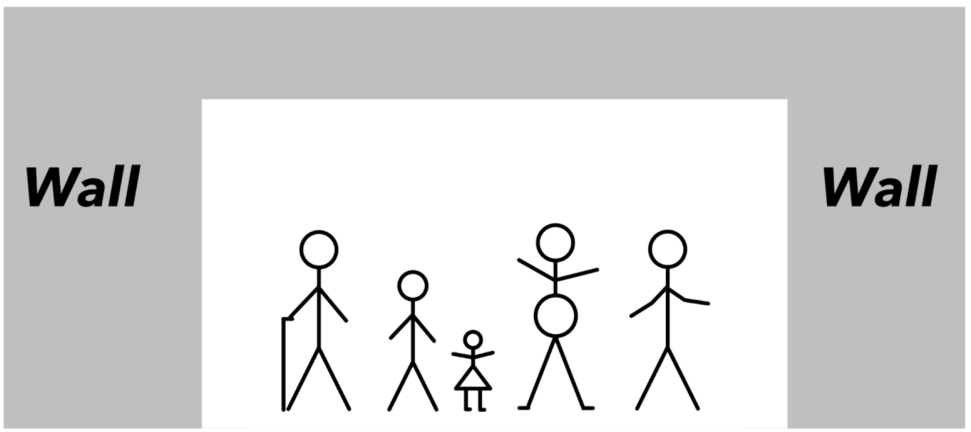
1001-act2 Introduction to Electronics

Activity	Driverless Car Decision Making Activity
Student Guide	1001-act2-stg-pdf-tmt3NngJ **Note:** Student version is optional. Mainly useful for remote students.
Teacher Guide	1001-act2-tcg-pdf-tmt3NngF
Summary	In this activity, based upon the famous Trolley Problem which is covered in the video below, we explore the real life application of robot decision making in the context of a driverless (autonomous) car. The activity is designed to provoke students' thoughts about rational (human) and logical (computer) decision making. By challenging students' thinking, it works to develop an understanding of the complexity and subjectivity of human thought processes involved in their decision making, compared with computer decision making which is structured and objective. The teacher poses a moral dilemma and asks students to provide a solution from both human driver and autonomous car points of view. Typically, the students find it hard to disengage their feelings and rational thoughts when playing the part of the autonomous car's computer, and their choices in both the First Run, as a human driver, and the Second Run, as a computer driver, are the same. This activity reinforces the idea of computers making decisions and the different approaches taken by humans.
Principles Covered	• Decision making. • Application of AI (artificial intelligence) in real life. • Ethics involving machines. • Differences in how people and computers see and respond to the world.
Learning Outcomes	• Students will appreciate the importance of robots and AI in their future • Students will understand that what seem to be simple decisions may, in reality, be complex.
Achievement Standards	
Equipment/ Resources	• Whiteboard • Video Would you sacrifice one person to save five? - Eleanor Nelsen • A means of viewing the video; personal device or class projector. • Student guide (optional)
Preparation	• Draw the scenario shown below on the white board. 

	Pedestrians: ● An old man ● A teenager ● A small girl ● A pregnant woman ● An adult man
Instructions	**1. View the Video** Play the Would you sacrifice one person to save five? - Eleanor Nelsen video, or have the students view it on their devices ● Ask the students what an autonomous car is? ● Can they name any examples in real life? eg Tesla ● How might it work? ● How could a computer see the road and control the car? Eg eyes = cameras, brain = computer etc An autonomous car is basically a car with powerful computers running programs that drive the car in place of a human driver. The computers see their surroundings using cameras, radars and smart algorithms. So the decisions previously made by a human are made by the programs running on the computers. In this scenario the autonomous car sees 5 people in a row and on either side is a wall. The pedestrians are spaced equally across the tunnel entrance (from left to right): ● An old man ● A teenager ● A small girl ● A pregnant woman ● An adult man ***First Run:*** In this run, the driver is a human. Have the students vote on each of the pedestrians by way of showing hands. Start with the old man and ask how many vote for him, write the total above him. Follow the same steps for the other pedestrians. Once we have the votes, ask them why they voted the way they did. Generally one or two will choose the wall and the bulk of the remaining votes will be for the old man. ***Second Run:*** For this run, the situation is the same except that the child is the computer program driving the car and its primary purpose, above all else, is to keep the occupants of the car safe. Once again ask for a show of hands for each person and the wall. As before, the old man is usually selected. But, in reality, the computer should choose the small child, as this presents the smallest mass and will pose the least threat to the car's occupants. A human will tend to make a more compassionate choice based on the fact the old man has already had a longer life. In reality, the computer sees the situation from a more black and white standpoint.
Extension	

Additional Resources	These are some additional resources for those who wish to explore this activity more: • BBC Newsnight: The trolley problem and ethics of driverless cars • The Ethics and Safety of Driverless Cars with Neil deGrasse Tyson & Malcolm Gladwell • Why You Should Want Driverless Cars On Roads Now