Year 10 Apollo Archimedes Lesson Plans

Robotics Term 1

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Overview

Robotics is an important part of the growth of our society. As a people, we have been desensitized to Robotic, through complacency and the media, after the hysteria, Robots would cause mass unemployment, of the 50’s, 60’s and 70’s. Recent advancements, in this field, have meant that the field of Robotics is poised to do just that.

Part of this module is based around building Robots to compete in the Robocup. It is suggested that the Robotics module is run well before a Robocup, even the term before, so bugs can be worked and the unit isn’t rushed. This unit could be the start of a very competitive Robotics team. The rest of the unit is designed to show that Robotics has a much darker side and to show we are in fact on the edge of a revolution in technology. The following years will bring the fears of our forefathers to the front and robots will take common jobs from the masses.

It is suggested that various stimulus materials are randomly used, regarding advances in the field, to spark awareness, in the classroom, and to supplement the debates that are run, as part of the course, in readiness for the assignment. A teacher, running the course, will be surprised how polarised students will be, over topics, and how heated the debates will become. Using this build up, during the term, will help students have strong opinions, so topics choice, in their final assignment, and their ability to create a persuasive argument will be much easier. As a footnote, it was surprisingly easy, teaching this topic, to have a chilling vision of the very same arguments being played out, in our history, in regards to Woman’s Suffrage, Indigenous Hidden history and in Afro- American modern history. It is interesting, and fortunate, that such a high tech subject allows these themes to be explored, in a futuristic context, by students who will be in positions to make real life decisions, in this area, in the near future.

The Tribot robot, used in the program, was chosen for a couple of reasons

a) Simplicity and speed of design – students could spend weeks creating a design – while this unit has an engineering element it is meant to be from additional construction and designing of programs. Tribot plans are readily available and construction time, of the initial robot, is short.

b) The manoeuvrability of the design. – The designer has had vast experience in design both as a Mechatronics Engineer and taking multiple winning teams of students to Robocup challenges. Robots that continually win have a short based design like the Tribot.
# Lesson Plans

## Lesson 1 – History of Robotics

<table>
<thead>
<tr>
<th>Topic: Robotics</th>
<th>Time: 70 min</th>
<th>Lesson Number: 1</th>
<th>Author: Bishop</th>
</tr>
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**Lesson Title:** History of Robotics

**Lesson Intentions:**
- Create a timeline
- Prioritising information & Summarising text
- Develop a basic knowledge of the history of Robotics
- First thoughts on the ethics of Robotics

**Sequence/Strategies:**
- **Warm up:** Have students write down and name all of the “Robots” they have encountered (real or not)
- Spend a few minutes going through an outline of the term including dates for upcoming assessment (Persuasive Essay presentation so we will be building these skills throughout the term) before outlining today’s lesson.
- Hand out the demo timeline and text, discuss and make notes on the features.
- Arrange students in pairs or groups (maximum 3 in a group), each group will need a print out or access to the website (be careful they do not wander on the internet or they will find already prepared timelines) and paper to present their timelines on. Make sure they include some of the early “robots”, the coinage of the term Robots and Robotics
- Give students a maximum of 20 minutes to read through the material and convert to their timeline.
- Allow students 5 min to wander around looking at the other groups timelines to see how much detail other groups have used.
- Take some time to discuss Asimov’s Three Laws of Robotics, Artificial Intelligence and the possibility of Robotic Sentience. Be prepared for a impromptu debate, the class will divide quickly to polar opposites.
- **Closure:** Students take a few minutes to complete the 3, 2, 1 go activity (3 things I have learnt, 2 things I enjoyed, 1 concern I have) and discuss with the person next to them.

- **Assign Homework,** if time go through using TED on the interactive whiteboard (they have seen this before so not necessary)

**Resources/Materials/Weblinks:**
- History of robotics (students): [http://robotics.megagiant.com/history.html](http://robotics.megagiant.com/history.html)
- Resource 1.1 Timeline example (one is supplied but a class relevant example would be more beneficial)
- Materials: Access to internet or pre-printed copies of information from the internet, poster/butchers paper, felt pens etc to create timeline, blue tack/tape to hang completed timelines

**Prior Knowledge:**
- Students should already be comfortable with working in small groups and critiquing each other’s work, prior experience in note taking and summarizing text is also an advantage.

**Homework/Assessment:**
- Ask students to find a brilliant talk on TED. It must be less than 10 min, can be on any topic. They must email me the link with their reasons why they think it is brilliant.

**Extra Note:**
- This lesson can be conducted completely digitally using smart art in Microsoft word for example if you have good access to computers and students already have good computer literacy.
Lesson Title: Overview of Programming

Lesson Intentions:
- Look at what programming is, what is used for
- Get a basic understanding of flowcharting
- Analyse flowcharting
- Pseudo code
- Analyse Pseudocode

Sequence/Strategies:
- Discuss what programming is, where it came from and why we do it
- Demonstrate structuring processes in flowcharting, show the symbols and discuss what they mean and how to use them.
- Move into Pseudocode, demonstrate the organisation of ideas and the flow.
- Have student demonstrate these structures with

Resources/Materials/Weblinks:
- About Programming: [http://www.bfoit.org/itp/Programming.html](http://www.bfoit.org/itp/Programming.html) (up to and including Programming using the English language)
  - [http://outspeaking.com/words-of-technology/what-is-programming.html](http://outspeaking.com/words-of-technology/what-is-programming.html)
- PseudoCode [http://www.bfoit.org/itp/Pseudocode.html](http://www.bfoit.org/itp/Pseudocode.html) down to Looking back – ignore the Logo stuff

Prior Knowledge:
- Some experience in Predict, observe, explain (POE) activities, group work activities or analysis an advantage but not necessary

Homework/Assessment:
- Have students pseudocode a weekend morning and making choices like having breakfast and choosing clothes, deciding what to do – you could add variables like what if it rains
Lesson 3 – Tech Challenge Robotics Debate

Lesson Title: Overview of Programming

Lesson Intentions:
- Learn about Debating
- Organise and argument on a Topic as a group
- Present an individual aspect of an argument or reply with follow up
- Create a final response as a group

Sequence/Strategies:
- Invite a guest speaker on Debating to give a short 15 or 20 minute lecture on the ideas of debating
- Create an impromptu debate in the class
- Stimulus Paragraph
  - It’s the year 2114, Robots have been a regular part of our lives for the last 100 years gradually being redesigned to do more and more of our menial tasks and jobs that are far too dangerous for humans to do. In the process artificial Intelligence became increasingly more advanced until around 60 years ago Robots gained sentience. Today, Robots are asking to be recognised as a separate race, to be removed from their slavitude to humanity and to have the right to vote.
- Divide the class into 2 (For and against) depending on the time you have left after your speaker, allot a time for the groups to get together to do some research on the topic. This is a recurring theme in mankind’s history so there is a plethora of similes to research.
- Student then have 1 minute to bring an argument with supporting data, or a reply to the last speakers speech (allow members to swap order if they were going to argue that particular point)
- At the end they have two minutes to create a concluding statement as a group
- One person from each team presents the conclusion.
- Give them a running tally out of 2 (allowing halves) give half a mark for a decent point, ½ for having a supporting argument and scale the rest of the mark on how good they both were.

Resources/Materials/Weblinks:
- Google search for information

Prior Knowledge:
- Indigenous History, Afro-American History, Women’s right to vote

Homework/Assessment:
- More research on the topic of the Debating, have students email a short report on debating using PEEL sentence structure
### Lesson 4 – Robocup and Robobuilding

<table>
<thead>
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<th>Topic: Robotics</th>
<th>Time: 70 min</th>
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<th>Author: Bishop</th>
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**Lesson Title:** Overview of Programming

**Lesson Intentions:**
- Learn about The Robocup
- Learn about the competitions
- Start to build the robot

**Sequence/Strategies:**
- Look at the Robocup Junior website
- Look at the Robosoccer and the Robo Rescue rules
- Allow the class to divide into groups depending on the challenge they would prefer— 2 is optimum, 3 is ok, 4 if you really have to (not recommended as it usually ends with students doing nothing or paring to talk)
- Have students build the Tribot – it’s great for both of these competitions and save students hours of mucking around getting a design. Build it up to where they add the cords. That is don’t add the front section to the robot as this will change depending on the challenge they choose.

**Resources/Materials/Weblinks:**

**Prior Knowledge:**
- Lego instructions and working in groups

**Homework/Assessment:**
- Research other designs and ways to construct for future lessons

### Lesson 5 – Robobuilding continued

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<th>Author: Bishop</th>
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**Lesson Title:** Overview of Programming

**Lesson Intentions:**
- Continue to build their robot and start to learn to operate it

**Sequence/Strategies:**
- Continue to build
- Work through the basic programming guide in the programming environment

**Resources/Materials/Weblinks:**

**Prior Knowledge:**
- Lego instructions and working in groups

**Homework/Assessment:**
-
### Lesson 6 – Programming Motion

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**Lesson Title:** Overview of Programming

**Lesson Intentions:**
- Explore the Lego Mindstorm programming interface
- Allow students to start to experiment with motion

**Sequence/Strategies:**
- Look at the Lego Mindstorm environment and run through the tutorials under the Tribot
- Work through chapter 4 – The art of Lego Mindstorm NXT-G programming
- Make sure they work individually on the programming tasks and try out their code on their group robots

**Resources/Materials/Weblinks:**
- The art of Lego Mindstorm NXT-G programming

**Prior Knowledge:**
- Reading and following instructions

**Homework/Assessment:**
- Read the text at home and become familiar with the interface

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### Lesson 7 – Programming Sensors

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**Lesson Title:** Overview of Programming

**Lesson Intentions:**
- Explore the Lego Mindstorm programming interface
- Allow students to start to experiment with sensors

**Sequence/Strategies:**
- Look at the Lego Mindstorm environment and run through the tutorials under the tribot
- Work through chapter 5 – The art of Lego Mindstorm NXT-G programming
- Make sure they work individually on the programming tasks and try out their code on their group robots

**Resources/Materials/Weblinks:**
- The art of Lego Mindstorm NXT-G programming

**Prior Knowledge:**
- Reading and following instructions

**Homework/Assessment:**
- Read the guide and become more familiar with the interface
Lesson 8 – Tech Challenge Robotics Debate

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**Lesson Intentions:**
- Learn about the Ethics of Robotics
- Organise and argument on a Topic as a group
- Present an individual aspect of an argument or reply with follow up
- Create a final response as a group

**Sequence/Strategies:**
- Have students reflect
- Stimulus Paragraph
  - It’s the year 2184, Robots have finally been given the right to vote and to some extent citizenship, though they still experience some segregation and don’t have full rights as you and I enjoy. Improvements in Robotics, artificial intelligence and miniaturisation has meant robots have become more human looking and are often indistinguishable from humans at first glance. Robots and some humans are requesting that Robots are given the right to marry. They would like the right to have both robot/robot and robot/human unions.
- Divide the class into 2 (For and against) depending on the time you have left after your speaker, allot a time for the groups to get together to do some research on the topic. This is a recurring theme in mankind’s history so there is a plethora of similes to research. (set the guidelines of no discussion on the mechanics of a physical human/robot relationships e.g sex)
- Student then have 1 minute to bring an argument with supporting data, or a reply to the last speakers speech (allow members to swap order if they were going to argue that particular point)
- At the end they have two minutes to create a concluding statement as a group
- One person from each team presents the conclusion.
- Give them a running tally out of 2 (allowing halves) give half a mark for a decent point, ½ for having a supporting argument and scale the rest of the mark on how good they both were.

**Resources/Materials/Weblinks:**
- Google search for information

**Prior Knowledge:**
- Indigenous History, Afro-American History, Women’s right to vote

**Homework/Assessment:**
- More research on the topic of the Ethics
## Lesson 9 – Design Challenge - Programming

<table>
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<tr>
<th>Topic:</th>
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<th>Time:</th>
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<th>Lesson Number:</th>
<th>9</th>
<th>Author:</th>
<th>Bishop</th>
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</table>

**Lesson Title:** Advanced Programming

**Lesson Intentions:**
- Put the skills of the last lesson to more appropriate use in a Robocup context
- Students need to spend time honing their skills and the concepts they are learning
- Use the skills to follow a line

**Sequence/Strategies:**
- Roll out the Rescue mat (socks only on the mat, if you want it to last.)
- Ask students to use the skills they have learnt from the last 2 lessons to make their robot follow the line.
- Give them little help and ask students not to share their discoveries

**Resources/Materials/Weblinks:**
- There is a basic line following program on the Mindstorm programme in the design section – they will have seen it.
- Don’t use colour sensors just light sensors.
- Make sure the light is fairly even e.g. from above – incidental light can cause a robot to work well at one edge of the course and not the other.
- Tips for strugglers
  - The sensors need to be reasonably close to the mat but not too close that they get false readings
  - The sensor needs to be parallel to the floor else most of the beam will bounce away undetected.
  - The White of the mat is theoretically 100 (all light on) and black is 0 (no light on) so setting somewhere in the middle should let the robot distinguish if it’s off track.
  - Can be done with one sensor, two is better but is more involved
  - Those struggling with getting the tight corners and some of the course topography let them know.
    after a good while, the stopped motor can be reversed to get a tighter turning radius

**Prior Knowledge:**
- Lesson 6 and 7

**Homework/Assessment:**
- Give them the following article – let them read and consider its implications. Many of the jobs are traditionally jobs for teenagers, the unskilled and surprisingly the highly educated.
## Lesson 10 – Design Challenge - Programming

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<tr>
<th>Topic</th>
<th>Time: 70 min</th>
<th>Lesson Number: 10</th>
<th>Author: Bishop</th>
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**Lesson Title:** Advanced Programming

**Lesson Intentions:**
- Put the skills of the last lesson to more appropriate use in a Robocup context
- Students need to spend time honing their skills and the concepts they are learning
- Use their skills to detect the green direction change markers, the silver mark and the edge of the toxic spill when pushing out the survivor. Soccer people could use their sensor to detect the ball and move towards it or the colour changes of the mat so they know if they are off side.

**Sequence/Strategies:**
- Roll out the Rescue mat (socks only on the mat, if you want it to last.)
- Ask students to use the skills they have learnt from the last 3 lessons to make their robot complete the task.
- Give them little help and ask students not to share their discoveries

**Resources/Materials/Weblinks:**
- There is a basic line following program on the Mindstorm programme in the design section – they will have seen it.
- Don’t use colour sensors just light sensors.
- Green will be somewhere else on the spectrum. They need to figure this out and change the program to suit
- Tips for strugglers
  - The sensors need to be reasonably close to the mat but not too close that they get false readings
  - The sensor needs to be parallel to the floor else most of the beam will bounce away undetected.
  - The White of the matt is theoretically 100 (all light on) and black is 0 (no light on) so setting somewhere in the middle should let the robot distinguish if it’s off track.
  - Can be done with one sensor, two is better but is more involved
  - They need to check
  - Those struggling with getting the tight corners and some of the course topography let them know. After a good while, the stopped motor can be reversed to get a tighter turning radius.

**Prior Knowledge:**
- Basic understanding of the Lego Mindstorm system

**Homework/Assessment:**
**Lesson 11 – Robolab 2.9**

<table>
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<tr>
<th>Topic: Robotics</th>
<th>Time: 70 min</th>
<th>Lesson Number: 11</th>
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**Robolab 2.9**

Robolab 2.9 is more structured icon based language that will prepare students for more structured lower level languages like Qbasic. The underlying programming language LABVIEW was used by NASA to program the early Mars rovers so it is incredibly powerful. This language lends itself to design concepts like flowcharting.

**Lesson Intentions:**
- Learn the Robolab language and be able to do the same tasks as the native lego language
- Start to use Flowcharts

**Sequence/Strategies:**
- Work with them through the basics layout. Load the Language onto the Lego bot.
- The manual has a lot of things they aren’t going to use so the relevant bits will be listed.
- Have students focus on these and test them on the Robot – Note some NXT commands have their own NXT section.
- Have students note that the code looks like a flowchart with a start a flow and an end
- Pg 28-31 motors
- Quick look at pg 31
- Pg 39-41 Wait for
- Pg 43-44 wait for push
- Pg 48 NXT wait for push
- Pg 56-57 NXT angle sensor
- Pg 71 -74 Forks
- Pg 71,81 Forks
- Pg 102-104 Jumps
- Pg105, 117,118,119
- Pg 133 -139 Events
- Pg 155-160
- Other parts may be of interest but this will give a good overview of the topics

**Resources/Materials/Weblinks:**
- Robolab Reference Guide

**Prior Knowledge:**
- What they learnt from earlier programming and flowcharting

**Homework/Assessment:**
- Further reading of the guide
Lesson 12 – Robolab 2.9 continued

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<th>Topic: Robotics</th>
<th>Time: 70 min</th>
<th>Lesson Number: 12</th>
<th>Author: Bishop</th>
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**Lesson Title:** Robolab 2.9

**Lesson Intentions:**
- Synthesis knowledge from the earlier Mindstorm to the Robolab environment
- Continue flowcharts

**Sequence/Strategies:**
- Students have an understanding of line following (Rescue) from earlier work. They will now use this to program the same thing in Robolab
- Have students use flowcharts to plan their approach to this. They could draw the icon they are going to choose if it makes it easier.

**Resources/Materials/Weblinks:**
- Flow charts- [http://www.rff.com/flowchart_shapes.htm](http://www.rff.com/flowchart_shapes.htm) down to Input/output (ignore delay)

**Prior Knowledge:**
- What they learnt from earlier programming and flowcharting

**Homework/Assessment:**
- Further reading of the guide and revision of flowcharting
Lesson 13 – Tech Challenge Robotics Debate/Assignment out

<table>
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**Lesson Title:** Overview of Programming

**Lesson Intentions:**
- Learn about the Ethics of Robotics
- Organise and argument on a Topic as a group
- Present an individual aspect of an argument or reply with follow up
- Create a final response as a group

**Sequence/Strategies:**
- Have students reflect
- Stimulus Paragraph
  - It’s the year 22144, Robotics have risen around us and become more and more integrated into our society. Many of the sentient robots own homes, operate businesses and marry. They have become strong upstanding citizens. Robots have now asked to be able to create their own country. They wish to section off a rectangle in the centre of Australia. It will take part of The Northern Territory, Western Australia, Queensland and south Australia. This is land that is mostly useless to humans but will allow Robotic lifeforms, who don’t require water, food or are greatly affected by heat, to build their own cities, have their own rules, self-govern and have their own heart land.
  - Divide the class into 2 (For and against) depending on the time you have left after your speaker, allot a time for the groups to get together to do some research on the topic. This is a recurring theme in mankind’s history so there is a plethora of similes to research. (set the guidelines of no discussion on the mechanics of a physical human/robot relationships e.g. sex)
  - Student then have 1 minute to bring an argument with supporting data, or a reply to the last speaker speech (allow members to swap order if they were going to argue that particular point)
  - At the end they have two minutes to create a concluding statement as a group
  - One person from each team presents the conclusion.
  - Give them a running tally out of 2 (allowing halves) give half a mark for a decent point, ½ for having a supporting argument and scale the rest of the mark on how good they both were.
  - Go over the Assignment.

**Resources/Materials/Weblinks:**
- Google search for information

**Prior Knowledge:**
- Indigenous History, Afro-American History, Women’s right to vote

**Homework/Assessment:**
- More research on the topic of the Ethics
Lesson 14 – Assignment lesson

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<th>Topic: Robotics</th>
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</table>

**Lesson Title:** Robolab 2.9 continued

**Lesson Intentions:**
- Allow time to plan/discuss and work on their assignment

**Sequence/Strategies:**
- Have them plan their strategies, research their topic using historical ties, focus on structure.

**Resources/Materials/Weblinks:**
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**Prior Knowledge:**
- PEEL
- OneNote
- Persuasive essay writing

**Homework/Assessment:**
- Further research on their topic

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Lesson 15 – Robolab 2.9 continued

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<th>Topic: Robotics</th>
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**Lesson Title:** Robolab 2.9 continued

**Lesson Intentions:**
- Synthesis knowledge from the earlier Mindstorm to the Robolab environment
- Continue flowcharts

**Sequence/Strategies:**
- Students have an understanding of line following (Rescue) and Robosoccer from earlier work. They will now use this to program the same thing in Robolab
- Have students use flowcharts to plan their approach to this. They could draw the icon they are going to choose if it makes it easier.

**Resources/Materials/Weblinks:**
- Flow charts: [http://www.rff.com/flowchart_shapes.htm](http://www.rff.com/flowchart_shapes.htm) down to Input/output (ignore delay)

**Prior Knowledge:**
- What they learnt from earlier programming and flowcharting

**Homework/Assessment:**
- Further reading of the guide and revision of flowcharting
**Lesson 16 – Robolab 2.9 continued**

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**Lesson Title:** Robolab 2.9  

**Lesson Intentions:**  
- Synthesis knowledge from the earlier Mindstorm to the Robolab environment  
- Continue flowcharts

**Sequence/Strategies:**  
- Students have an understanding of line following (Rescue) and Robosoccer from earlier work. They will now use this to program the same thing in Robolab  
- Have students use flowcharts to plan their approach to this. They could draw the icon they are going to choose if it makes it easier.

**Resources/Materials/Weblinks:**  
- Flow charts - [http://www.rff.com/flowchart_shapes.htm](http://www.rff.com/flowchart_shapes.htm) down to Input/output (ignore delay)  

**Prior Knowledge:**  
- What they learnt from earlier programming and flowcharting

**Homework/Assessment:**  
- Further reading of the guide and revision of flowcharting

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**Lesson 17 – Assignment lesson**

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**Lesson Title:** Robolab 2.9 continued  

**Lesson Intentions:**  
- Allow time to plan/discuss and work on their assignment

**Sequence/Strategies:**  
- Have them plan their strategies, research their topic using historical ties, focus on structure.

**Resources/Materials/Weblinks:**  

**Prior Knowledge:**  
- PEEL  
- OneNote  
- Persuasive essay writing

**Homework/Assessment:**  
- Further research on their topic
**Lesson 18 – Robolab 2.9 continued/Assignment due**

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<td><strong>Sequence/Strategies:</strong></td>
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<td>• Students have an understanding of line following (Rescue) and robosoccer from earlier work. They will now use this to program the same thing in Robolab</td>
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<td>• Have students use flowcharts to plan their approach to this. They could draw the icon they are going to choose if it makes it easier.</td>
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<tr>
<td><strong>Resources/Materials/Weblinks:</strong></td>
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<tr>
<td>• Flow charts - <a href="http://www.rff.com/flowchart_shapes.htm">http://www.rff.com/flowchart_shapes.htm</a> down to Input/output (ignore delay)</td>
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<td>• Examples - <a href="http://www.edrawsoft.com/flowchart-examples.php">http://www.edrawsoft.com/flowchart-examples.php</a></td>
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<tr>
<td><strong>Prior Knowledge:</strong></td>
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<tr>
<td>• What they learnt from earlier programming and flowcharting</td>
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<tr>
<td><strong>Homework/Assessment:</strong></td>
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<tr>
<td>• Further reading of the guide and revision of flowcharting</td>
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**Lesson 19 – Robolab 2.9 continued**

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<thead>
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<th>Topic: Robotics</th>
<th>Time: 70 min</th>
<th>Lesson Number: 19</th>
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<td><strong>Lesson Title:</strong> Robolab 2.9 continued</td>
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<td><strong>Lesson Intentions:</strong></td>
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<tr>
<td>• Synthesis knowledge from the earlier Mindstorm to the Robolab environment</td>
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<td>• Continue flowcharts</td>
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<tr>
<td>Topic</td>
<td>Time</td>
<td>Lesson Number</td>
<td>Author</td>
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<tr>
<td>Robotics</td>
<td>70 min</td>
<td>20</td>
<td>Bishop</td>
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</table>

**Lesson Title:** Robolab 2.9 continued

**Lesson Intentions:**
- Students demonstrate their robots in battle and teams compete

**Sequence/Strategies:**
- Students have all the skills focused to compete in the rescue and the Robosoccer to produce the ultimate winner

**Resources/Materials/Weblinks:**
- 

**Prior Knowledge:**
- What they learnt from earlier programming and flowcharting

**Homework/Assessment:**
Resources

Most of the resources for this unit are quite large. A list of these will be placed below

- About Programming - [http://www.bfoit.org/itp/Programming.html](http://www.bfoit.org/itp/Programming.html) (up to and including Programming using the English language)
- Flow charts - [http://www.rff.com/flowchart_shapes.htm](http://www.rff.com/flowchart_shapes.htm) down to Input/output (ignore delay)
- History of robotics - [http://robotics.megagiant.com/history.html](http://robotics.megagiant.com/history.html)
- Programming - [http://outspeaking.com/words-of-technology/what-is-programming.html](http://outspeaking.com/words-of-technology/what-is-programming.html)
- PseudoCode - [http://www.bfoit.org/itp/Pseudocode.html](http://www.bfoit.org/itp/Pseudocode.html)
- Timeline - [1.1 Timeline example](#)
Assessment Tasks

Robotics Persuasive Essay

Background and Outline of the Task

Robots have historically been used in society to perform tasks unsuitable for humans due to danger, precision or repetition. Robots have also commonly been used for human entertainment.

Recently, Robots from several independent companies have passed the Turing test, a test of an artificial intelligence’s ability to demonstrate intelligent behaviour equivalent to that of, or indistinguishable from that of, a human. World renowned researchers, from the Maths Department, have extrapolated the validity of these advances and have concluded Robotic Units will gain sentience by the year 2034. In response to these sudden advances in Robotic Artificial Intelligence (RAI), and the Maths Department report, a committee, named the Robotic Artificial Intelligence Department of Intelligent Technology (RAID IT), has been hastily put together to preempt computer sentience.

World famous Physicist, Dr Steven Hawking from Cambridge University has released a statement on the subject after watching the movie Transcendence, stating that we, as a people, could be making a serious mistake with and are in serious danger from Artificial intelligence. He has posed the question, "If a superior alien civilisation sent us a message saying, "We’ll arrive in a few decades," would we just reply, "OK, call us when you get here – we’ll leave the lights on"? He is so deeply concerned by the current advances and their implications he has raised concerns in the Scientific community forum.

You have been chosen, from among the many thousands of students in the Apollo program, to be a member of the RAID IT committee to be the voice of the future. Your mission is to research a relevant topic and creating documentation that will influence policy makers and thusly alter the direction of mankind for the next 100 years.

Task

You can chose but there is only one student per topic/side of argument. Your teacher will have the final say as to the topic you are to work on.

Topic Choices

a) Should sentient robotic life forms be put in control of life or death monitoring e.g. controlling nuclear power stations, monitoring Soviet/US missile defense installations
   For/Against

b) Should sentient robotic life forms be controlled by Asimov’s three laws of robotic? For/Against

c) Should sentient robotic life forms be allowed to be “free” citizens? For/Against

d) Should sentient robotic life forms be given the right to vote? For/Against

e) Should sentient robotic life forms be able to earn money? For/Against

f) Should sentient robotic life forms be able to marry other robots and/or to humans? For/Against

g) Should sentient robotic life forms be able to adopt human children? For/Against

h) Should sentient robotic life forms be able to own property e.g. houses? For/Against

i) Should sentient robotic life forms be in positions of power e.g. Judges, Company heads or Prime Ministers? For/Against

j) Should sentient robotic life forms have their lifespan limited and what to? For/Against

k) Should sentient robotic life forms be stopped from having “too human” an appearance? For/Against

l) Should sentient robotic life forms have their intelligence limited? For/Against

m) Should sentient robotic life forms be able to hold positions like Doctors or Solicitors? For/Against

Though most of these topics are set in a future context, many of the themes have been played out in our past in such instances as Women’s Sufferage, Indigenous Hidden History and Afro-American history. These themes could be accessed as proof of concepts in some instances.
**Persuasive Essay**

Your report will be 1000 words in length and be in the form of a persuasive essay as outlined, in the document, on G:\Curriculum\Year 10\Apollo\Mr Bishop\Microsoft Word - Writing the Persuasive Essay.pdf. It will follow all of the rules of proper essay writing e.g PEEL paragraph structure, spelling, punctuation and grammatical correctness.

**Audience:** Write your report assuming that the readers have basic scientific knowledge. This means that any technical language specific to your topic will need to be explained.

**Language Features:** The language of your report needs to be formal written language. This means you do not use contractions (i.e. don’t and can’t), you need to use technical terminology and you cannot use personal pronouns (i.e. I, we and us, this is also referred to as third person). Finally, don’t forget to PEEL in your paragraphs (point, explain, example, link).

---

**References**


**Bibliography**


## Criteria Sheet

<table>
<thead>
<tr>
<th>Where?</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
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<tbody>
<tr>
<td>Knowledge and application</td>
<td></td>
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<tr>
<td>OneNote Intro</td>
<td>The student work has the following characteristics: accurate and comprehensive explanation of Ethical implications and issues related to the topic</td>
<td>The student work has the following characteristics: accurate explanation of Ethical implications relevant to Ethical situations, across the areas of the topic</td>
<td>The student work has the following characteristics: explanation of ethical concepts relevant to topic</td>
<td>The student work has the following characteristics: basic demonstration of ethical knowledge related to topic</td>
<td>The student work has the following characteristics: basic ethical facts</td>
</tr>
<tr>
<td>Discussion ideas</td>
<td>Critical elements of an ethical argument are clearly identified and prioritised</td>
<td>Significant elements of an ethical argument are identified</td>
<td>Obvious elements of ethical arguments are identified</td>
<td>Basic aspects of ethical arguments are recognised</td>
<td>Use of basic engineering knowledge.</td>
</tr>
<tr>
<td>Final Argument Conclusion</td>
<td>Discerning selection and correct and efficient application of ethical arguments using complex familiar and unfamiliar themes relevant to topic.</td>
<td>Appropriate selection and correct application of ethical arguments as applied to complex familiar or simple unfamiliar themes relevant to topic.</td>
<td>Selection and application of ethical arguments as applied to simple familiar ethical themes relevant to topic.</td>
<td>Application of basic ethical argument relevant to topic</td>
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<tr>
<td>Final Argument Conclusion</td>
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<tr>
<td>Where?</td>
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<tr>
<td>Investigative and analytical processes</td>
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<tr>
<td>Design ideas</td>
<td>The student work has the following characteristics: effective interpretation and thorough analysis of relevant argument</td>
<td>The student work has the following characteristics: correct interpretation and detailed analysis of obvious relevant argument</td>
<td>The student work has the following characteristics: interpretation and analysis of argument</td>
<td>The student work has the following characteristics: explanation of basic facts</td>
<td>The student work has the following characteristics: factual statements are made about topic</td>
</tr>
<tr>
<td>Final solution</td>
<td>points are analysed in depth and detail from multiple perspectives to identify relevant ethical principles</td>
<td>points are analysed in detail to identify relevant ethical principles</td>
<td>Reasonable evidence are developed.</td>
<td>evidence that test aspects of the argument are developed.</td>
<td>incomplete evidence was produced.</td>
</tr>
<tr>
<td>Test results</td>
<td>optimal evidence that validate arguments are developed and refined.</td>
<td>effective evidence that test ethical arguments are developed and modified.</td>
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<tr>
<td>Conclusion</td>
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<tr>
<td>Conclusion</td>
<td>The student work has the following characteristics: comprehensive evaluation of arguments in relation to the critical elements of the topic</td>
<td>The student work has the following characteristics: considered evaluation of arguments in relation to the significant elements of the topic</td>
<td>The student work has the following characteristics: evaluation of argument in relation to obvious outcomes of the topic</td>
<td>The student work has the following characteristics: comparison of arguments in relation to chosen topic</td>
<td>The student work has the following characteristics: comparison of ideas</td>
</tr>
<tr>
<td>Evaluation and technical communication</td>
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<tr>
<td>Overall report</td>
<td>valid, well-reasoned conclusions and recommendations based on investigations and justified by relevant data</td>
<td>valid conclusions and recommendations based on investigations and supported by engineering knowledge or data</td>
<td>conclusions and recommendations are based on investigations</td>
<td>conclusions are stated and recommendations made</td>
<td></td>
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<tr>
<td></td>
<td>effective organisation and succinct presentation of information in the most appropriate modes relevant to the topic in the form of a persuasive argument</td>
<td>logical organisation and clear presentation of information in appropriate modes relevant to the topic in the form of a persuasive argument</td>
<td>organisation and presentation of information in modes relevant to the topic in the form of a persuasive argument</td>
<td>presentation of information relative to the topic</td>
<td>presentation of some information related to the topic.</td>
</tr>
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