1. Course 1 - Microbit Beginner lessons
   1. Beautiful image - <https://www.microbit.co.uk/blocks/lessons/beautiful-image>
   2. Lucky7 - <https://www.microbit.co.uk/blocks/lessons/lucky-7>
   3. Answering machine - <https://www.microbit.co.uk/blocks/lessons/answering-machine>
   4. Game of chance - <https://www.microbit.co.uk/blocks/lessons/game-of-chance>
   5. Smiley - <https://www.microbit.co.uk/blocks/lessons/smiley>
   6. Magic logo - <https://www.microbit.co.uk/blocks/lessons/magic-logo>
   7. Snowflake fall - <https://www.microbit.co.uk/blocks/lessons/snowflake-fall>
   8. Screen Wipe - <https://www.microbit.co.uk/blocks/lessons/screen-wipe>
   9. Flashing Heart - <https://www.microbit.co.uk/blocks/lessons/flashing-heart>
   10. Blink - <https://www.microbit.co.uk/blocks/lessons/blink>
   11. Night Light - <https://www.microbit.co.uk/blocks/lessons/night-light>
   12. Game Counter - <https://www.microbit.co.uk/blocks/lessons/game-counter>
   13. Happy Birthday - <https://www.microbit.co.uk/blocks/lessons/happy-birthday>
2. Course 2 - Microbit Advanced lessons
   1. Magic8 - <https://www.microbit.co.uk/blocks/lessons/magic-8>
   2. Guess the number - <https://www.microbit.co.uk/blocks/lessons/guess-the-number>
   3. Counter - <https://www.microbit.co.uk/blocks/lessons/counter>
   4. Love Meter - <https://www.microbit.co.uk/blocks/lessons/love-meter>
   5. Rock Paper Scissors - <https://www.microbit.co.uk/blocks/lessons/rock-paper-scissors>
   6. Truth or Dare - <https://www.microbit.co.uk/blocks/lessons/truth-or-dare>
   7. Spinner - <https://www.microbit.co.uk/blocks/lessons/spinner>
   8. Die Roll - <https://www.microbit.co.uk/blocks/lessons/die-roll>
   9. Looper - <https://www.microbit.co.uk/blocks/lessons/looper>
   10. Strobe Light - <https://www.microbit.co.uk/blocks/lessons/strobe-light>
   11. Temperature - <https://www.microbit.co.uk/blocks/lessons/temperature>
   12. Digi Yoyo - <https://www.microbit.co.uk/blocks/lessons/digi-yoyo>
   13. Rotation Animation - <https://www.microbit.co.uk/blocks/lessons/rotation-animation>
   14. Compass - <https://www.microbit.co.uk/blocks/lessons/compass>
   15. Zoomer - <https://www.microbit.co.uk/blocks/lessons/zoomer>
   16. Glowing Pendulum - <https://www.microbit.co.uk/blocks/lessons/glowing-pendulum>
   17. Classic Beatbox - <https://www.microbit.co.uk/blocks/lessons/classic-beatbox>
   18. Light Beatbox - <https://www.microbit.co.uk/blocks/lessons/light-beatbox>
3. Course 2.1 - Microbit Advanced lessons
   1. Walking the Plank - <https://youtu.be/HJ2jBW_BMpk> (Done)
      1. Create a spirit level using the microbit. This uses the rotation / roll block within MakeCode. The game is called Walking the Plank.
      2. The child puts the microbit on the other side of the palm and is made to walk around the room.
      3. You win the game by walking from one end of the room to the other without tilting the board. If the board tilts the program detects it and shows the skull icon which signifies game over.
      4. Click on button A to re-set the counter and start the game.
      5. If the child manages to walk around the room with spirit level remaining at 0 for 60 seconds they win the game
      6. At the end of 60 seconds you display game over and win if the spirit level is still at 0.
      7. If the child has tilted the board you might say, try again – better luck next time.
      8. Challenge - Add a buzzer. As soon you as go off zero you go beep, beep.
   2. Crossy Roads Game - <https://youtu.be/-S1aAlUp16A> (Done)
      1. The aim of this game is to get a bug (single LED) to navigate the screen from bottom to the top while we have traffic (two rows of LED’s) moving from left to right on the screen.
      2. Horizontal row 1 - Declare two variables for x, y position. Light up LED and move the row across the screen. The LED’s bounce from one end of the screen to the other and back.
      3. Horizontal row 2 - Declare two variables for x, y position. Keep a row’s gap between the two rows. Light up LED and move the row across the screen. The LED’s bounce from one end of the screen to the other and back.
      4. Vertical LED – Declare another set of variables. Use them to define an LED in the centre of the screen at the bottom. Program control into button A, B to move the LED up and down.
      5. If you reach the top you’ve won the game.
      6. Challenge - If you bump into another LED you’ve lost and game re-starts.
      7. Challenge – The horizontal rows can suddenly move up or down by a row.
      8. Challenge – Add a second LED that moves vertically
   3. Slithering Snake - (Done)
      1. The aim of this program is to light up LED’s progressively like a snake moving around the board. This program uses variables for the LED co-ordinates which change (+ / - ) to move the snake across the screen.
      2. Challenge - Button A increases the pace of the snake
      3. Challenge - Button B decreases the pace at which the snake moves
      4. Challenge - Button A+B re-sets the game
   4. Light Up –
      1. This program draws a character on the screen and provides the user the ability to increase (button A) and decrease (button B) brightness
      2. Draw any character on the screen
      3. Program button A to increase the LED brightness
      4. Program button B to decrease the LED brightness
      5. Program button A + B to detect the brightness and show a sun or moon depending on the brightness level detected
   5. Fireflies –
      1. This program create the firefly effect by randomly lighting up LED’s across the board making them look like fireflies
      2. Randomly lighting LED’s across the board. Use variables to plot co-ordinates.
      3. Use variables and random functions.
      4. Plot random X and Y co-ordinates for the single variable
      5. Challenge – Shaking the board increases the rate of movement i.e. decrease time between change of lighting position
      6. Challenge – Button A re-sets the rate of movement i.e. decrease time between change of lighting position
      7. Challenge – Clicking on B adds another variable and plot random X, Y co-ordinates
      8. Challenge – Use music and play a beep when a firefly comes up on screen.
   6. Digital thermometer
      1. In this program we create a digital thermometer that displays temperature in both Celsius and Fahrenheit
      2. Display temperature in degree celcius (button A)
      3. Display temperature in farenheit (button B)
   7. Calculator game - <https://www.youtube.com/watch?v=S5JicIbzytg>
      1. Program 1st button to increase variable 1
      2. Program 2nd button to increase variable 2
      3. Program 1st + 2nd button to add variable 1st + 2nd
   8. Ticketing system - <http://www.101computing.net/bbc-microbit-ticketing-system/>
      1. The queue should start at the value 0, and should be displayed on the micro:bit LED screen.
      2. When a shop assistant is available they press button A to call for a customer: The queue number displayed on the micro:bit should increase by 1.
      3. The shop assistant should be able to cancel their action by pressing button B: in this case the queue number should decrease by 1.
      4. To reset the ticketing system, the shop assistant should press both A and B buttons simultaneously. The queue number will be reset to 0.
   9. Higher or Lower game - <http://www.101computing.net/bbc-microbit-higher-or-lower-game/>
   10. Car racing game - <http://www.101computing.net/microbit-car-racing-game/>
   11. Building a traffic light - <http://www.101computing.net/micro-bit-traffic-light/>
   12. Building a stopwatch timer - <http://www.101computing.net/micro-bit-stopwatch/>
   13. Simon says - <http://www.101computing.net/microbit-simon-game/>
   14. Uklele Chord Reader - <http://www.101computing.net/microbit-ukulele-chord-reader/>
   15. Tetris game - <http://www.101computing.net/bbc-microbit-tetris-game/>
   16. The queens cupcake - <http://www.101computing.net/the-queens-cupcake/>
   17. Goldrush - <http://www.101computing.net/gold-rush/>
   18. What a mole - <http://www.101computing.net/bbc-microbit-whack-a-mole/>
   19. Automated car park display - <http://www.101computing.net/bbc-microbit-automated-car-park-display/>
   20. Howarts sorting hat - <http://www.101computing.net/bbc-microbit-hogwarts-sorting-hat/>
   21. Ski slopes –
       1. Create a vertical ski slope. User starts as an LED at the top.
       2. User navigates using the buttons i.e. button A towards left and button B towards the right
       3. Move left/right to avoid hitting the obstacles.
       4. Game ends if you hit the obstacles or stay alive for 60 seconds
   22. Snowball flight –
       1. Target shown on the top of the board
       2. Use button A and button B to align direction of the throw
       3. Use button A+B to throw
       4. Get as many hits as you can within the time limit
       5. Display hits at the end of the game
   23. Space wars –
       1. Objects float past the screen
       2. Guns at the bottom of the screen
       3. Use button A to fire the left gun and button B to fire the right gun
       4. Time the game to 60 seconds
       5. Display count of targets hit at the end of the game
   24. Ping pong game –
       1. By default bats remain at the top of the screen on the right/left sides
       2. Use button A to move left bat down (vertically) and button B to move right bat down (vertically)
       3. Ball is deflected depending on the angle of the hit
       4. Maintain score and timer (60s)
       5. Display score at the end of the game
   25. Elecfreaks - <http://www.elecfreaks.com/estore/elecfreaks-micro-bit-tinker-kit-without-micro-bit-board.html>
   26. TinkerAcademy - <https://tinkercademy.com/microbit/>
   27. Hackster.io - <https://www.hackster.io/microbit/products/bbc-micro-bit-board>
   28. Speed warning alert (Using Accelerometer)
   29. Virtual pets (TBD)
   30. Fitness device (TBD)
   31. Take pictured by talking to a camera on the phone using Bluetooth (TBD)
4. Course 3 - Making with the Microbit - Advanced lessons
   1. The Watch (Maker) - <https://www.microbit.co.uk/blocks/lessons/the-watch>
   2. Hack Your Headphones (Maker) - <https://www.microbit.co.uk/blocks/lessons/hack-your-headphones>
   3. Banana Keyboard (Maker) - <https://www.microbit.co.uk/blocks/lessons/banana-keyboard>
   4. Telegraph (Maker) - <https://www.microbit.co.uk/blocks/lessons/telegraph>
   5. Ornament Chain (Maker) - <https://www.microbit.co.uk/td/lessons/ornament-chain>
   6. Hero - <https://www.microbit.co.uk/blocks/lessons/hero>
5. Course 4 - Basics of Electronics
   1. Series circuit
      1. LED, Resistor
      2. LED, Resistor + Resistor (Series)
   2. Parallel circuit
      1. LED, Resistor
      2. LED, Resistor + Resistor (Parallel)
   3. Transistors – NPN (& PNP)
      1. Simple NPN circuit – Turn LED on/off
   4. Blinking an LED
      1. Single LED
      2. Multiple LED’s
      3. Increasing value of resistors
      4. Introduce a transistor
   5. Color control with a Tricolor (RGB) LED
      1. Single RGB LED
      2. RGB LED, Potentiometer
      3. RGB LED, Potentiometer, Switch
   6. Using an LDR and measuring analog inputs
      1. LDR, Potentiometer
   7. Breadboard switches in parallel with the main switches
      1. Switch 1, Switch 2
      2. Switch 1, Switch 2, LED 1, LED 2
   8. Dimming an LED using a potentiometer
      1. LED, Potentiometer, Switch
   9. Using a transistor to drive a motor
      1. NPN Transistor, Resistor, Motor
   10. Using the accelerometer to control motor speed
       1. Single speed / Duty Cycle
       2. Set button A to increase speed
       3. Set button A to increase speed and button B to decrease speed
   11. Setting the tone with a piezo buzzer
       1. Play music with the buzzer
       2. Detect input on button A an play a melody
       3. Detect input on button B and play a different melody
       4. Detect input on button A + B and play a different melody
6. Course 5 - Advanced Electronics
   1. Building an RGB gradient - <http://www.101computing.net/bbc-microbit-rgb-gradient/>
   2. Car lighting system - <http://www.101computing.net/bbc-microbit-car-lighting-system/>
   3. Wind power in action
   4. Making a game using the compass
   5. Creating a capacitor charge circuit
   6. Making a pedestrian crossing using LEDs
   7. Making a random dice
   8. Exploring transistors
      1. Darlington Pair for high current gain
      2. H-Bridge using 4 transistors to drive a motor
   9. Displaying temperature using the on-board sensor
   10. Building a soil moisture sensor
   11. Measuring humidity using the DHT11
   12. Measuring temperature using the DHT11
   13. Using a solid state relay to turn on LED, motor
   14. Create a Traffic Light Using 3 LEDs and a HC SR04 (Distance Sensor)
   15. Measuring algae in water using an LDR and an LED to determine if the water needs to be refreshed
7. Course 5 - Robotics
   1. Building the robot car