**CORE ROBOTICS COURSE - BASIC**

**STEPPING STONE ( BASIC ROVER )**

**TASKS**

* **MOVE FORWARD AND BACKWARD**
* **EXPLAIN ABOUT DIFFERENT TURNS LIKE POINT ,PIVOT, DIFFERENTIAL**
* **MAKE A SQUARE BY MOVING**
* **MAKE A TRAINGLE**
* **DIGITAL 8 WITHOUT REPEATING SIDES**
* **CIRCLE**
* **CAPITAL LETTER R**
* **INFINITY SYMBOL**

**GET INTO GEARS**

**TASKS**

* **MOVE ROVER FORWARD FOR 30CMs AND MEASURE THE TIME TAKE TO REACH**
* **EXPLAIN ABOUT DRIVE AND DRIVEN GEAR**
* **USED SAME SIZE GEAR AND MEASURE TIME AND SPEED**
* **USED BIG DRIVE GEAR AND SMALL DRIVEN GEAR FOR THE SAME**
* **USED SMALL DRIVE AND BIG DRIVEN**

**AUTOMATED BOOM BARRIER**

**TASKS**

* **TELL ABOUT CONDITIONAL BLOCKS LIKE WAIT, LOOP, SWITCH**
* **MECHANICAL STOPPER**
* **MOVE THE BARRIER UP BY 90 DEGREE AND THEN DOWN**
* **SENSE THE OBJECT USING SENSOR AND UP THE BARRIER**
* **NO OBJECT DOWN THE BARRIER**
* **NOW MAKE A TOLLPLAZA/OR PARKING SYTSTEM USING ROVER AND BARRIER**

**MY MUSICAL INSTRUMENT**

**TASKS**

* **MOVE THE ROBOT TILL IT SENSE RED COLOUR BLOCK AND STOP**
* **NOW AFTER STOPPING PLAY A SOUND FOR RED BLOCK**
* **NOW AGAIN MOVES FROWARD AND SENSE BLUE COLOUR AND DO THE SAME**
* **TRY WITH MULTIPLE BLOCKS**

**MY LINE FOLLOW ROBOT**

**TASKS**

* **MOVE ROVER TOWARDS WHITE WHEN SENSE BLACK & VICE VERSA**
* **FOLLOW THE LINE TILL DETECTS RED COLOURED BLOCK AND STOP**
* **NOW MEDIUM MOTOR WILL ASIDE RED BLOCK TO LEFT SIDE OF PATH**
* **DO THE SAME FOR DIFFERENT COLOUR BLOCKS ON DIFFERENT SIDES**
* **NOW ASIDE RED BLOCK TO LEFT, SKIP GREEN BLOCK, ASIDE BLUE TO RIGHT**

**AUTOMATED STREET LIGHTS**

**TASKS**

* **MEASURE AMBIENT LIGHT VALUES FOR DARK AND BRIGHT**
* **DISPLAY “DAY” WHEN DETECTS BRIGHT AND “NIGHT” WHEN DARK OUTSIDE**
* **TURN ON THE STREET LIGHT WHEN ITS DARK OUTSIDE**
* **TURN OFF STREET LIGHT WHEN ITS BRIGHT OUTSIDE**

**PANDORA BOX**

**TASKS**

* **WHEN FIRST TOUCH SENSOR PRESSED DOOR BOX**
* **WHEN SECOND ONE PRESSED ITS GETS CLOSED**
* **DO THE BOTH USING SWITCH BLOCK**

**CANDY DISPENSER**

**TASKS**

* **DISPENSE ONE CANDY OF RED COLOUR TO RIGHT SIDE**
* **DISPENSE ONE CANDY TO LEFT FOR GREEN BLOCK**
* **DISPENSE TWO CANDYS WHEN BLUE IS SENSED ANY SIDE**
* **NOW PERFORM ALL COMBINE TOGETHER**

**AUTOMATIC DOOR**

**TASKS**

* **OPEN THE DOOR WHEN OBJECT IS SENSED**
* **CLOSED THE DOOR WHEN NO OBJECT IS DETECTED**
* **OPEN THE DOOR TILL OBJECT ITS THERE AND CLOSED AFTER ITS GET INSIDE DOOR**

**CORE ROBOTICS COURSE – INTERMEDIATE**

**ANTI THEFT ALRAM**

**TASKS**

* **MAKE ALARMING SOUND WHEN TOUCH SENSOR IS RELEASED**
* **MAKE ALARMING SOUND WHEN ULTRA SONIC SENSOR SENSE NO OBJECT**
* **MAKE SOUND WHEN COLOUR SENSOR DO NOT SEE THAT COLOUR OBJECT**
* **COMBINE ALL TOGETHER FOR A FAIL SAFE PROGRAM**

**VISITOR COUNTER**

**TASKS**

* **EXPLAIN VARIABLES, READ & WRITE, COMPARE ETC BLOCKS**
* **ADDITION, SUBTRACTION, DIVISION, MULTIPY PROGRAM USING VARIABLES**
* **SEQUENCE OF NUMBERS LIKE 1, 2, 3, 4, … AND SO ON**
* **ODD AND EVEN NUMBERS DISPLAY**
* **DISPLAY THIS PATTERN 1, 4, 16, 25, …**
* **FIBONACI SERIES**
* **USED ULTRA SONIC SENSOR TO INCREMENT THE COUNT BY 1 WHEN VISITOR IS SENSED**

**ELECTRONIC DICE**

**TASKS**

* **WHEN TOUCH SENSOR IS PRESSED DISPLAY A RANDOM NUMBER FROM 1 -6**
* **PLAY HAPPY SOUND FOR EVERY 6 AND SAD SOUND FOR 1 – 5**
* **DISPLAY THE NUMBERS OF SIXS COMES WHEN SENSOR IS PRESSED**
* **DISPLAY THE NUMBERS OF DICE ROLL**
* **NOW PREPARE A GAME TO REACH 25 COUNT FIRST FOR TWO PLAYERS**

**MAZE SOLVER**

**TASKS**

* **STOP THE ROVER WHEN ITS DETECTS ANY OBJECT IN FRONT OF HIM ELSE MOV**
* **NOW TURN THE SENSOR IF NO OBJECT TAKE A TURN AND MOVE**
* **CHECK LEFT AND RIGHT BOTH COMPARE DISTANCE TURN ROVER TOWARDS GREATER DISTANCE**
* **MOVE YOUR ROVER TO CENTER OF MAZE IF START AT ANY POSITION**

**LINE FOLLOW**

**TASKS**

* **CALIBRATE THE COLOUR SENSORS TO GET READING CLOSE TO 0 AND 100**
* **FOLLOW LINE BASED ON 5 STATES AND GIVE MOTOR POWERS ACCORDINGLY**
* **NOW DO THE SAME FOR 7 STATES**
* **9 STATES**
* **15 STATES**

**HEIGHT MEASURING DEVICE**

**TASKS**

* **MEASURE AND DISPLAY CURRENT DISTANCE OF ULTRA SONIC SENSOR**
* **NOW MEASURE THE HEIGHT OF THE OBJECT STANDING HERE AND DISPLAY**
* **NOW CONVERT THE HEIGHT IN INCHES AND DISPLAY**
* **NOW IN FEETS**

**AREA CALCULATOR**

**TASKS**

* **MEASURE 1 ROTATIONS IN CMs AND DISPLAY ON EV3 SCREEN**
* **NOW CALCULATE AREA OF SQUARE AND DISPLAY**
* **RECTANGLE**
* **TRAINGLE**

**MY GRABBER ROBOT**

**TASKS**

* **MOVE ROVER TO FOLLOW 5 STATE LINE FOLLOW**
* **STOP THE ROVER WHEN RED BLOCK IS SENSE**
* **GRAB THE BLOCK AND THROW AWAY FROM LINE FOLLOW**
* **DO THE SAME FOR MULTIPLE COLOUR BLOCKS**

**CORE ROBOTICS COURSE – ADVANCE**

**EV3 MENU SYSTEM**

**TASKS**

* **CREATE A GIVEN MENU AND DISPLAY FOR 6 SECONDS**
* **NOW DISPLAY ENTER YOUR CHOICE**
* **DISPLAY CONGRATS MESSAGE FOR ORDER CONFIRMATION AND ASSIGNED A RANDOM TABLE NUMBER**
* **CALCULATE THE BILL OF THE MENU ITEMS WITH 5% GST AND DISPLAY TOTAL**
* **LAST DISPLAY THANKING YOU**

**PROPORTIONAL LINE FOLLOW**

**TASKS**

* **CALIBRATE THE COLOUR SENSORS TO GET READING CLOSE TO 0 AND 100**
* **FIND ERROR VALUE USING ERROR = TV – ASV**
* **NOW FIND VALUE OF KP IT WILL BE BETWEEN ZERO AND ONE**
* **NOW TURN VALUE USING TURN = KP \* ERROR**
* **MOTOR VALUES USING MOTOR B = TP + TURN & MOTOR VALUES USING MOTOR B = TP + TURN**
* **NOW FOLLOW THE LINE BASED ON THIS CONDITIONS**

**REMOTE CONTROL RACE CAR**

**TASKS**

* **CONNECT TWO EV3 DEVICES USING BLUETOOTH AND DOWNLOAD PROGRAMS IN BOTH EV3s**
* **SEND MESSAGE 1 FROM ONE EV3(MASTER) TO ANOTHER EV3(SLAVE) AND DISPLAY**
* **NOW SEND MESSAGE TO DISPLAY DIFFERENT NUMBERS FOR DIFFERENT BRICK BUTTONS**
* **CONNECT TWO TOUCH SENSOR AND MOVE RACE CAR FORWARD AND BACKWARD FOR DIFFERENT SENSORS**
* **WHEN BOTH TOUCH SENSORS ARE PRESSED MOVE RACE CAR FORWARD AND PORT ONE SENSOR IS PRESSED TAKE TURN TOWARDS LEFT AND VICE VERSA**

**GYRO SENSOR**

**TASKS**

* **MOVE ROVER STAIGHT AND TAKE A TURN USING GYRO**
* **MOVE YOUR ROVER TO SQUARE SHAPE PATTERN**

**RELIABLITY TECHNIQUE**

**TASKS**

* **CALIBRATE BOTH COLOUR SENSORS**
* **MOVE MOTOR B WHEN SENSOR 1 DETECTS WHITE AND VICE VERSA FOR MOTOR C**
* **WHEN ANY COLOUR SENSOR DETECTS BLACK THAT MOTOR WILL STOP**
* **ALIGN ROVER STRAIGHT AND RUN IF STOP SHOULD BE ALIGN STRAIGHT ONLY**
* **ALIGH ROVER DIAGONAL AND RUN IF STOP SHOULD BE ALIGH STRAIGHT ONLY**