Introduction
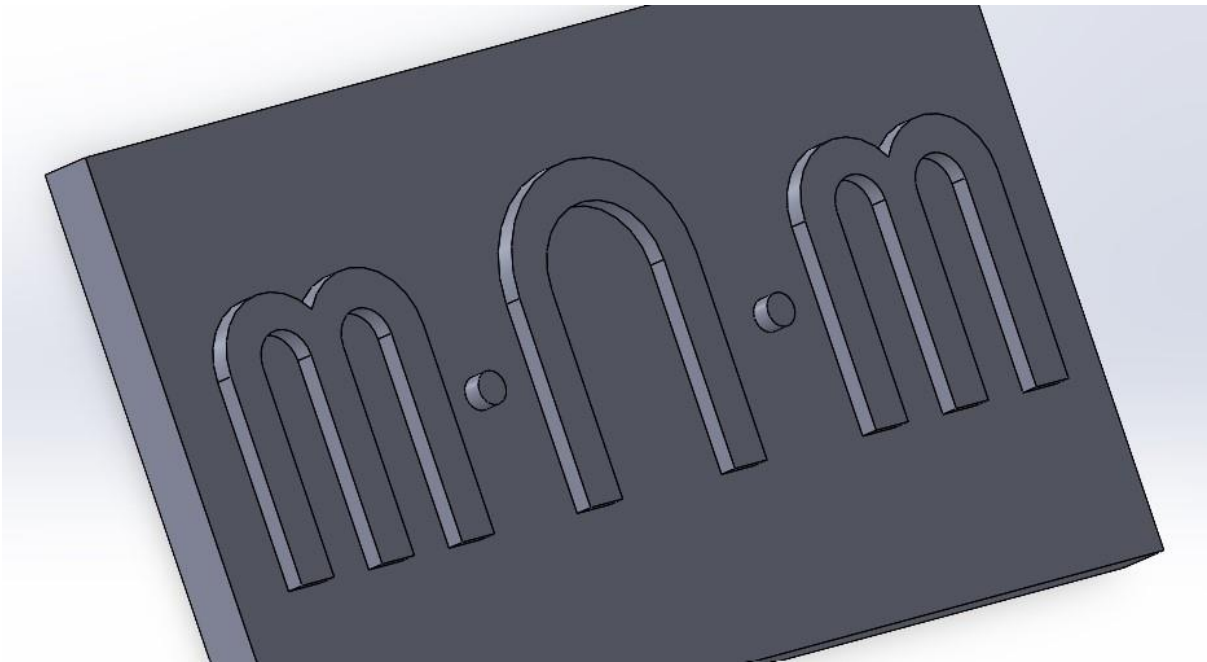
This project is designed to expose one to the application of robot system design in the real world. Using a software called "RobotStudio" created by ABB Ltd, alongside with SolidWorks. The requirements are:

1. Create a character, shape, symbol, or a word that you wish to draw in SolidWorks (or a similar CAD package). Save your item as a .sat file.
2. Develop a working model with any model of robot in RobotStudio
3. Train your robot simulation to draw the object that you created.
4. Run your robot simulation in Robot Studio software mode.
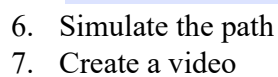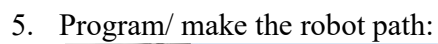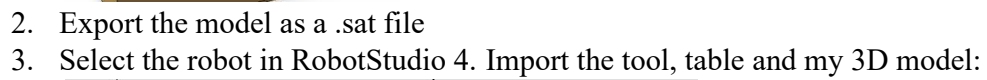
My Shape

I choose to create my initials as my shape MNM (Michael Ngolleni Maingi). This is as it contains circular and linear paths and it involves the tool lifting action, meeting all the requirements

Above is the SolidWorks 3D model of my name.

Steps & Images

1. Make the 3D model of my initials:

2. Export the model as a .sat file
3. Select the robot in RobotStudio 4. Import the tool, table and my 3D model:

5. Program/ make the robot path:

6. Simulate the path
7. Create a video

CODE:

```
MODULE Module1
    CONST robtarget
Target_10:=[[180.960676312,417.876148446,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9
E+09,9E+09,9E+09]];
    CONST robtarget
Target_20:=[[180.960676312,367.876148446,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9
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E+09,9E+09,9E+09]];

    CONST robtarget
Target_30:=[[190.960676312,367.876148446,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9
E+09,9E+09,9E+09]];

    CONST robtarget
Target_40:=[[190.960676312,417.876148446,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9
E+09,9E+09,9E+09]];

CONST robtarget
Target_50:=[[194.710676312,424.371338975,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+09,9E+09]];
CONST robtarget
Target_70:=[[205.960676312,417.876148446,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+09,9E+09]];
CONST robtarget
Target_80:=[[205.960676312,367.876148446,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+09,9E+09]];
CONST robtarget
Target_90:=[[215.960676312,367.876148446,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+09,9E+09]];
CONST robtarget
Target_100:=[[215.960676312,417.876148446,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+09,9E+09]];
CONST robtarget
Target_110:=[[219.710676312,424.371338975,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+09,9E+09]];
CONST robtarget
Target_130:=[[230.960676312,417.876148446,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+09,9E+09]];
CONST robtarget
Target_140:=[[230.960676312,367.876148446,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+09,9E+09]];
CONST robtarget
Target_150:=[[240.960676312,367.876148446,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+09,9E+09]];
CONST robtarget
Target_160:=[[240.960676312,417.876148446,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+09,9E+09]];
CONST robtarget
Target_170:=[[235.405653207,430.388027618,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+09,9E+09]];
CONST robtarget
Target_190:=[[210.508284978,427.876148446,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+09,9E+09]];
CONST robtarget
Target_200:=[[198.881728,434.277720743,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+09,9E+09]];
CONST robtarget
Target_220:=[[180.960676312,417.876148446,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+09,9E+09]];
CONST robtarget
Target_230:=[[250.482336293,400,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+09,9E+09]];
CONST robtarget

CONST robtarget
Target_240:=[[252.482336293,403.464101615,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+09,9E+09]];
Target_250:=[[256.482336293,403.464101615,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+09,9E+09]];
CONST robtarget
Target_260:=[[258.482336293,400,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+09,9E+09]];
CONST robtarget
Target_270:=[[256.482336293,396.535898385,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+09,9E+09]];
CONST robtarget
Target_280:=[[252.482336293,396.535898385,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+09,9E+09]];
CONST robtarget
Target_290:=[[250.482336293,400,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+09,9E+09]];
CONST robtarget
Target_300:=[[280.960676312,417.876148446,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+09,9E+09]];
CONST robtarget
Target_310:=[[289.710676312,433.031593012,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+09,9E+09]];
CONST robtarget
Target_330:=[[315.960676312,417.876148446,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+09,9E+09]];
CONST robtarget
Target_340:=[[315.960676312,367.876148446,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+09,9E+09]];
CONST robtarget
Target_350:=[[325.960676312,367.876148446,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+09,9E+09]];
CONST robtarget
Target_360:=[[325.960676312,417.876148446,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+09,9E+09]];
CONST robtarget
Target_370:=[[312.210676312,441.69184705,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+09,9E+09]];
CONST robtarget
Target_390:=[[270.960676312,417.876148446,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+09,9E+09]];
CONST robtarget
Target_400:=[[270.960676312,367.876148446,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+09,9E+09]];
CONST robtarget
Target_410:=[[280.960676312,367.876148446,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,

CONST robtarget
9E+09,9E+09,9E+09]];
    CONST robtarget
Target_420:=[[280.960676312,417.876148446,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,
9E+09,9E+09,9E+09]];
Target_430:=[[348.553180702,400,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+0
9,9E+09]];
    CONST robtarget
Target_440:=[[346.553180702,396.535898385,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,
9E+09,9E+09,9E+09]];
    CONST robtarget
Target_450:=[[342.553180702,396.535898385,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,
9E+09,9E+09,9E+09]];
    CONST robtarget
Target_460:=[[340.553180702,400,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+0
9,9E+09]];
    CONST robtarget
Target_470:=[[342.553180702,403.464101615,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,
9E+09,9E+09,9E+09]];
    CONST robtarget
Target_480:=[[346.553180702,403.464101615,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,
9E+09,9E+09,9E+09]];
    CONST robtarget
Target_490:=[[348.553180702,400,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+0
9,9E+09]];
    CONST robtarget
Target_500:=[[395,367.876148446,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+0
9,9E+09]];
    CONST robtarget
Target_510:=[[395,417.876148446,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+0
9,9E+09]];
    CONST robtarget
Target_520:=[[398.75,424.371338975,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9
E+09,9E+09]];
    CONST robtarget
Target_540:=[[410,417.876148446,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+0
9,9E+09]];
    CONST robtarget
Target_550:=[[410,367.876148446,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+0
9,9E+09]];
    CONST robtarget
Target_560:=[[420,367.876148446,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+0
9,9E+09]];
    CONST robtarget
Target_570:=[[420,417.876148446,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+0
9,9E+09]];
    CONST robtarget

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    CONST robtarget
Target_580:=[[414.428326624,430.19199697,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9
E+09,9E+09,9E+09]];
    CONST robtarget
Target_600:=[[390,427.03330138,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+09
,9E+09]];
    Target_610:=[[378.500331515,434.138320297,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,
9E+09,9E+09,9E+09]];
    CONST robtarget
Target_630:=[[360,417.876148446,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+0
9,9E+09]];
    CONST robtarget
Target_640:=[[360,367.876148446,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+0
9,9E+09]];
    CONST robtarget
Target_650:=[[370,367.876148446,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+0
9,9E+09]];
    CONST robtarget
Target_660:=[[370,417.876148446,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+0
9,9E+09]];
    CONST robtarget
Target_670:=[[373.75,424.371338975,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9
E+09,9E+09]];
    CONST robtarget
Target_690:=[[385,417.876148446,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+0
9,9E+09]];
    CONST robtarget
Target_700:=[[385,367.876148446,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+0
9,9E+09]];
    CONST robtarget
Target_710:=[[395,367.876148446,20],[0,0,1,0],[0,0,0,0],[9E+09,9E+09,9E+09,9E+09,9E+0
9,9E+09]];

    PROC main()
        Path_10;
        Path_20;
        Path_30;
        Path_40;
        Path_50;
    ENDPROC


    PROC Path_10()
        MoveL Target_10,v300,fine,MyTool\WObj:=Workobject_1;
        MoveL Target_20,v300,fine,MyTool\WObj:=Workobject_1;
        MoveL Target_30,v300,fine,MyTool\WObj:=Workobject_1;
        MoveL Target_40,v300,fine,MyTool\WObj:=Workobject_1;
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CONST robtarget
    MoveC Target_50,Target_70,v300,fine,MyTool\WObj:=Workobject_1;
    MoveL Target_80,v300,fine,MyTool\WObj:=Workobject_1;
    MoveL Target_90,v300,fine,MyTool\WObj:=Workobject_1;
    MoveL Target_100,v300,fine,MyTool\WObj:=Workobject_1;
    MoveC Target_110,Target_130,v300,fine,MyTool\WObj:=Workobject_1;
    MoveL Target_140,v300,fine,MyTool\WObj:=Workobject_1;
    MoveL Target_150,v300,fine,MyTool\WObj:=Workobject_1;
    MoveL Target_160,v300,fine,MyTool\WObj:=Workobject_1;

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      MoveC Target_170,Target_190,v300,fine,MyTool\WObj:=Workobject_1;
      MoveC Target_200,Target_220,v300,fine,MyTool\WObj:=Workobject_1;
   ENDPROC
   PROC Path_20()
      MoveL Target_230,v40,fine,MyTool\WObj:=Workobject_1;
      MoveC Target_240,Target_250,v40,fine,MyTool\WObj:=Workobject_1;
      MoveC Target_260,Target_270,v40,fine,MyTool\WObj:=Workobject_1;
      MoveC Target_280,Target_290,v40,fine,MyTool\WObj:=Workobject_1;
   ENDPROC
   PROC Path_30()
      MoveL Target_300,v100,fine,MyTool\WObj:=Workobject_1;
      MoveC Target_310,Target_330,v100,fine,MyTool\WObj:=Workobject_1;
      MoveL Target_340,v100,fine,MyTool\WObj:=Workobject_1;
      MoveL Target_350,v100,fine,MyTool\WObj:=Workobject_1;
      MoveL Target_360,v100,fine,MyTool\WObj:=Workobject_1;
      MoveC Target_370,Target_390,v100,fine,MyTool\WObj:=Workobject_1;
      MoveL Target_400,v100,fine,MyTool\WObj:=Workobject_1;
      MoveL Target_410,v100,fine,MyTool\WObj:=Workobject_1;
      MoveL Target_420,v100,fine,MyTool\WObj:=Workobject_1;
   ENDPROC
   PROC Path_40()
      MoveL Target_430,v50,fine,MyTool\WObj:=Workobject_1;
      MoveC Target_440,Target_450,v50,fine,MyTool\WObj:=Workobject_1;
      MoveC Target_460,Target_470,v50,fine,MyTool\WObj:=Workobject_1;
      MoveC Target_480,Target_490,v50,fine,MyTool\WObj:=Workobject_1;
   ENDPROC
   PROC Path_50()
      MoveL Target_500,v100,fine,MyTool\WObj:=Workobject_1;
      MoveL Target_510,v100,fine,MyTool\WObj:=Workobject_1;
      MoveC Target_520,Target_540,v100,fine,MyTool\WObj:=Workobject_1;
      MoveL Target_550,v100,fine,MyTool\WObj:=Workobject_1;
      MoveL Target_560,v100,fine,MyTool\WObj:=Workobject_1;
      MoveL Target_570,v100,fine,MyTool\WObj:=Workobject_1;
      MoveC Target_580,Target_600,v100,fine,MyTool\WObj:=Workobject_1;
      MoveC Target_610,Target_630,v100,fine,MyTool\WObj:=Workobject_1;
      MoveL Target_640,v100,fine,MyTool\WObj:=Workobject_1;
      MoveL Target_650,v100,fine,MyTool\WObj:=Workobject_1;
      MoveL Target_660,v100,fine,MyTool\WObj:=Workobject_1;
      MoveC Target_670,Target_690,v100,fine,MyTool\WObj:=Workobject_1;
      MoveL Target_700,v100,fine,MyTool\WObj:=Workobject_1;
      MoveL Target_710,v100,fine,MyTool\WObj:=Workobject_1;
   ENDPROC
ENDMODULE
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