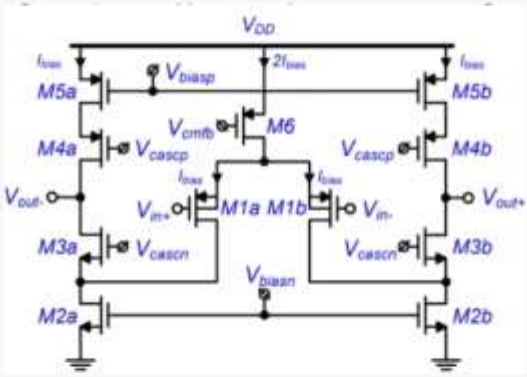
بسم الله الرحمن الرحيم

Task 2:

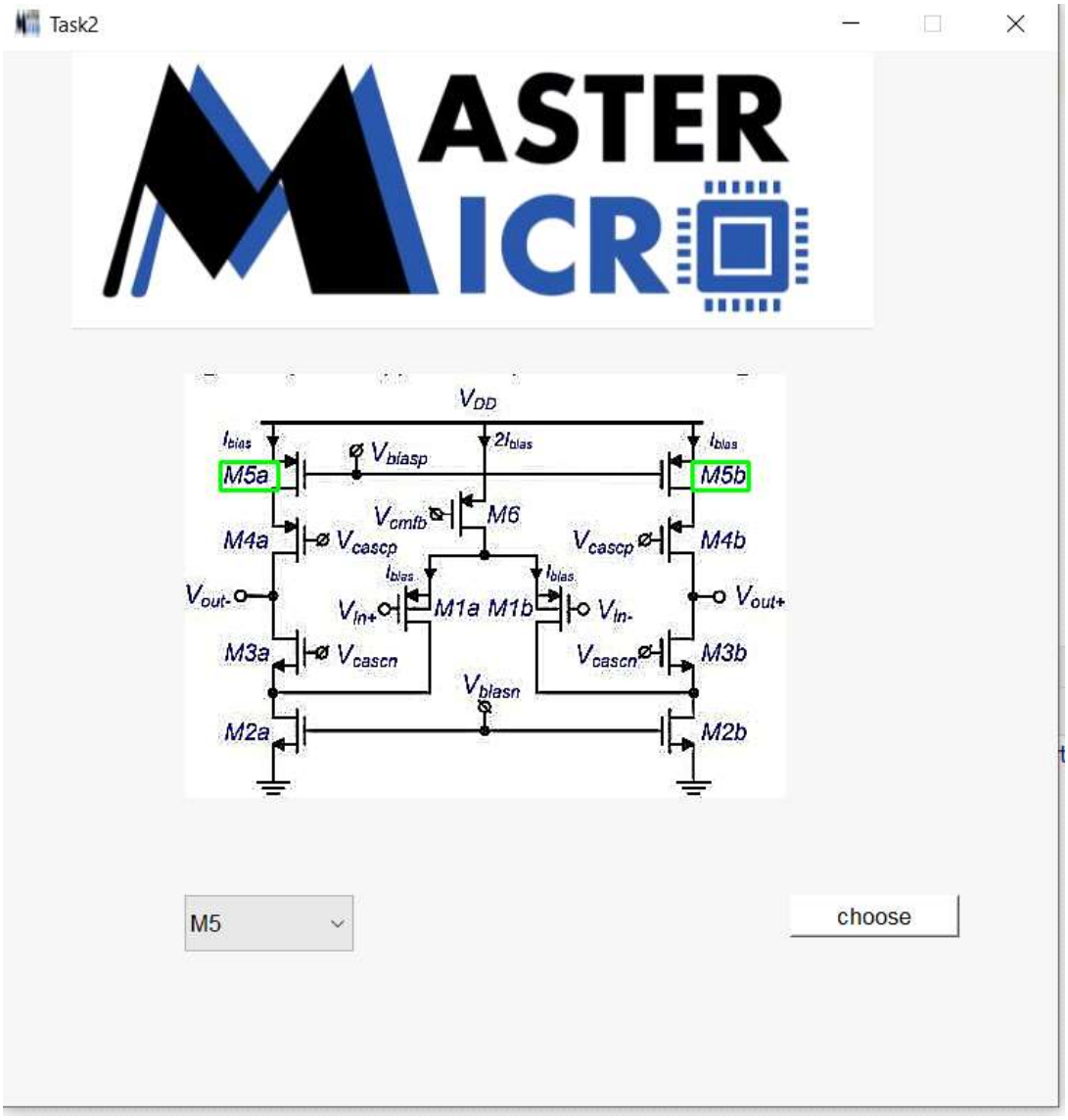
Task2



M1

choose


Task2
MASTER
MICR
V_{DD}
I_{bias}
V_{biasp}
$2I_{bias}$
M5a
M5b
V_{cmfb}
M6
M4a
V_{cascp}
M4b
V_{out-}
V_{in+}
M1a
M1b
V_{in-}
V_{out+}
M3a
V_{cascn}
M3b
V_{biasn}
M2a
M2b
M2
choose



first thing in code i bulid the gui by using PySide2 lib and and set the Geometry demnison and i inserted :

-icon

-label("Macro img")

-bush putton(" choose") to smart detect the text on image

-combo box (drop box)

-labe ("schem)

```
from PySide2.QtGui import QPixmap ,QIcon ,QFont ,QDoubleValidator,QValidator , QImage
from PySide2.QtWidgets import QMainWindow, QApplication, QLabel ,QDesktopWidget ,QPushButton,QLineEdit ,QComboBox
from PySide2 import QtWidgets
```

fig : the pyside2 lib

```
class MyWindow(QMainWindow):

        def __init__(self):
            super(MyWindow,self).__init__()

            self.init_ui()


        def init_ui(self):
            self.title = "Task2"
            self.setWindowTitle (self.title)
            self.setGeometry (300, 200, 250, 250)
            self.setFixedSize (750, 750)

            self.label1 = QtWidgets.QLabel (self)
            pixmap = QPixmap ('macro.jpg')
            self.label1.setPixmap (pixmap)
            self.label1.setGeometry (50, -300, 1000, 800)




            self.label2 = QtWidgets.QLabel (self)
            pixmap = QPixmap ('schem.JPG')
            self.label2.setPixmap (pixmap)
            self.label2.setGeometry (130, 30, 500, 700)
```

```
self.choose_button = QtWidgets.QPushButton (self)
self.choose_button.setText ("choose")
self.choose_button.setFont (QFont ('Arial', 10))
self.choose_button.setGeometry (560 , 600, 120, 30)
self.choose_button.setStyleSheet ("background-color: white")
self.choose_button.clicked.connect (self.btn_click)

self.combo = QComboBox (self)
self.combo.setWindowTitle ("enter")
self.combo.setGeometry (130, 600, 120, 40)
self.combo.setFont(QFont ('Arial', 10))
self.combo.addItems (["M1", "M2", "M3", "M4", "M5"])

self.textError = QtWidgets.QLabel (self)
self.textError.setFont (QFont ('Times', 12))
self.textError.setGeometry (560, 550, 120, 30)
self.textError.setStyleSheet ("color: red")



self.setIcon ()
self.center ()
```

as you can see i bulid the window and setting the Title and adding Icon , Label , combo box and set the font type and the Gemometry

```
    self.setIcon()
    self.center()

def setIcon(self):
    appIcon = QIcon("macro.JPG")
    self.setWindowIcon(appIcon)

def center(self):
    qReact = self.frameGeometry ()
    centerpoint = QDesktopWidget ().availableGeometry ().center ()
    qReact.moveCenter (centerpoint)
    self.move (qReact.topLeft ())
```

and i also wrote 2 function first to add Macro icon when user run the gui and center to make the gui appear at the center .

so when when the user press on choose and choose like M1 ?

```
import pytesseract
import numpy as np
import cv2
```

fig : library used for filteration and detect the text

```
    text =self.combo.currentText()
    filtered_image = self.image_correct("schem.JPG")
    h, w, _ = filtered_image.shape  # assumes color image
    boxes = pytesseract.image_to_boxes (filtered_image)
```

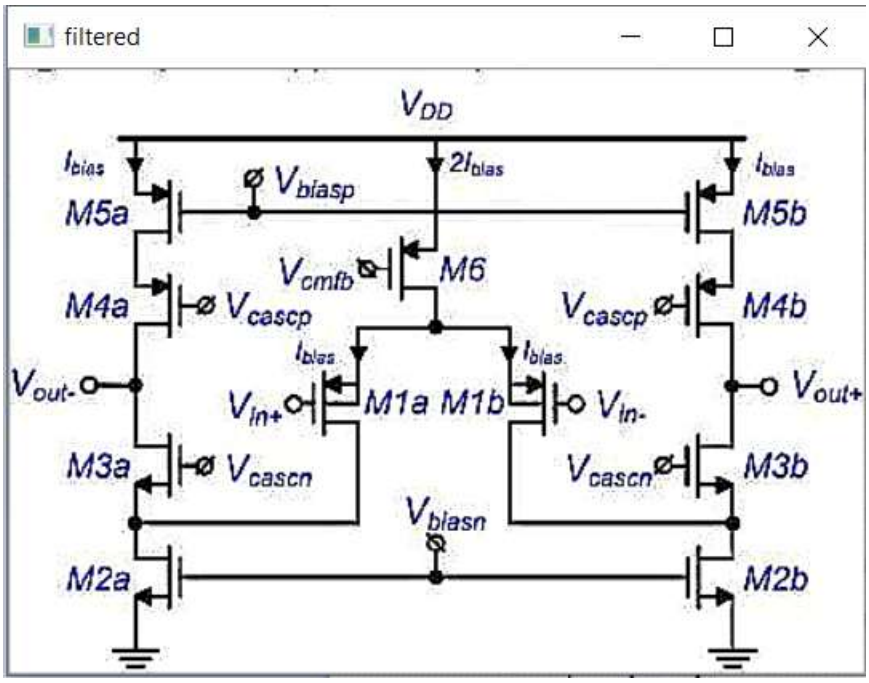
first i read the input from combo box as string like "M1"

then i filtered the Schematic image by using gaussian filter to sharp the image

```
def image_correct(self,string):

    img = cv2.imread (string)
    h, w, _ = img.shape  # assumes color image
    sharpening_filter = np.array ([[-1, -1, -1], [-1, 9, -1], [-1, -1, -1]])
    sharpened_imag = cv2.filter2D (img, -1, sharpening_filter)

    return  sharpened_imag
```



and i aslo used tried another filer to smooth the image but i wrote the gaussian filter in the code.

the i used pytesseract to detect text from the filtered image in array of strings every character with x,y,z,h

```
text =self.combo.currentText()
filtered_image = self.image_correct("schem.JPG")
h, w, _ = filtered_image.shape  # assumes color image
boxes = pytesseract.image_to_boxes (filtered_image)
```

the strings in boxes

```
V 279 95 290 109 0
e 290 93 295 100 0
a 296 93 302 100 0
s 302 93 308 100 0
e 309 93 314 100 0
n 315 93 321 100 0
® 322 93 340 114 0
| 335 93 340 114 0
M 367 97 381 110 0
3 381 97 399 110 0
z 28 41 51 54 0
e 52 33 79 51 0
? 84 37 223 70 0
H 286 29 339 74 0
F 339 29 351 74 0
```

but there was issue with pytesseract library so i searched and found i have to put this line and download pytessearact-ocr-exe and excute this file which will generate a folder contains scripts (the path of this folder is in line)

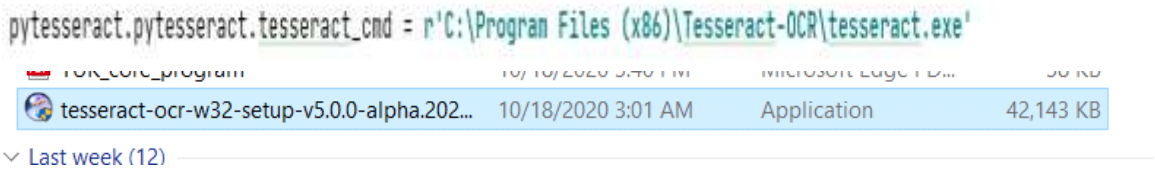


fig: the line & the file

then i wirte code to dectect the line with start with character i want to highlight like "1" in case customer choose M1 then i took the (x,y,z,h) from the line and put in function add green rectange around it ,this code is generic for any Schematic

```
# draw the bounding boxes on the image
for b in boxes.splitlines ():
    b = b.split (' ')
    if b[0]=="1":
        img = cv2.rectangle (img, (int (b[1]), h - int (b[2])), (int (b[3]), h - int (b[4])), (0, 255, 0), 2)
```

but i put more simply direct code .

```
if text == "M1":
    img = cv2.rectangle (filtered_image, (214,  155), (250, 175),
                         (0, 255, 0), 2)
    img = cv2.rectangle (filtered_image, (175, 155), (214, 175),
                         (0, 255, 0), 2)


elif text =="M2" :

    img = cv2.rectangle (filtered_image, (25, 245), (66, 265),
                         (0, 255, 0), 2)
    img = cv2.rectangle (filtered_image, (360, 245), (400, 265),
                         (0, 255, 0), 2)


elif text =="M3":
    img = cv2.rectangle (filtered_image, (25, 187), (66, 207),
                         (0, 255, 0), 2)
    img = cv2.rectangle (filtered_image, (360, 187), (400, 207),
                         (0, 255, 0), 2)
```

then i took the filtered imag in rgb format like [(255,0,0) , (0,255,0) ,,,,,] and converted in format to be able to sent to label.pixmap to be inserted instead the original image on the same location (label)

```
rgb_array= cv2.cvtColor(img , cv2.COLOR_BGR2RGB)
h, w, ch = rgb_array.shape
bytesPerLine = ch * w
qImg = QImage (rgb_array.data, w, h, bytesPerLine, QImage.Format_RGB888)
#print(qImg)
self.label2.clear()
self.label2.setPixmap (QPixmap.fromImage(qImg))
self.label2.setGeometry (130, 30, 500, 700)
```

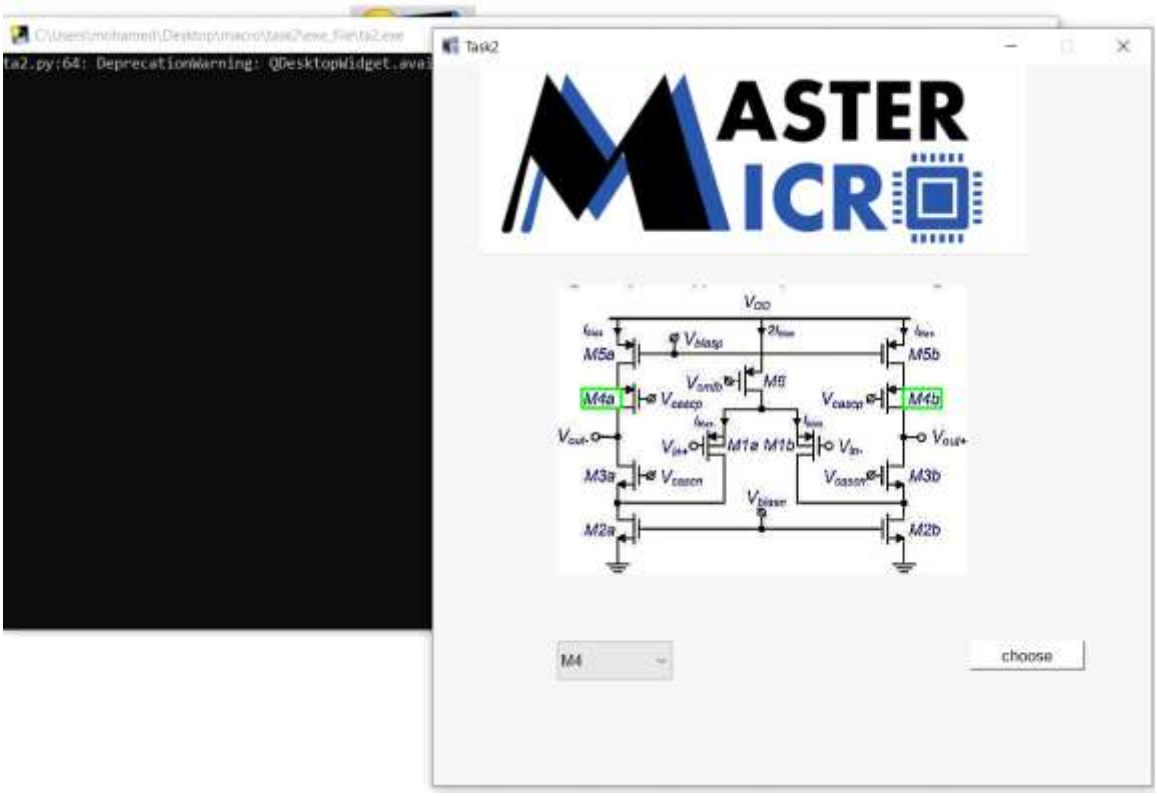
last thing i execute the gui to run and add sleep function so when the user try to run the Gui it will not open immediately.

```
import sys
import time
```

fig : libraries used to show the gui

```
app = QApplication(sys.argv)
w = MyWindow()
w.show()
time.sleep(5)
w.resize(700,700)
sys.exit(app.exec_())
```

then i extra converted the py file to exe file and there is no issue this time pyinstaller supports all the used libraries . but you must insert the "schem"& "micro" in same folder or path to be showed in the exe file



best regards ,

mohamed osama