Face Detection Algorithm

Libraries are loaded

In [1]:
```
import cv2
import numpy as np
import matplotlib.pyplot as plt
```

User inputs the name of the file

In [2]:
```
fileName = input("Please enter the name of the file with the extension: ")
```

```
Please enter the name of the file with the extension: image1.jpg
```

Image is loaded

In [3]:
```
img = cv2.imread(fileName)
```

Image is preprocessed

In [4]:
```
# Convert image to grayscale
gray = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)

# Apply noise reduction and contrast stretching
gray = cv2.GaussianBlur(gray, (5,5), 0)
clahe = cv2.createCLAHE(clipLimit=2.0, tileGridSize=(8,8))
gray = clahe.apply(gray)
```

Haar Cascade Classifier is loaded

In [5]:
```
face_cascade = cv2.CascadeClassifier('haarcascade_frontalface_default.xml')
```

Detection of faces begins

In [6]:
```
faces = face_cascade.detectMultiScale(gray, scaleFactor=1.3, minNeighbors=5)
```

If faces are detected, rectangles are drawn around them

In [7]:
```
if len(faces) > 0:
    for (x,y,w,h) in faces:
        cv2.rectangle(img, (x,y), (x+w,y+h), (0,0,255), 10)

    # Display image with detected faces and number of faces detected
    plt.imshow(cv2.cvtColor(img, cv2.COLOR_BGR2RGB))
    plt.title(str(len(faces)) + ' face(s) detected')
    plt.show()

# If no faces are detected, display a message
else:
    print("No faces detected in the image.")
```