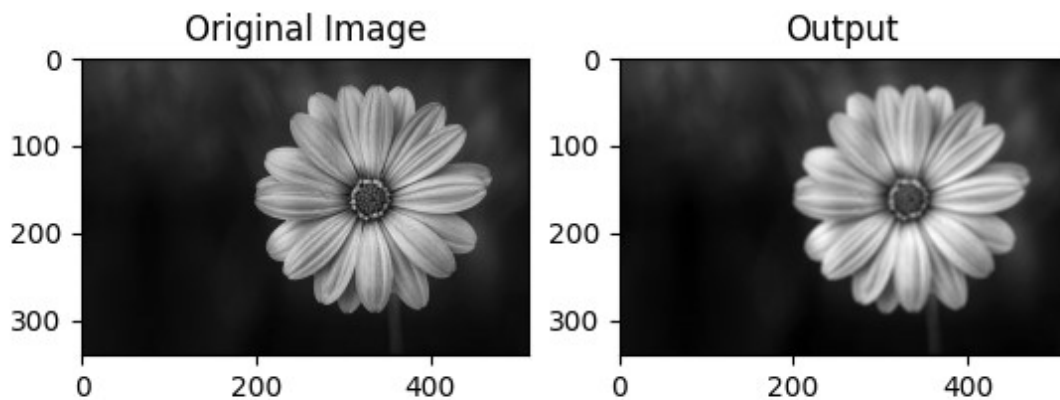EXPT 4 a

```python
#Spatial domain processing
import cv2
import numpy as np
import matplotlib.pylab as plt
abc=cv2.imread("E:/IPMV images/flower-729512__340.jpg",0)
plt.subplot(1,2,1)
plt.title('Original Image')
plt.imshow(abc,cmap='gray')

#low pass filter
lpf=np.ones((5,5))/25
abc2=cv2.filter2D(abc,-1,lpf)
plt.subplot(1,2,2)
plt.title('Output')
plt.imshow(abc2,cmap='gray')
plt.show()
```
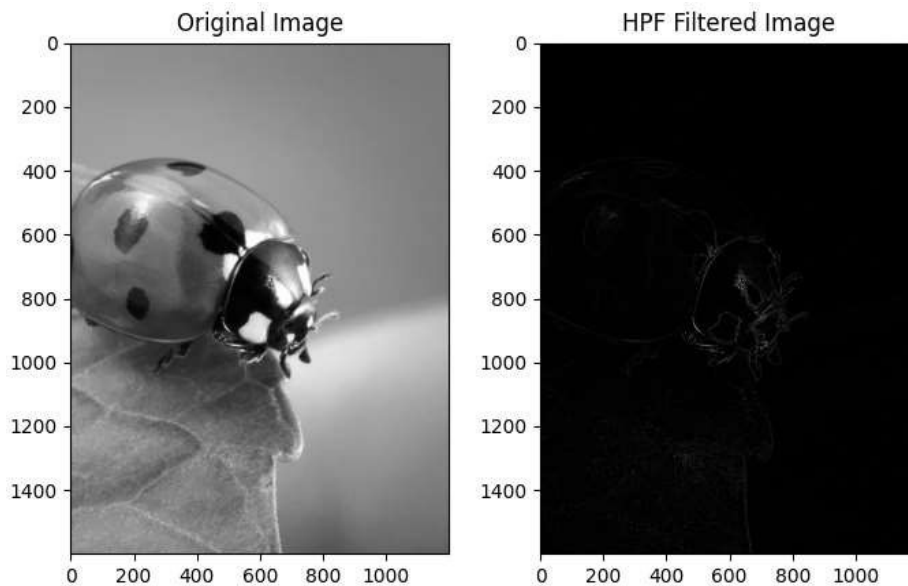
Expt 4 b

```python
#EXPT 4B
import cv2 as cv
import numpy as np
import matplotlib.pylab as plt

#Reading image as grayscale
img=cv.imread("E:\IPMV images\insect.webp",0)
plt.subplot(1,2,1)
plt.title('Original Image')
plt.imshow(img,cmap='gray')

#Creating HPF
hpf=np.array([[-1,-1,-1],[-1,8,-1],[-1,-1,-1]])

#Applying filter to input image
pqr =cv.filter2D(img,-1,hpf)
plt.subplot(1,2,2)
plt.title('HPF Filtered Image')
plt.imshow(pqr,cmap='gray')
plt.show()
```

Output:

Expt 4 c

```python
#EXPT 4C
import cv2 as cv
import numpy as np
import matplotlib.pylab as plt

#Reading image as grayscale
img=cv.imread("E:\IPMV images\insect.webp",0)
plt.subplot(1,2,1)
plt.title('Original Image')
plt.imshow(img,cmap='gray')

#Creating HBF
hbf=np.array([[-1,-1,-1],[-1,9.1,-1],[-1,-1,-1]])

#Applying filter to input image
pqr =cv.filter2D(img,-1,hbf)
plt.subplot(1,2,2)
plt.title('HBF Filtered Image')
plt.imshow(pqr,cmap='gray')
plt.show()
```
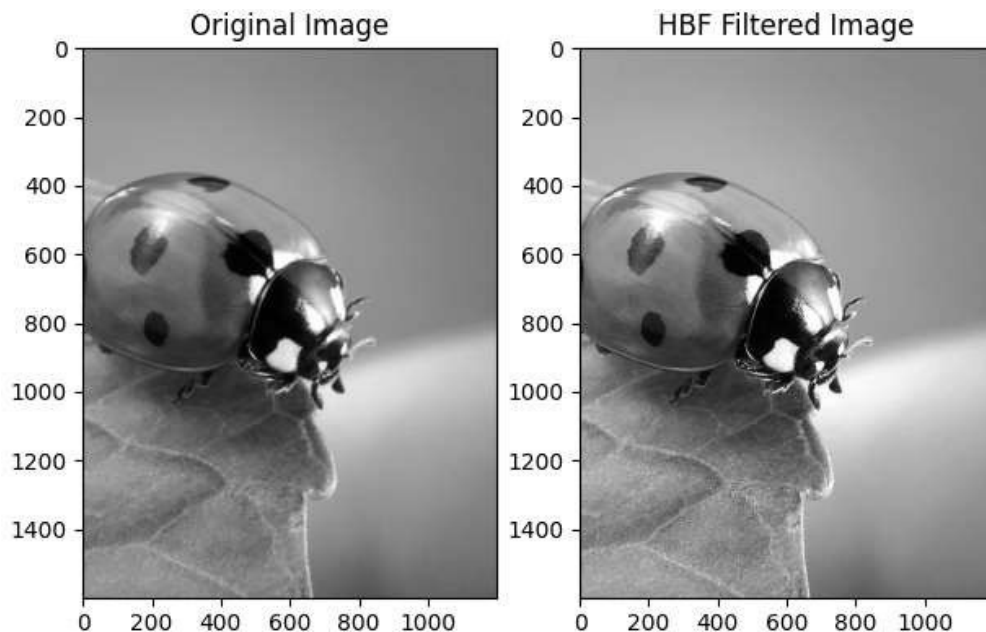
Output:

Expt 4 d

```python
#EXPT 4D
import cv2 as cv
import numpy as np
import matplotlib.pylab as plt

#Reading image as grayscale
img=cv.imread("E:/IPMV images/blobs.png",0)
plt.subplot(1,2,1)
plt.title('Original Image')
plt.imshow(img,cmap='gray')

#Creating Horizontal Edge Detection Filter
hedf=np.array([[-1,-1,-1],[2,2,2],[-1,-1,-1]])

#Applying filter to input image
pqr =cv.filter2D(img,-1,hedf)
plt.subplot(1,2,2)
plt.title('HEDF Filtered Image')
plt.imshow(pqr,cmap='gray')
plt.show()
```
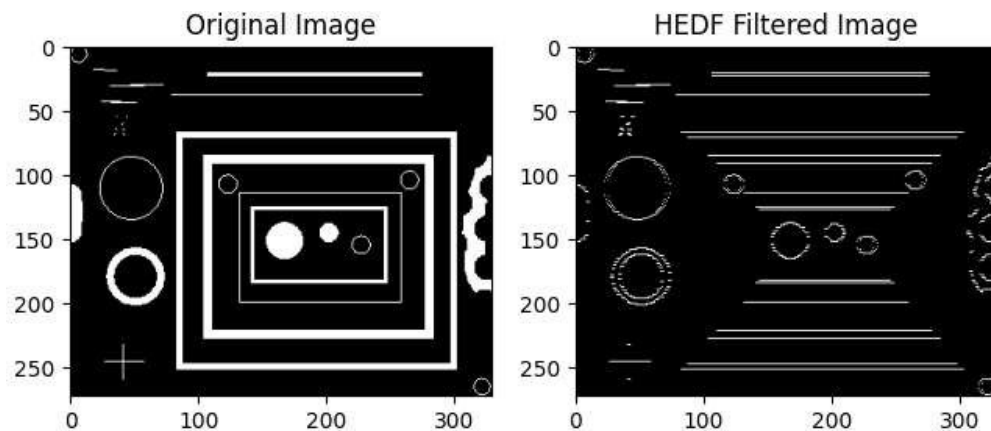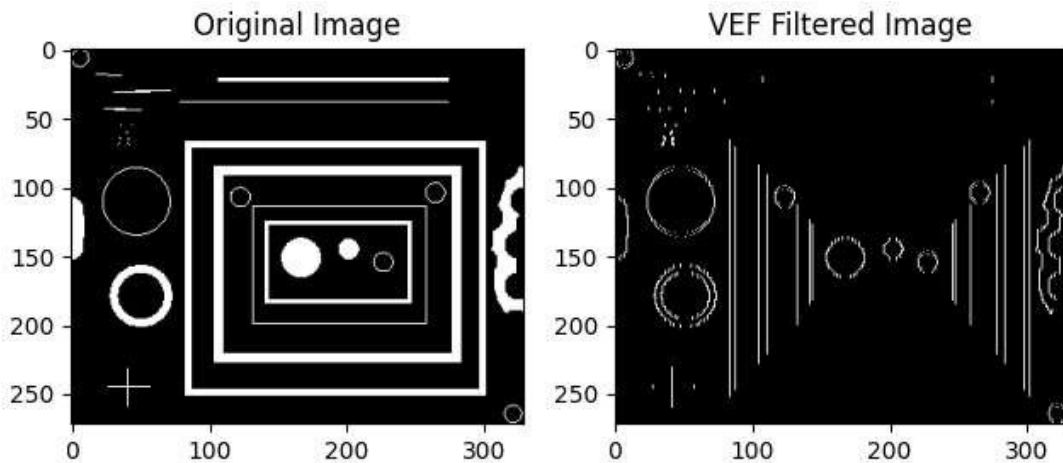
Output

Expt 4 e

```
#EXPT 4E
import cv2 as cv
import numpy as np
import matplotlib.pylab as plt

#Reading image as grayscale
img=cv.imread("E:/IPMV images/blobs.png",0)
plt.subplot(1,2,1)
plt.title('Original Image')
plt.imshow(img,cmap='gray')

#Creating Vertical Edge Detection Filter
vef=np.array([[-1,2,-1],[-1,2,-1],[-1,2,-1]])

#Applying filter to input image
pqr =cv.filter2D(img,-1,vef)
plt.subplot(1,2,2)
plt.title('VEF Filtered Image')
plt.imshow(pqr,cmap='gray')
plt.show()
```

Output:

Expt 4 f

```
#EXPT 4F
import cv2 as cv
import numpy as np
import matplotlib.pylab as plt

#Reading image as grayscale
img=cv.imread("E:/IPMV images/blobs.png",0)
plt.subplot(1,2,1)
plt.title('Original Image')
plt.imshow(img,cmap='gray')

#Creating Diagonal Edge Detection
dief=np.array([[2,-1,-1],[-1,2,-1],[-1,-1,2]])

#Applying filter to input image
pqr =cv.filter2D(img,-1,dief)
plt.subplot(1,2,2)
plt.title('DIEF Filtered Image')
plt.imshow(pqr,cmap='gray')
plt.show()
```

Output: