TD4 Introduction a l'image ZHOU-NAN

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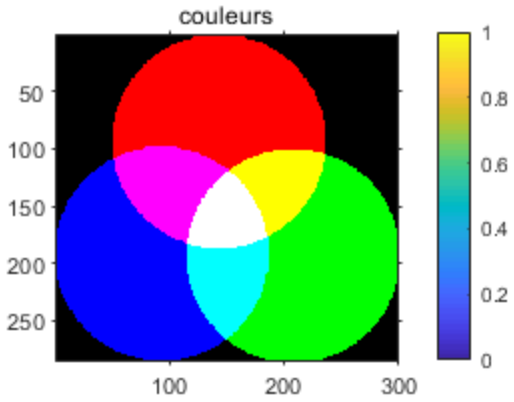
1ire partie: La couleur en imagerie numerique

Question 1:

```
clear; close all; clc

I0=double(imread('ImagesTD4/couleurs.png'))/255;
figure; imshow(I0);title('couleurs');colorbar;axis on
whos I0
```

```
  Name        Size                 Bytes  Class     Attributes

  I0        285x300x3            2052000  double
```



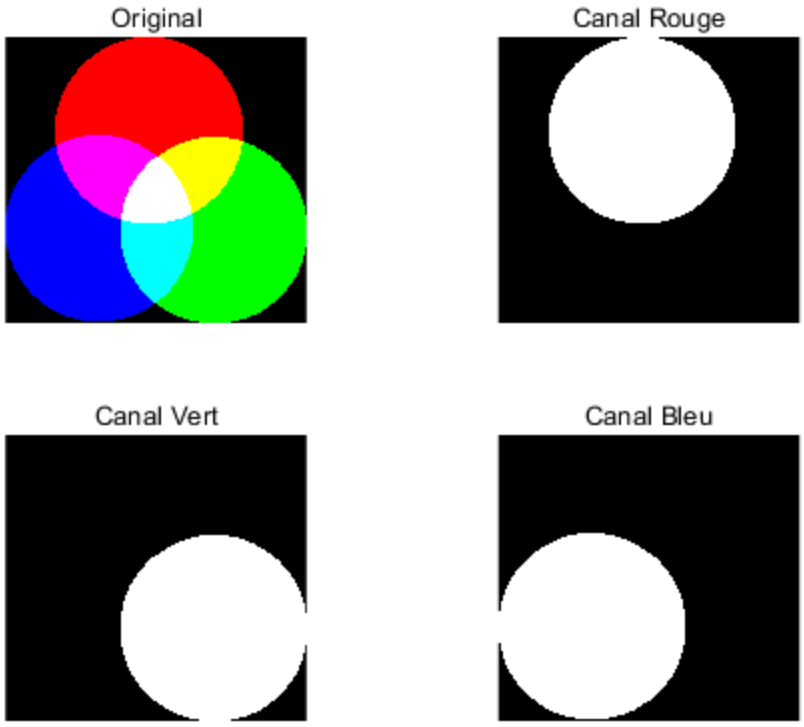
La difference de format Matlab entre une image niveau de gris et une image couleur ...

```
I0(30,120,:)
% I(:,:,1) correspond a ...
```

```
ans(:,:,1) =

     1


ans(:,:,2) =

     0


ans(:,:,3) =

     0
```

Question 2:

```
figure;
subplot(2,2,1);imshow(I0);title('Original')
subplot(2,2,2);imshow(I0(:,:,1));title('Canal Rouge')
subplot(2,2,3);imshow(I0(:,:,2));title('Canal Vert')
subplot(2,2,4);imshow(I0(:,:,3));title('Canal Bleu')
```



Interpretation : ...

Question 3:

```
I1=double(imread('ImagesTD4/TSE1.png'))/255;
figure;
subplot(2,2,1); imshow(I1);title('Atrium')
I1R(:,:,1)=I1(:,:,1);
I1R(:,:,2)=0;
I1R(:,:,3)=0;
subplot(222); imshow(I1R);title('Atrium_R')
I1G(:,:,2)=I1(:,:,2);
I1G(:,:,1)=0;
I1G(:,:,3)=0;
subplot(2,2,3);imshow(I1G);title('Atrium_G')
I1B(:,:,3)=I1(:,:,3);
I1B(:,:,1)=0;
I1B(:,:,2)=0;
subplot(2,2,4);imshow(I1B);title('Atrium_B')
```

Si chaque couleur est codee sous 8 bits (format uint8) combien de couleurs peuvent etre codees?
256*256*256

Question 4

```
[Iq,map]=rgb2ind(I1,5,'nodither');
figure
subplot(1,2,1);imshow(Iq,[]);colorbar
subplot(1,2,2);imshow(Iq,map);colorbar
```

Question 5

```
[Id,map1]=rgb2ind(I1,5,'dither');
figure
imshow(Id,map1);colorbar
```

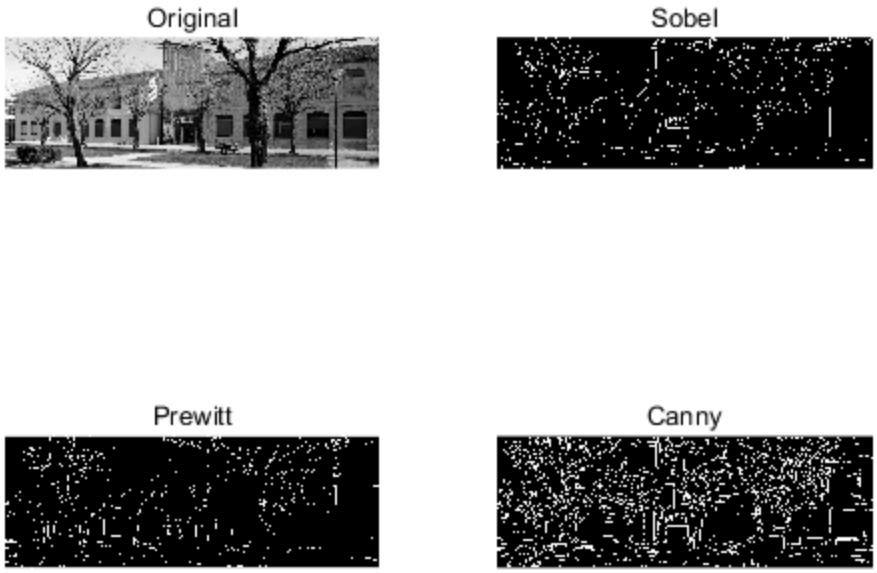
Question 6

```
I2=double(imread('ImagesTD4/TSE2.jpg'))/255;
I2a=I2(:,:,1)/3+I2(:,:,2)/3+I2(:,:,3)/3;
figure
imshow(I2a,[]);
```

Question 7

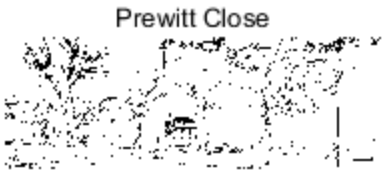
```
BW1=edge(I2a,'sobel');
BW2=edge(I2a,'prewitt');
```

```
BW3=edge(I2a,'canny');
figure
subplot(2,2,1);imshow(I2a);title('Original');
subplot(2,2,2);imshow(BW1);title('Sobel');
subplot(2,2,3);imshow(BW2);title('Prewitt');
subplot(2,2,4);imshow(BW3);title('Canny');
```



Question 8

```
sel1=strel('line',10,45);
BW1_c=imclose(BW1,sel1);
BW2_c=imclose(BW2,sel1);
BW3_c=imclose(BW3,sel1);
figure
subplot(2,2,1);imshow(-BW1_c,[]);title('Sobel Close');
subplot(2,2,2);imshow(-BW2_c,[]);title('Prewitt Close');
subplot(2,2,3);imshow(-BW3_c,[]);title('Canny Close');
```



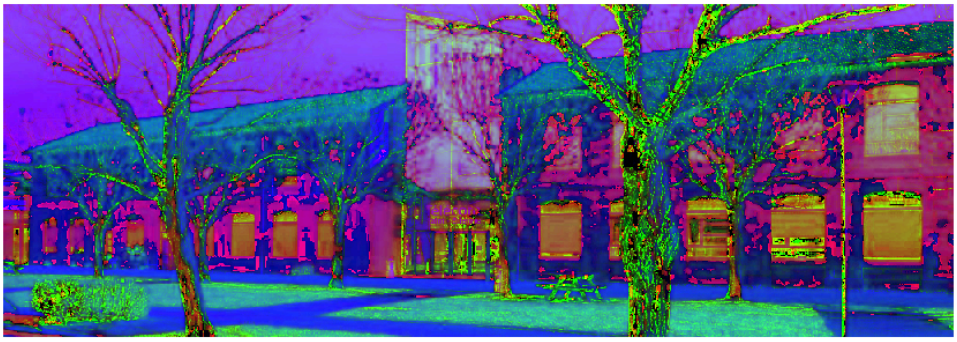
Question 9

Question 10

```
I2R=I2(:,:,1);
I2G=I2(:,:,2);
I2B=I2(:,:,3);
BWR=edge(I2R,'canny');
BWG=edge(I2G,'canny');
BWB=edge(I2B,'canny');
BW=im2uint8(cat(3,BWR,BWG,BWB));
figure
imshow(BW);
```

Question 12

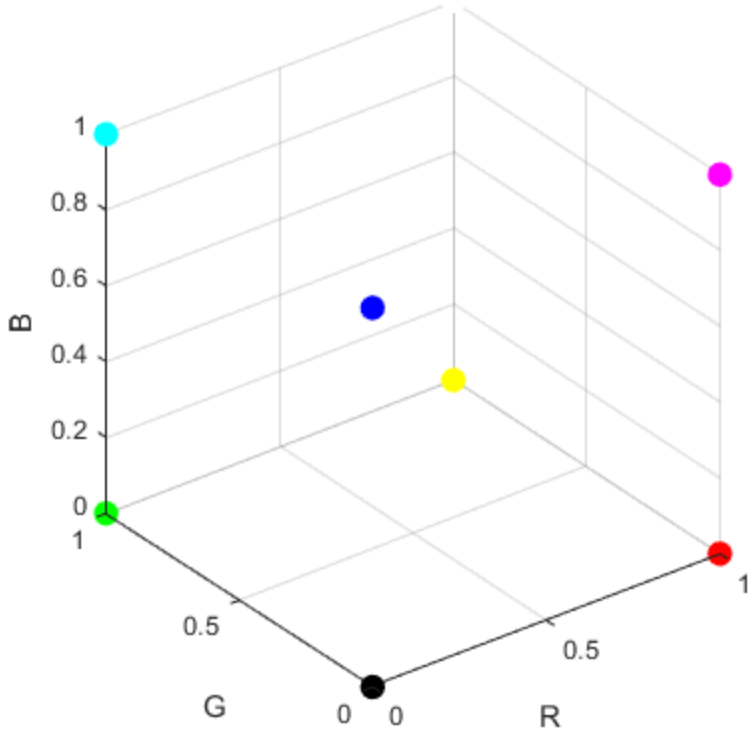
```
I2_hsv=rgb2hsv(I2);
figure
imshow(I2_hsv);
```

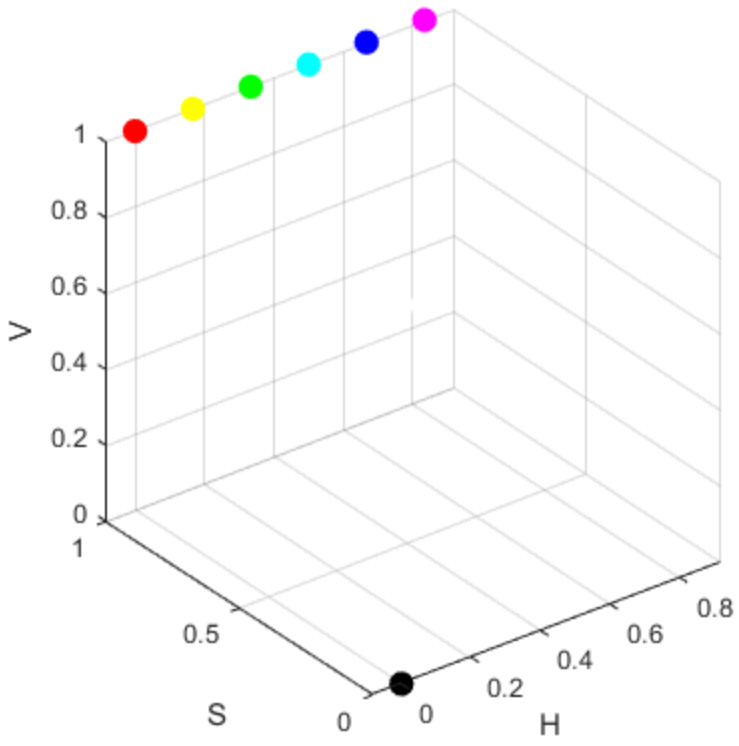


Question 13

```
R = I0(1:8:end,1:8:end,1); % on prend 1 pixel sur 8 pour aller plus
 vite
G = I0(1:8:end,1:8:end,2); % on prend 1 pixel sur 8 pour aller plus
 vite
B = I0(1:8:end,1:8:end,3); % on prend 1 pixel sur 8 pour aller plus
 vite
figure;
scatter3(R(:),G(:),B(:),1000,[R(:),G(:),B(:)],'Marker','.');
xlabel('R'); ylabel('G'); zlabel('B');
axis vis3d;

I_hsv=rgb2hsv(I0); % conversion en HSV
H = I_hsv(1:8:end,1:8:end,1); % extraction du canal L
S = I_hsv(1:8:end,1:8:end,2); % extraction du canal a
```

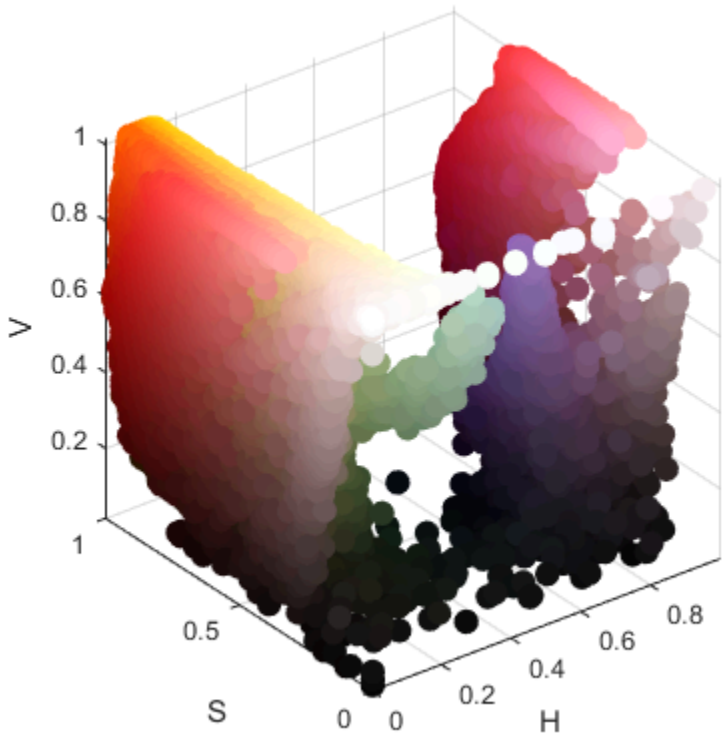
```
V = I_hsv(1:8:end,1:8:end,3); % extraction du canal b
figure;
scatter3(H(:),S(:),V(:),1000,[R(:),G(:),B(:)],'Marker','.');
xlabel('H'); ylabel('S'); zlabel('V');
axis vis3d;
```





Question 14

```
I3=double(imread('ImagesTD4/peppers.png'))/255;
figure
imshow(I3,[]);
R3 = I3(1:end,1:end,1);
G3 = I3(1:end,1:end,2);
B3 = I3(1:end,1:end,3);
I3_hsv=rgb2hsv(I3); % conversion en HSV
H3 = I3_hsv(1:end,1:end,1);
S3 = I3_hsv(1:end,1:end,2);
V3 = I3_hsv(1:end,1:end,3);
figure;
scatter3(H3(:),S3(:),V3(:),1000,[R3(:),G3(:),B3(:)],'Marker','.');
xlabel('H'); ylabel('S'); zlabel('V');
axis vis3d;
```




```
I3s=(H3>0.5)&(S3<0.5);
```

```
figure
imshow(I3s,[])
```

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