

# Prednaska 9

## Radkove vyplnovani

Příklad ze slidy 3

```
clc

%img = zeros(7,10);
%body = [6,3; 4,1; 1,4; 3,4; 3,7; 1,9; 6,9;6,3];

img = zeros(70,100);
body = [60,30; 40,10; 10,40; 30,40; 30,70; 10,90; 60,90;60,30];
pocet_bodu = size(body,1)-1;

% smernice jednotlivych usecek
% (y2 - y1) / (x2-x1)
smernice = zeros(1,pocet_bodu);
for i = 1: pocet_bodu
    smernice(i) = (body(i+1,2)-body(i,2))/(body(i+1,1)-body(i,1));
end

% Hrany, ktere se pocitaji
hrany = [];
for i = 1: pocet_bodu
    if(smernice(i) < Inf && smernice(i) > -Inf)
        hrany = [hrany; body(i,:), body(i+1,:)];
    end
end

pocet_hran = size(hrany,1);
display(hrany);
```

```
hrany = 5x4
    60    30    40    10
    40    10    10    40
    10    40    30    40
    30    70    10    90
    10    90    60    90
```

%zde by melo dojít ke zkrácení všech usecek

```
% nalezení všech hranic na y
for j = min(body(:,1)) : max(body(:,1))
    pruseciky_x = [];
    for i = 1 : pocet_hran
        t = (j - hrany(i,1))/(hrany(i,3)-hrany(i,1));

        if (t>=0 && t <=1) %kontrola zda lezi na usecce
            x = hrany(i,2) + t*(hrany(i,4)-hrany(i,2));
            pruseciky_x = [pruseciky_x, x];
        end
    end
end
```

```

    %display(j);
    display(pruseciky_x);
    pruseciky_x = sort(pruseciky_x);
    for k = size(pruseciky_x,2) : -2 : 2
    %for k = 1 : 2 : size(pruseciky_x,2)
        for l = round(pruseciky_x(k - 1)) : round(pruseciky_x(k))
            img(j,l) = 1;
        end
    end
end
end
end

```

```

pruseciky_x = 1x4
    40    40    90    90
pruseciky_x = 1x4
    39    40    89    90
pruseciky_x = 1x4
    38    40    88    90
pruseciky_x = 1x4
    37    40    87    90
pruseciky_x = 1x4
    36    40    86    90
pruseciky_x = 1x4
    35    40    85    90
pruseciky_x = 1x4
    34    40    84    90
pruseciky_x = 1x4
    33    40    83    90
pruseciky_x = 1x4
    32    40    82    90
pruseciky_x = 1x4
    31    40    81    90
pruseciky_x = 1x4
    30    40    80    90
pruseciky_x = 1x4
    29    40    79    90
pruseciky_x = 1x4
    28    40    78    90
pruseciky_x = 1x4
    27    40    77    90
pruseciky_x = 1x4
    26    40    76    90
pruseciky_x = 1x4
    25    40    75    90
pruseciky_x = 1x4
    24    40    74    90
pruseciky_x = 1x4
    23    40    73    90
pruseciky_x = 1x4
    22    40    72    90
pruseciky_x = 1x4
    21    40    71    90
pruseciky_x = 1x4
    20    40    70    90
pruseciky_x = 1x2
    19    90
pruseciky_x = 1x2
    18    90
pruseciky_x = 1x2
    17    90
pruseciky_x = 1x2
    16    90
pruseciky_x = 1x2

```

```

15    90
pruseciky_x = 1x2
14    90
pruseciky_x = 1x2
13    90
pruseciky_x = 1x2
12    90
pruseciky_x = 1x2
11    90
pruseciky_x = 1x3
10    10    90
pruseciky_x = 1x2
11    90
pruseciky_x = 1x2
12    90
pruseciky_x = 1x2
13    90
pruseciky_x = 1x2
14    90
pruseciky_x = 1x2
15    90
pruseciky_x = 1x2
16    90
pruseciky_x = 1x2
17    90
pruseciky_x = 1x2
18    90
pruseciky_x = 1x2
19    90
pruseciky_x = 1x2
20    90
pruseciky_x = 1x2
21    90
pruseciky_x = 1x2
22    90
pruseciky_x = 1x2
23    90
pruseciky_x = 1x2
24    90
pruseciky_x = 1x2
25    90
pruseciky_x = 1x2
26    90
pruseciky_x = 1x2
27    90
pruseciky_x = 1x2
28    90
pruseciky_x = 1x2
29    90
pruseciky_x = 1x2
30    90

```

```

imshow(img);

```



## Vyplneni oblasti obrazkem

```
vzor = rgb2gray(imread("pattern_small.png"));
[mv, nv] = size(vzor);

img = uint8(zeros(300,300));
body = [50,30; 280,21; 200,290; 60,190];

pocet_bodu = size(body,1)-1;

smernice = zeros(1,pocet_bodu);
for i = 1: pocet_bodu
    smernice(i) = (body(i+1,2)-body(i,2))/(body(i+1,1)-body(i,1));
end

hrany = [];
for i = 1: pocet_bodu
    if(smernice(i) < Inf && smernice(i) > -Inf)
        hrany = [hrany; body(i,:), body(i+1,:)];
    end
end

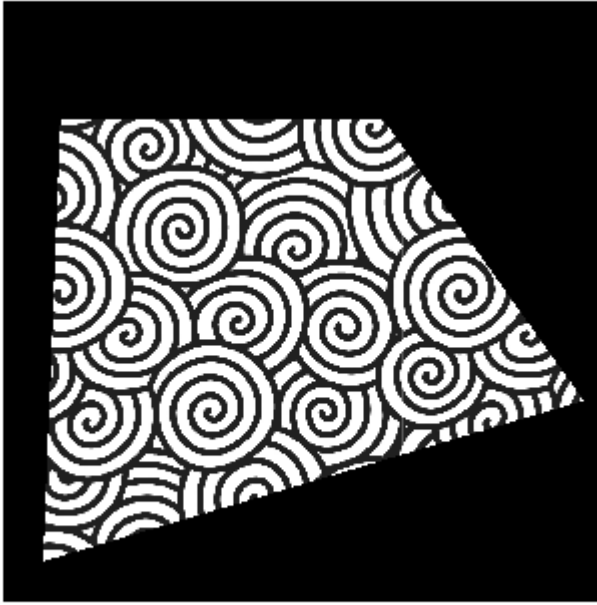
pocet_hran = size(hrany,1);

for j = min(body(:,1)) : max(body(:,1))
    pruseciky_x = [];
    for i = 1 : pocet_hran
        t = (j - hrany(i,1))/(hrany(i,3)-hrany(i,1));

        if (t>=0 && t <=1)
            x = hrany(i,2) + t*(hrany(i,4)-hrany(i,2));
            pruseciky_x = [pruseciky_x, x];
        end
    end

    pruseciky_x = sort(pruseciky_x);
    for k = 1 : 2 : size(pruseciky_x,2)-1
        for l = round(pruseciky_x(k)) : round(pruseciky_x(k+1))
            img(j,l) = vzor(mod(j,mv)+1,mod(l,nv)+1);
        end
    end
end
```

```
figure, imshow(img);
```



## Srafovani

```
img = zeros(70,100);
body = [60,30; 20,50; 20,90; 60,90];
%body = [60,30; 40,10; 10,40; 30,40; 30,70; 10,90; 60,90;60,30];
pocet_bodu = size(body,1)-1;

% smernice jednotlivych usecek
% (y2 - y1) / (x2-x1)
smernice = zeros(1,pocet_bodu);
for i = 1: pocet_bodu
    smernice(i) = (body(i+1,2)-body(i,2))/(body(i+1,1)-body(i,1));
end

% Hrany, ktere se pocitaji
hrany = [];
for i = 1: pocet_bodu
    if(smernice(i) < Inf && smernice(i) > -Inf)
        hrany = [hrany; body(i,:), body(i+1,:)];
    end
end

pocet_hran = size(hrany,1);
display(hrany);
```

```
hrany = 2x4
    60    30    20    50
    20    90    60    90
```

```
%zde by melo dojít ke zkrácení všech úseček
```

```
% nalezení všech hranic na y
```

```
for j = min(body(:,1)) : 3 : max(body(:,1))
    pruseciky_x = [];
    for i = 1 : pocet_hran
        t = (j - hrany(i,1))/(hrany(i,3)-hrany(i,1));

        if (t>=0 && t <=1) %kontrola zda lezi na úsečce
            x = hrany(i,2) + t*(hrany(i,4)-hrany(i,2));
            pruseciky_x = [pruseciky_x, x];
        end
    end
    %display(j);
    display(pruseciky_x);
    pruseciky_x = sort(pruseciky_x);
    for k = size(pruseciky_x,2) : -2 : 2
        %for k = 1 : 2 : size(pruseciky_x,2)
            for l = round(pruseciky_x(k - 1)) : round(pruseciky_x(k))
                img(j,l) = 1;
            end
        end
    end
end
end
```

```
pruseciky_x = 1x2
    50    90
pruseciky_x = 1x2
    48.5000    90.0000
pruseciky_x = 1x2
    47    90
pruseciky_x = 1x2
    45.5000    90.0000
pruseciky_x = 1x2
    44    90
pruseciky_x = 1x2
    42.5000    90.0000
pruseciky_x = 1x2
    41    90
pruseciky_x = 1x2
    39.5000    90.0000
pruseciky_x = 1x2
    38    90
pruseciky_x = 1x2
    36.5000    90.0000
pruseciky_x = 1x2
    35    90
pruseciky_x = 1x2
    33.5000    90.0000
pruseciky_x = 1x2
    32    90
pruseciky_x = 1x2
    30.5000    90.0000
```

```
imshow(img);
```



## Srafovani 2

```
img = zeros(70,100);
body = [60,30; 20,50; 20,90; 60,90];
%body = [60,30; 40,10; 10,40; 30,40; 30,70; 10,90; 60,90;60,30];

pocet_bodu = size(body,1)-1;

smernice = zeros(1,pocet_bodu);
for i = 1: pocet_bodu
    smernice(i) = (body(i+1,2)-body(i,2))/(body(i+1,1)-body(i,1));
end

hrany = [];
for i = 1: pocet_bodu
    if(smernice(i) < Inf && smernice(i) > -Inf)
        hrany = [hrany; body(i,:), body(i+1,:)];
    end
end

pocet_hran = size(hrany,1);

delka_useku = 5;

for j = min(body(:,1)) : max(body(:,1))
    pruseciky_x = [];
    for i = 1 : pocet_hran
        t = (j - hrany(i,1))/(hrany(i,3)-hrany(i,1));

        if (t>=0 && t <=1)
            x = hrany(i,2) + t*(hrany(i,4)-hrany(i,2));
            pruseciky_x = [pruseciky_x, x];
        end
    end

    pruseciky_x = sort(pruseciky_x);
    for k = 1 : 2 : size(pruseciky_x,2)-1
        plny = 1;
        aktualni_delka = delka_useku;
        for l = round(pruseciky_x(k)) : round(pruseciky_x(k+1))
            if(plny==1)
```

```

        img(j,1) = 1;
    end
    aktualni_delka = aktualni_delka -1;
    if(aktualni_delka ==0)
        if(plny == 1)
            plny = 0;
        else
            plny = 1;
        end
    end
    aktualni_delka = delka_useku;
end
end
end
end
imshow(img);

```



### Srafovani 3

```

m = 70;
n=100;
img = zeros(m,n);
body = [60,30; 20,50; 20,90; 60,90];
%body = [60,30; 40,10; 10,40; 30,40; 30,70; 10,90; 60,90;60,30];

% srafy vztazene k x = 1
x = 1;
% x = min(body(:,2));

delka_useku = 5;
aktualni_delka = delka_useku;
plny = 1;
srafy = zeros(1,n);
for i = x : n
    if(plny == 1)
        srafy(i) = 1;
    end
    aktualni_delka = aktualni_delka -1;
    if(aktualni_delka ==0)
        if(plny == 1)
            plny = 0;
        else
            plny = 1;
        end
    end
end

```



```

        end
        aktualni_delka = delka_useku;
    end
end

pocet_bodu = size(body,1)-1;

smernice = zeros(1,pocet_bodu);
for i = 1: pocet_bodu
    smernice(i) = (body(i+1,2)-body(i,2))/(body(i+1,1)-body(i,1));
end

hrany = [];
for i = 1: pocet_bodu
    if(smernice(i) < Inf && smernice(i) > -Inf)
        hrany = [hrany; body(i,:), body(i+1,:)];
    end
end

pocet_hran = size(hrany,1);

for j = min(body(:,1)) : max(body(:,1))
    pruseciky_x = [];
    for i = 1 : pocet_hran
        t = (j - hrany(i,1))/(hrany(i,3)-hrany(i,1));

        if (t>=0 && t <=1)
            x = hrany(i,2) + t*(hrany(i,4)-hrany(i,2));
            pruseciky_x = [pruseciky_x, x];
        end
    end

    pruseciky_x = sort(pruseciky_x);
    for k = 1 : 2 : size(pruseciky_x,2)-1
        plny = 1;
        aktualni_delka = delka_useku;
        for l = round(pruseciky_x(k)) : round(pruseciky_x(k+1))
            img(j,l) = srafy(l);
        end
    end
end
figure, imshow(img);

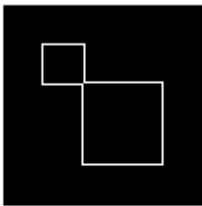
```



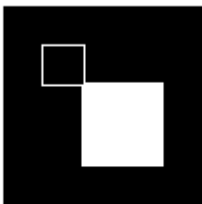
## Hranice v rastru

funkce imfill

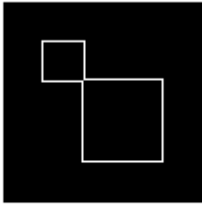
```
I = logical(imread('oblst_ukol.png'));  
imshow(I);
```



```
BW2= imfill(I,[60,60],4);  
figure, imshow(BW2);
```



```
I = logical(imread('oblst_ukol.png'));  
imshow(I);
```



```
BW2= imfill(I,[60,60],8);  
figure, imshow(BW2);
```

