PARFOR Variables Classification (Exercises)

What is the value of each variable after the loop

```
a = ones(1,10);
e=0;
f=5;
g=0;
h=10;
parfor idx = 1:10
    b=2*a;
    c=a(idx);
    d(idx) = idx;
    e = e+idx;
    f = idx;
    g = g+2;
    h = 20;
end
```

a: ones(1:10) (**broadcast**)

b: undefined (**temp**)

c: undefined (**temp**)

d: 1:10 (**sliced**)

e: 55 (**reduction**)

f: 5 (**temp**)

g: 20 (**reduction**)

h: 10 (**temp**)

idx: undefined (**loop**)

H and f are not broadcast , although they are declared before the loop ;
because they are never read inside the loop so there is no need to send them to the workers

PARFOR Variables Classification (Exercises)

What is the value of each variable after the loop

```
a=0;
c=pi;
z=0;
r = rand(1,10);
parfor i=1:10
    a=i;
    z=z+i;
    b(i)=r(i);
    if i<=c
        d=2*a;
    end
end
```

a:0(temporary)
c:pi(broadcast)
z:55(reduction)
i:undefined(loop)
r:10 randoms(sliced input)
b:same 10 randoms(sliced output)
d:undefined(temporary)

PARFOR in Action(Exercises)

Write a script to find the prime numbers in a range (a,b):

+ isPrime function takes only one argument and returns 1 or 0

+ getPrimesPar function takes a,b and returns an array of the prime numbers found in that range and uses “parfor loop”

+getPrimesSeq function takes a,b and returns an array of the prime numbers found in that range and uses “for-loop”

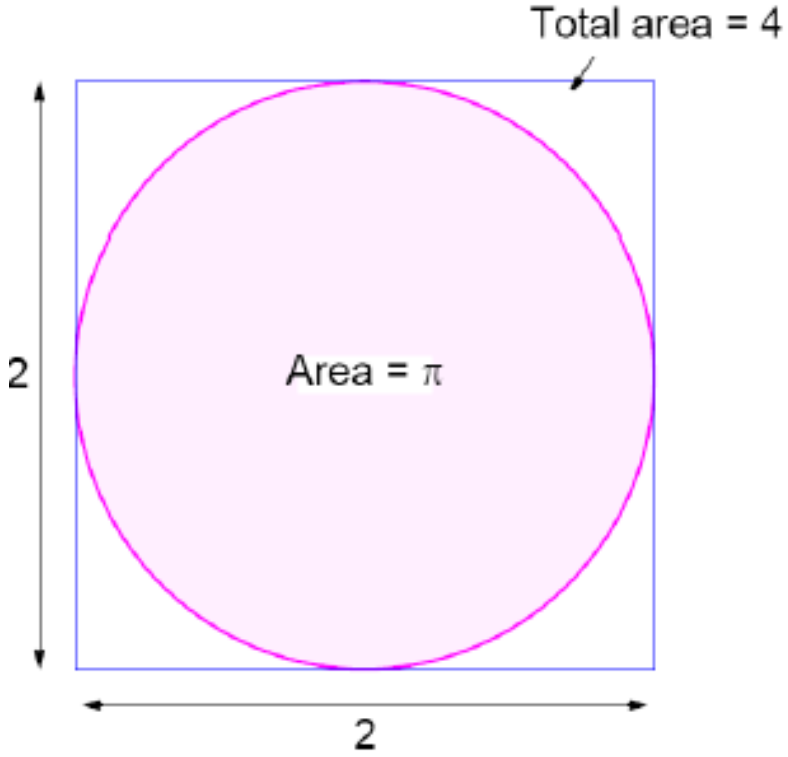
(try both For and PARFOR)

PARFOR in Action(Exercises)

Monte-Carlo Method:

Estimate the value of PI(π)

$$\frac{\text{Area of circle}}{\text{Area of square}} = \frac{\pi . r^2}{2 \times 2} = \frac{\pi}{4}$$

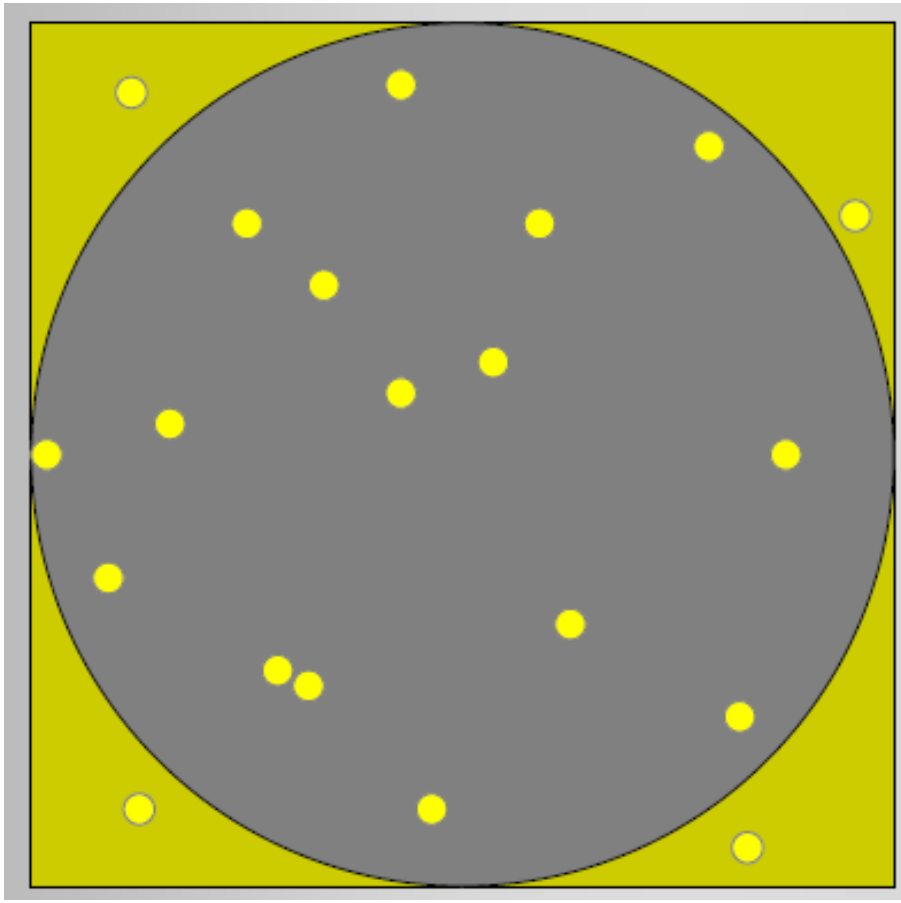


Randomly choose points

Count the points that lie in the circle

When the number of points is large enough ;

PARFOR in Action(Exercises)



$$\frac{16}{20} \approx \frac{\pi}{4} \Rightarrow \pi \approx 3.2$$

PARFOR in Action(Exercises)

Write a Matlab script to estimate the value of PI using Monte-Carlo Method

+inCircle Function: takes arguments x and y ; finds if the specified point is in the circle (distance <radius)

+FindPi Function : generates x and y, if in circle ; increment the counter

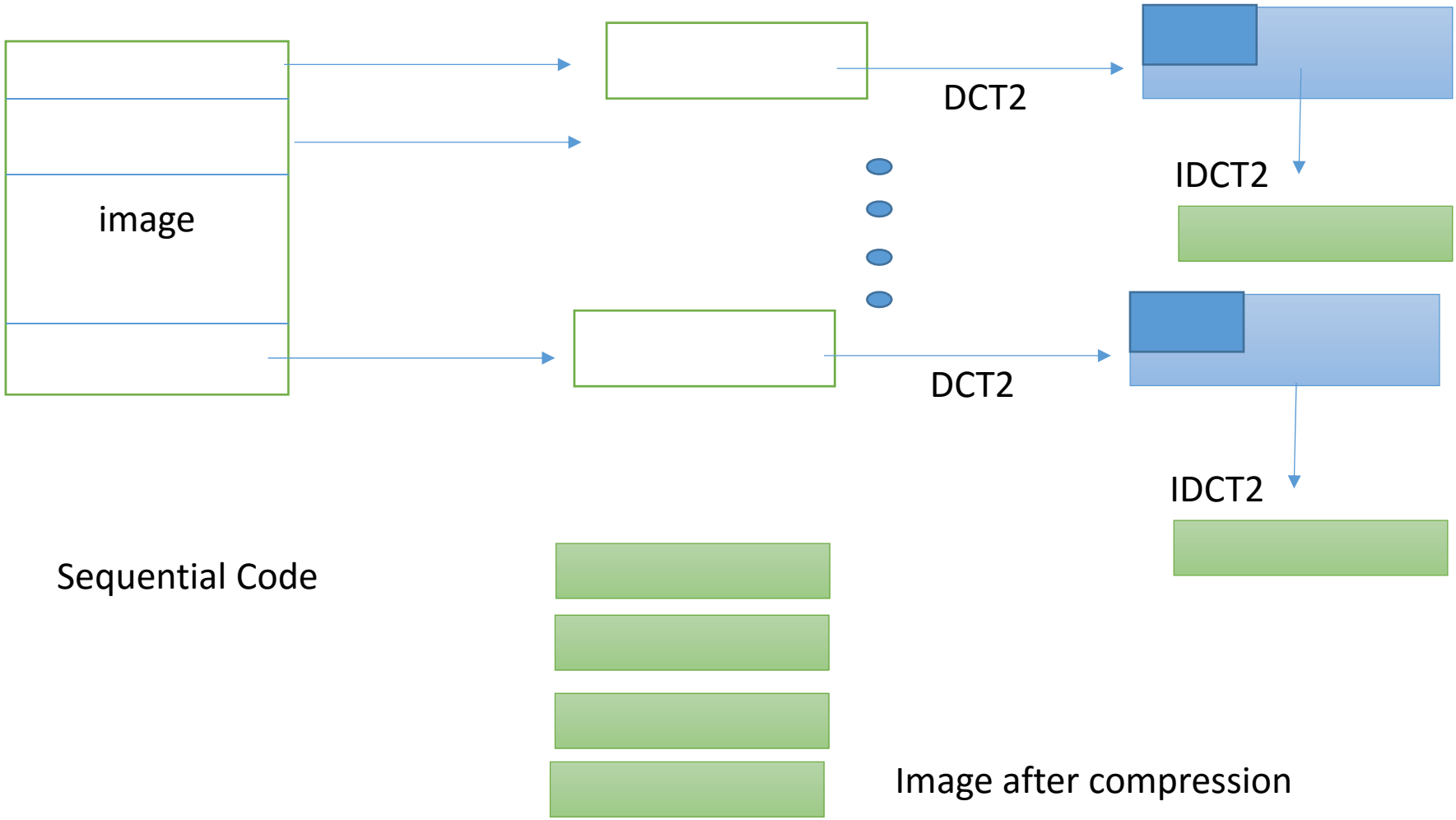
PARFOR in Action(Exercises)

Simple Image Compression Method (using DCT)

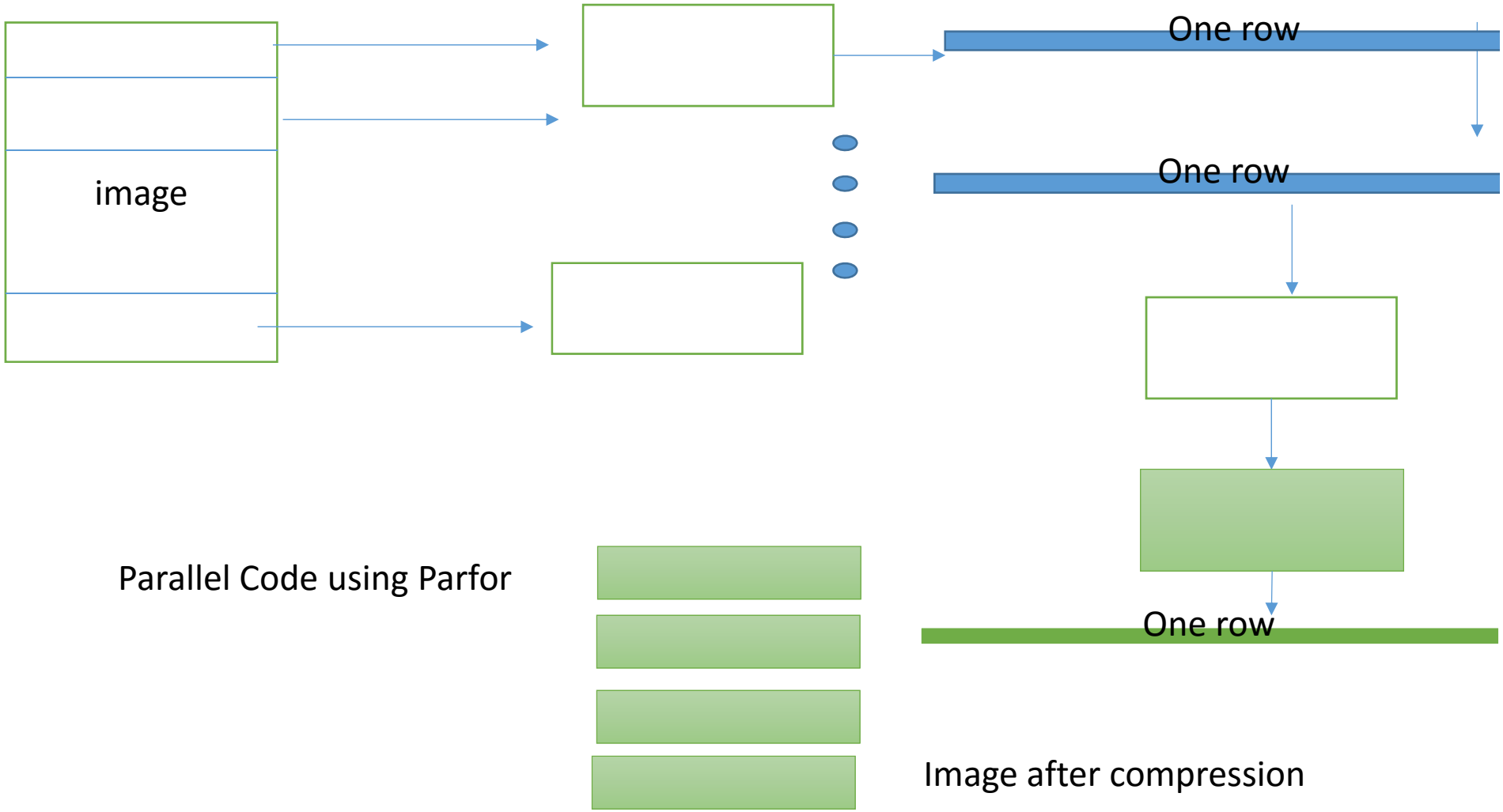
-Image energy can be compressed in a few DCT Coefficients

-if we eliminate (zero out) the high-frequency coefficients we can benefit from many compression algorithms(like RLC) while still having reasonable image quality

PARFOR in Action(Exercises)



PARFOR in Action(Exercises)



PARFOR in Action(Optional)

write a Matlab script that compresses the input image using the previous method

+read input image

+perform DCT

+ take only some high-energy coefficients

+perform IDCT

Use both for and Parfor

Which one is faster here?