% Jacob Krol

% Creation of prime spirals / Ulam Spirals

clc

% Input of max value

r=true; % r = "repeat"

while(r==true)

max=input('Enter the maximum value to test:');

max=floor(max); %round down

disp(' ')

if(max<=0)

disp('The entered value is invalid. Please try again.')

else

r=false;

disp('Calculating...')

end

disp(' ')

end

% Create the grid

side=ceil(sqrt(max)); %take the square root, round up

if(mod(side,2)==0) %if it's even, add one

side=side+1;

end

grid=zeros(side+1);

% Center the starting point

posx=ceil(side/2);

posy=posx;

direction=1;

% Fill the spiral

count=1;

while(count<max)

%add the value

p=true;

if(mod(count,2)==0 || count==1)

p=false;

else

for test = 3:2:count-1

if(mod(count,test)==0)

p=false;

break

end

end

end

grid(posy,posx)=p+1;

turn=false;

switch direction %change position correct amount & check corner

case 1

posx=posx+1;

if(grid(posy+1,posx)==0)

turn=true;

end

case 2

posy=posy+1;

if(grid(posy,posx-1)==0)

turn=true;

end

case 3

posx=posx-1;

if(grid(posy-1,posx)==0)

turn=true;

end

case 4

posy=posy-1;

if(grid(posy,posx+1)==0)

turn=true;

end

end

if(turn==true) %turn corner if needed

direction=direction+1;

end

if(direction==5) %loop direction values above 4

direction=1;

end

count=count+1; %next value

end

if(count==max)

p=true;

if(mod(count,2)==0)

p=false;

else

for test = 3:2:count-1

if(mod(count,test)==0)

p=false;

break

end

end

end

grid(posy,posx)=p+1; %add the value

end

disp('Completed')

mycolor=ones(3,3);

mycolor(3,:)=[0.2 0.2 1];

colormap(mycolor)

pcolor(grid)

shading flat