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```
function PS08_HallPetch_fu194 (metel,gsIn)
```

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% ENGR 132
% Program Description
% import data about metel from csv file
% calculate regression line of each metel
% print the predicted yield stress of given metel and given grain size
%
% Function Call
% PS08_HallPetch_fu194 (metel,gsIn)
%
% Input Arguments
% String metel - element sign of metel
% double gsIn - grain size input
%
% Output Arguments
% none
%
% Assignment Information
% Assignment:      PS 08, Problem 1
% Author:         Yuefan Fu, fu194@purdue.edu
% Team ID:        001-05
% Contributor:     Name, login@purdue [repeat for each]
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
```

INITIALIZATION

```
%metel='Cu';
%gsIn=10000;
%import data from csv file
allData=importdata('Data_material_grainsz_yieldstress.csv');
numData=allData.data;
sampleSize=size(numData);
%initialize variables that will be updated in loops
count1=1;
grainSize=[];
yieldstress=[];
elementList=[];
```

CALCULATIONS

```
while(count1<=sampleSize(2))
    sampleSize=size(numData);
    if(mod(count1,2)==1)
        %get grain size from number data
        grainSize=[grainSize,numData(:,count1)];
        %parse element sign from the text cell
        elementList=[elementList,strtok(allData.textdata(count1),':')];
    else
        %get yield stress from number data
        yieldstress=[yieldstress,numData(:,count1)];
    end
    count1=count1+1;
end
count2=1;
coefReg=[];
%calculate the regression line for each metel in database
while(count2<=sampleSize(2)/2)
    tempX=grainSize(:,count2);
    noNaNX=tempX(~isnan(tempX));
    tempY=yieldstress(:,count2);
    noNaNY=tempY(~isnan(tempY));
    [out1,out2,out3]=PS06_regressionUDF_ful94(noNaNX.^(-1/2),noNaNY);
    coefReg=[coefReg;[out1,out2,out3]];
    count2=count2+1;
end
%check if the metel given in the database
elementTag=strcmp(elementList,metel);
if(sum(elementTag)~=1)
    fprintf('WARNING: metel is not found in database, result for Fe will be shown\n');
    metel='Fe';
    elementTag=strcmp(elementList,metel);
end
metelIndex=find(strcmp(elementList,metel));
fprintf('regression line is yieldStress = %.2f grainSize + %.2f ,with coefficient of deter
mination = %.2f\n',coefReg(metelIndex,:));
%calculate the predicted yield stress
result=coefReg(metelIndex,1)*gsIn.^(-1/2)+coefReg(metelIndex,2);
fprintf('predicted yield streed for metel %s is %.3f\n',metel,result);
%check if the grain size is out of range
curGrainSize=(grainSize(:,elementTag));
if(gsIn<min(curGrainSize)||gsIn>max(curGrainSize))
    fprintf('WARNING: the grain size input is out of range of data %s\n',metel);
end
```

regression line is yieldStress = 143.25 grainSize + 16.23 ,with coefficient of determinati
on = 1.00
predicted yield streed for metel Cu is 30.560

COMMAND WINDOW OUTPUT

```
%PS08_HallPetch_ful94('Fe',100)
%regression line is yieldStress = 672.84 grainSize + 49.72 ,with coefficient of determinat
```

```
ion = 0.80
%predicted yield streed for metel Fe is 117.002

%PS08_HallPetch_fu194('Na',100)
%WARNING: metel is not found in database, result for Fe will be shown
%regression line is yieldStress = 672.84 grainSize + 49.72 ,with coefficient of determinat
ion = 0.80
%predicted yield streed for metel Fe is 117.002

%PS08_HallPetch_fu194('V',300000)
%regression line is yieldStress = 268.79 grainSize + 206.03 ,with coefficient of determina
tion = 0.73
%predicted yield streed for metel V is 206.521
%WARNING: the grain size input is out of range of data V
```

ACADEMIC INTEGRITY STATEMENT

I/We have not used source code obtained from any other unauthorized source, either modified or unmodified. Neither have I/we provided access to my/our code to another. The project I/we am/are submitting is my/our own original work.

```
end
```