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```
% Mech103 - Lab 05 Intro to MatLab
% Created by: Erick Valentin
% Created on: 2/26/21
% Last Modified: 3/3/21
% Description: This script performes the calculations required to
 complete
%               the excercises labeled int the Lab05.
```

Problem 1 - Rice and Chess.

Last Modified: 3/3/21

```
% Determine the amount of grains of rice at a given square of a chess
% board, when the rice increases exponentially in each square.

% Clear any previous work.
clc
clear

% Defining variables.
x_0 = 1; % Initial Rice value on Square 1.
r = 1;   % Growth Rate.
t = 32;  % Number of Square.

% Equation to calculate the number of grains of rice in a given square
 of
%the chess board (x_t).
x_t = x_0*(1+r)^(t-1) % Setting "t-1" allos to enter the number of the
                      %square and retrieve the correct value of rice
 grain.

% Reassignt vaiable "t" to the value "64".
t = 64
x_t = x_0*(1+r)^(t-1)


x_t =

   2.1475e+09


t =
```

```
    64
```

```
x_t =

   9.2234e+18
```

Problem 2 - The Great Excel-Matlab Show-down.

Last Modified: 3/3/21

```
% Calculate the Specific Gravity of three different balls inputting
 only
% the ball's circunferenceand mass values.

% Defining Variables.
circumference = 8; % in inches.
mass = 160; % in grams.
radius = ((circumference/(2*pi))*2.54); % finds radius and converts to
 cm.
volume = (4/3)*pi*(radius^3); % Calculates the volume of the ball in
 cm^3.
density = (mass/volume); % in g/cm^3.

% Calculates the specific gravity of the ball.
specificGravity = (density)/1 % in g/cm^3.
```

```
specificGravity =

    1.1293
```

Problem 3 - Dyson

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```
% Calculates the approximate daily energy produsedby a hypothetical
 Dyson
% sphere around the sun and how many seconds it take to produce one
% Yottadollars.

% Defining Variables.
area_Sun = 6.09e+12; % in km^2.
temp_Sun = 5778; % in Kelvin.
temp_Dyson = 263.15; % in Kelvin.
epsilon = 0.95; % measure of efficiency.
delta = 5.67e-8; % W/(m^2-K^4) Stefan-Boltzmann constant.

% Net Energy Transfer
```

```
netEnergyTransfer = epsilon*delta*area_Sun*((temp_Sun^4)-
(temp_Dyson^4)) %in Watts.

% 1 Watt = 1 Joule per second.

% To find how much energy the sun makes in a day I multiply
% netEnergyTransfer by the amount of seconds in a day (86400s)
energyPerDay = netEnergyTransfer*86400

% finding how many seconds it takes to make a YottaDollar at a rate
% of 11 cents/kWh.

% convert energyPerDay to kW/h
dyson_kWh = (energyPerDay/24)/1000;

% Finally I find how many seconds to make a YottaDollar.
secondsToYottaDolla = (dyson_kWh/3600)/(0.11/1.1^(-25))
```

```
netEnergyTransfer =

   3.6562e+20
```

```
energyPerDay =

   3.1590e+25
```

```
secondsToYottaDolla =

   3.0678e+17
```

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