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clc
clear
close all

%creating the choice for material
Material = {'Concrete',
16,30,96000,900,5,5;'Wood',18,50,100000,800,12,10;'Adobe',15,42,55000,600,4,5};

choice=menu('Select material',Material{1,1},Material{2,1},Material{3,1});

%SA is fixed
SA = 3000;

%calculating thickness
thickness = Material{choice,2}./12;

%total fixed cost
total_fc = thickness.*SA.*Material{choice,3} + Material{choice,5}.*Material{choice,6}.*Material{choice,7} +
Material{choice,4};

%% BreakEven Analysis
%Taking user inputs.

prompt = 'Please enter the Energy Cost [$/Week]: ';
EC = input(prompt);

prompt = 'Please enter the Labor Cost [$/Week]: ';
LC = input(prompt);

prompt = 'Please enter the Maintenance Cost [$/Week]: ';
MC = input(prompt);

prompt = 'Please enter the Landfill Cost [$/Week]: ';
LfC = input(prompt);

prompt = 'Please enter the number of weeks the zoo will operate: ';
no_weeks = input(prompt);

prompt = 'Please enter the number of years the analysis should include: ';
no_years = input(prompt);

%% zoo's anticipated public interest and donations

prompt = 'Please enter the number of Price of Admission per person [$/person]: ';
poa = input(prompt);

prompt = 'Please enter the Number of people per week that will visit the zoo: ';
no_people = input(prompt);

prompt = 'Please enter the Expected donations per week [$/week]: ';
exp_donations = input(prompt);

%Total number of weeks the zoo will operate is
total_weeks = no_weeks*no_years;

%total variable cost per week
total_vc_week = (EC + LC + MC + LfC);

% %total variable cost per year
% total_vc_year = no_weeks*total_vc_week;

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% %%Total variable costs for years requested
% total_vc = no_weeks*no_years*total_vc_week;

%Total costs including fc and vc
total_cost_vector = zeros();
cost = total_fc;
for i = 1:no_years
for j = 1:no_weeks
cost = cost + total_vc_week;
total_cost_vector(j,i) = cost;
end
end

total_cost = sum(total_cost_vector(:));

%% Revenue

%Revenue From admission per week
rfa = poa*no_people;

%Revenue from donations per week
rfd = exp_donations;

%total revenue per week
revenue_week = rfa + rfd;

%total revenue per year
revenue_year = revenue_week*no_weeks;

%total revenue for years requested

total_revenue_vector = zeros();
revenue = 0;
for i = 1:no_years
for j = 1:no_weeks
revenue = revenue + revenue_week;
total_revenue_vector(j,i) = revenue;
end
end
total_revenue = sum(total_revenue_vector(:));

%Total profit vector
total_profit_vector = total_revenue_vector - total_cost_vector;
total_profit = sum(total_profit_vector(:));

%Breakeven point in months (bem = breakevenmonth)
bem = (total_fc/(revenue_week - total_vc_week));

%% how much of a one-time donation it would take to "breakeven" at the end of 7 months.

%Costs at the end of seven months
cost_7months = total_vc_week*4*7;
total_cost_7months = total_fc + cost_7months;

%revenue without donation at the end of 7 months
revenue_7months = poa*no_people*4*7;

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%donation required
donation_required = total_cost_7months - revenue_7months;

%% Results output
fprintf('| Material: %s\n', Material{choice,1})
fprintf('| \t Operating %d weeks per year will generate per year:\n', no_weeks)
fprintf('| \t\tRevenue: %d\n', total_revenue)
fprintf('| \t\tCost: %d\n', total_cost)
fprintf('| \tThe break even time is %.2f months \n', bem)
fprintf('| \tThe total profit after %d years is $%.3e \n', no_years, total_profit)

fprintf('\tIt will take a one-time donation of $%.2f to breakeven in seven months\n', donation_required)

%% Plots
figure()
x = linspace(0,no_years, no_years*no_weeks);
y1 = reshape(total_cost_vector,[],1); %reshaping all the columns into one for easy plot
plot(x,y1,'LineWidth',1)

hold on
y2 = reshape(total_revenue_vector,[],1);
plot(x,y2,'LineWidth',1)
hold on
plot(x(1,ceil(bem)),y1(ceil(bem),1),'r*','MarkerSize',20) % marking the bem
legend('Costs','Revenue','Break Even Point')
title('Cost and Revenue against the years')
xlabel('Years')
ylabel('Cost and Revenue')
hold off

figure()

x = linspace(0,no_years, no_years*no_weeks);
y = reshape(total_profit_vector,[],1);
plot(x,y1,'LineWidth',1.5)
hold on
plot(x(1,ceil(bem)),y1(ceil(bem),1),'r*','MarkerSize',20) % marking the 10th data point of x and y
legend('Profit','Break Even Point')
title('Profit against the years')
xlabel('Years')
ylabel('Profit')
hold off

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