```
%profile creator
clear                           %rinse old variables
clc;                            %clears old prints in Matlab window
L_car=12;                       %total length of fuselage
W_body=2.55/2;                  %body width
R_nose=4;                       %nose radius
L_fuse=L_car-R_nose;            %Fuselage length

R_rear=1;                       %Radius of curvature of fuselage before boattail

A_dif=20*pi/180;                %diffusor angle
H_tail=0.0;                %Tail height
L_trunk=2;                  %length of trunkation of tail
n_nose=20;                  %number of values that each part is made up of
n_tail=20;
n_fuse=60;
n_trunc=10;
%nose section
if R_nose<W_body           %if front edge radius is not half of body width
%front                     %creates a 2 X 10 matrix with zeros in 1:st column and increasing values in second
   Co0=[(zeros(1,n_nose/2))' ((W_body-R_nose)/(n_nose/2):(W_body-R_nose)/(n_nose/2):(W_body-R_nose))'];
else
   Co0=[];
end
if R_nose<W_body           %if front edge radius is less than half of body width
%Front edge radius
   theta=(pi/2)*1/(n_nose/2):(pi/2)*1/(n_nose/2):pi/2;  %1 X 10 matrix
   Co1=[1-cos(theta)' sin(theta)'].*R_nose+[zeros(n_nose/2,1) (W_body-R_nose)*ones(n_nose/2,1)]; %2 X 10
matrix
%Main fuselage              %2 X 60 matrix with increasing values in one kolumn and 1.2750 in the other
   Co2=[((L_fuse/n_fuse):L_fuse/n_fuse:(L_fuse))'+R_nose ones(n_fuse,1)*(W_body)];
else
%Front edge radius
   theta2=3*pi/2:2*pi/40:2*pi;
   diff=R_nose-W_body;
   x_pos=R_nose*sin(theta2)+R_nose; %position of centre of revelation in X-direction
   y_pos=(R_nose-diff)*cos(theta2); %position of centre of revelation in Y-direction
   for i=1:size(y_pos);            %chech every value in y_pos
      y_pos(i)<0;                  %if any value in y_pos less than zero
      y_pos(i)=0;                  %set that value to zero
   end
   Co1=[x_pos' y_pos'];
%Main fuselage                  %2 X 60 matrix with increasing values in one kolumn and 1.2750 in the other
   x_body=R_nose:L_car/n_fuse:L_car;
   local=size(x_body);
   x_local=x_body(:,2:local(2));          %remove first value in Co2 so it different from last value in Co1
   y_body=ones((local(2)-1),1)*(W_body);
   Co2=[x_local' y_body];
end
%curvation after fuselage and before boattail
theta3=0:(A_dif/n_nose):A_dif;             %definition of angle for curvature
x_pos2=R_rear*sin(theta3)+12;               %position of centre of revelation in X-direction
y_pos2=R_rear*cos(theta3)+W_body-R_rear;    %position of centre of revelation in Y-direction
local2=[x_pos2' y_pos2'];
local2_size=size(local2);
Co3=local2(2:local2_size(1),:);
Co3_size=size(Co3);
X_coord=Co3(end,1);                %endposition for Co3 in X-direction
Y_coord=Co3(end,2);                %endposition for Co3 in Y-direction
%Diffusor/definition of boattail
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L_sum=L_car+R_rear*cos(A_dif);
Co4=[];
if Y_coord > H_tail  %check that minimum difusor height is not subceeded
   y=Y_coord:-Y_coord/n_tail:H_tail;  %begins where rearcurvature ends
    k=-tan(A_dif);                %slant on line - =>down + =>up
    m=Y_coord-k*X_coord;          %calculate where on y-axis straight line begins
    x=(y-m)/k;                    %equation of straight line
   temp=[x' y'];
   x_size=size(x);
    Co4=temp(2:x_size(2),:);     %creation part of plotting vector
   trunc_pos=Co4(end,1);
%Trunkation - define the chopped of part of the boattail
 if H_tail~=0
   Co5=[zeros(n_trunc+1,1)+trunc_pos (H_tail:-H_tail/n_trunc:0)'];
 else
    Co5=[];
 end
end
Coords=[Co0;Co1;Co2;Co3;Co4;Co5];   %all coordinats in one matrix
output1=[[flipud(Coords(:,1)) flipud(Coords(:,2)*-1)]; Coords]; %xfoil
[a b]=size(output1);
output2=[[a/2 a/2];Coords;[a/2 a/2];[Coords(:,1) Coords(:,2).* -1]]; %pablo
%figure
plot(output1(:,1),output1(:,2))
axis equal,grid on
%save bus-1-5radius.dat output2 -ascii
%save AA_TEST.dat output2 -ascii     %Produce data set used in Pablo

save aa.dat output1 -ascii       %Produce data set used in Xfoil
%save 20d4m.dat output1 -ascii       %Produce data set used in Xfoil
%save lorryp.dat output2 -ascii
%save bus_da0_dl0 output1 -ascii
```