```
/* scenario 1*/
proc optmodel;
var X1, X2, X3, X4, X5, Y1, Y2, Y3;
        num prob_id init 1;
        min z = ((3.97*X1+8.35*X2+7.47*X3+6.01*X4+3.97*X5)/6.7)+(800*Y1+450*Y2+400*Y3);
        con
        /*Ramp Fee waiver*/
        500*6.7*(1-Y1) <=X2,
        300*6.7*(1-Y2) <=X3,
   350*6.7*(1-Y3) <=X4,
   /*Fuel tank Constraints*/
   7000+X1<=13000,
   7000+X1-4800+X2 <= 13000,
   7000+X1-4800+X2-2000+X3 <=13000,
   7000+X1-4800+X2-2000+X3-5300+X4<=13000,
   7000+X1-4800+X2-2000+X3-5300+X4-3100 <=13000,
  /*Minimum Fuel Constraints*/
   7000 + X1-4800>= 2400,
   7000 +X1-4800+X2-2000>= 2400,
   7000 +X1-4800+X2-2000+X3-5300>= 2400,
   7000 + X1-4800+X2-2000+X3-5300+X4-3100>=2400,
   7000 + X1-4800+X2-2000+X3-5300+X4-3100+X5>=7000,

  /*Maximum Ramp Weight Constraints*/
   22200+7000+X1+2*200 <=36400,
   22200+7000+X1-4800+X2+4*200 <=36400,
   22200+7000+X1-4800+X2-2000+X3+8*200<=36400,
   22200+7000+X1-4800+X2-2000+X3-5300+X4+8*200<=36400,
   /*Maximum Landing Weight Constraints*/
```

```
   22200+7000+X1-4800+2*200<=31800,
   22200+7000+X1-4800+X2-2000+4*200<=31800,
   22200+7000+X1-4800+X2-2000+X3-5300+8*200<=31800,
   22200+7000+X1-4800+X2-2000+X3-5300+X4-3100+8*200<=31800,
   X1>=0, X2>=0, X3>=0, X4 >= 0, X5 >=0, Y1 >= 0, Y2 >= 0, Y3 >= 0;
         solve;
         create data sol_data_01 from X1 X2 X3 X4 X5 Y1 Y2 Y3 prob_id;

         print X1 X2 X3 X4 X5 Y1 Y2 Y3 ;

/* scenario 2*/
proc optmodel;
var X1, X2, X3, X4, X5, Y1 integer, Y2 integer, Y3 integer;
         num prob_id init 2;
         min z = ((3.97*X1+3.97*X2+3.97*X3+3.97*X4+3.97*X5)/6.7)+(800*Y1+450*Y2+400*Y3);
         con
         /*Ramp Fee waiver*/
         500*6.7*(1-Y1) <=X2,
         300*6.7*(1-Y2) <=X3,
   350*6.7*(1-Y3) <=X4,
   /*Fuel tank Constraints*/
   7000+X1<=13000,
   7000+X1-4800+X2 <= 13000,
   7000+X1-4800+X2-2000+X3 <=13000,
   7000+X1-4800+X2-2000+X3-5300+X4<=13000,
   7000+X1-4800+X2-2000+X3-5300+X4-3100 <=13000,
  /*Minimum Fuel Constraints*/
   7000 + X1-4800>= 2400,
   7000 +X1-4800+X2-2000>= 2400,
```

```
   7000 +X1-4800+X2-2000+X3-5300>= 2400,
   7000 + X1-4800+X2-2000+X3-5300+X4-3100>=2400,
   7000 + X1-4800+X2-2000+X3-5300+X4-3100+X5>=7000,

  /*Maximum Ramp Weight Constraints*/
   22200+7000+X1+2*200 <=36400,
   22200+7000+X1-4800+X2+4*200 <=36400,
   22200+7000+X1-4800+X2-2000+X3+8*200<=36400,
   22200+7000+X1-4800+X2-2000+X3-5300+X4+8*200<=36400,
   /*Maximum Landing Weight Constraints*/
   22200+7000+X1-4800+2*200<=31800,
   22200+7000+X1-4800+X2-2000+4*200<=31800,
   22200+7000+X1-4800+X2-2000+X3-5300+8*200<=31800,
   22200+7000+X1-4800+X2-2000+X3-5300+X4-3100+8*200<=31800,
   X1>=0, X2>=0, X3>=0, X4 >= 0, X5 >=0, Y1 >= 0, Y2 >= 0, Y3 >= 0;
         solve;
         create data sol_data_01 from X1 X2 X3 X4 X5 Y1 Y2 Y3 prob_id;

         print X1 X2 X3 X4 X5 Y1 Y2 Y3 ;

/* scenario 3a*/
proc optmodel;
var X1, X2, X3, X4, X5, Y1 binary, Y2 binary, Y3 binary;
         num prob_id init 1;
         min z = ((3.97*X1+8.35*X2+7.47*X3+6.01*X4+3.97*X5)/6.7)+(800*Y1+450*Y2+400*Y3);
         con
         /*Ramp Fee waiver*/
         500*6.7*(1-Y1) <=X2,
         300*6.7*(1-Y2) <=X3,
```

```
 350*6.7*(1-Y3) <=X4,
 /*Fuel tank Constraints*/
 7000+X1<=13000,
 7000+X1-4800+X2 <= 13000,
 7000+X1-4800+X2-2000+X3 <=13000,
 7000+X1-4800+X2-2000+X3-5300+X4<=13000,
 7000+X1-4800+X2-2000+X3-5300+X4-3100 <=13000,
/*Minimum Fuel Constraints*/
 7000 + X1-4800>= 2000,
 7000 +X1-4800+X2-2000>= 2000,
 7000 +X1-4800+X2-2000+X3-5300>= 2000,
 7000 + X1-4800+X2-2000+X3-5300+X4-3100>=2000,
 7000 + X1-4800+X2-2000+X3-5300+X4-3100+X5>=7000,

/*Maximum Ramp Weight Constraints*/
 22200+7000+X1+2*200 <=36400,
 22200+7000+X1-4800+X2+4*200 <=36400,
 22200+7000+X1-4800+X2-2000+X3+8*200<=36400,
 22200+7000+X1-4800+X2-2000+X3-5300+X4+8*200<=36400,
 /*Maximum Landing Weight Constraints*/
 22200+7000+X1-4800+2*200<=31800,
 22200+7000+X1-4800+X2-2000+4*200<=31800,
 22200+7000+X1-4800+X2-2000+X3-5300+8*200<=31800,
 22200+7000+X1-4800+X2-2000+X3-5300+X4-3100+8*200<=31800,
 X1>=0, X2>=0, X3>=0, X4 >= 0, X5 >=0, Y1 >= 0, Y2 >= 0, Y3 >= 0;
        solve;
        create data sol_data_01 from X1 X2 X3 X4 X5 Y1 Y2 Y3 prob_id;

        print X1 X2 X3 X4 X5 Y1 Y2 Y3 ;
```