**GROUP No. 3 - by Kevin George  
SHELL OIL PRODUCTION PROCESS PROBLEM**

**PROBLEM FORMULATION**  
**DECISION VARIABLE:-**

Crude1- barrel of crude1 purchased   
Crude2- barrel of crude2 purchased  
Gas1- Barrels of gas 1 available to sell  
Gas2- Barrels of gas 2 available to sell  
Gas3- Barrels of gas 3 available to sell  
Process1 - Number of hours process1 is run  
Process2 - Number of hours process2 is run  
Process3 - Number of hours process3 is run  
  
**OBJECTIVE FUNCTION:-**Maximize Profit = 9\*Gas1+ 10\*Gas2+24\*Gas3- 5\*Process1- 4\*Process2- Process3- 2\*Crude1 -3\*Crude2  
  
**CONSTRAINTS:-**

Crude1 200 {*Maximum available barrels of crude 1 per week*.}  
Crude2 300 {*Maximum available barrels of crude 2 per week.}*  
Process1+ Process2+ Process3 100 {*Maximum available hours for process in catalytic cracker}*  
Crude1 2\* Process1 + Process2 {*Amount of crude 1 to run the process}*Crude2 3\* Process1 + 3\* Process2 +2\*Process3 { *Amount of crude 2 to run the process}*Gas1 =2\* Process1 {*Total barrel of gas1 to sell}*Gas2= 1\* Process1+ 3\* Process2 -3\* Process3 {*Total barrel of gas2 to sell}*Gas3 =2\* Process3 {*Total barrel of gas3 to sell}*  
Crude1, Crude2, Gas1, Gas2, Gas3, Process1, Process2, Process3 0 {Non Negativity Constraint}

*//The commented PYOMO model is attached*

**OPTIMAL SOLUTION & INTERPRETATION.**Crude1- barrel of crude1 purchased = 100  
Crude2- barrel of crude2 purchased =300  
Gas1- Barrels of gas 1 available to sell=0   
Gas2- Barrels of gas 2 available to sell =300  
Gas3- Barrels of gas 3 available to sell=0  
Process1 - Number of hours process1 is run =0  
Process2 - Number of hours process2 is run =100  
Process3 - Number of hours process3 is run =0  
  
Maximized Profit is $1499.99.  
  
The LP solution for this problem shows that Shell oil company need to run only process 2 for 100 hrs. in a week by shutting down process 1 &2 to maximize the profit to $ 1500 approx. The company is only producing gas 2 (300 barrels) by consuming crude oil1 (100 barrel) and crude oil 2(300 barrel).