UAS Pemrograman Komputer Lanjut 2023-2024

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In [1]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as pt
import seaborn as sns
from sklearn.linear_model import LinearRegression
sns.set_theme()

df = pd.read_excel('DataUAS2023.xlsx')
df_T = df.loc[:,'Temperature']
df_P =df.loc[:,'Pressure']
df_r = df.loc[:,'Reactant_Concentration']
df_k = df.loc[:,'Catalyst_Concentration']
df_y = df.loc[:,'Product_Yield']
df
```

Out[1]:

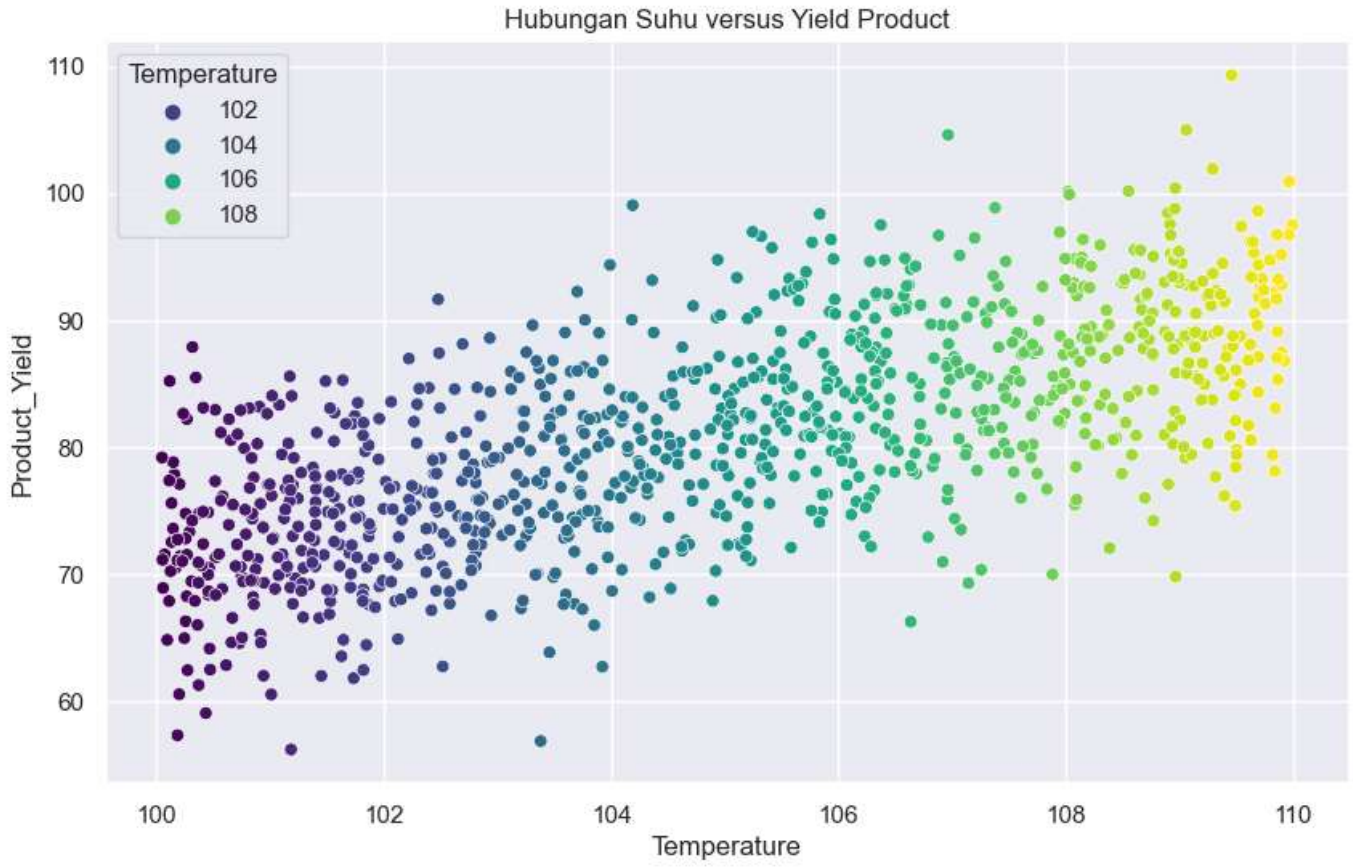
	Temperature	Pressure	Reactant_Concentration	Catalyst_Concentration	Product_Yield
0	103.745401	105.355402	1.1	0.932925	77.742609
1	109.507143	102.329311	1.1	0.827506	79.815183
2	107.319939	105.760396	1.1	0.697209	85.430469
3	105.986585	106.221171	1.1	0.714327	85.138568
4	101.560186	106.119581	1.1	0.461716	76.107794
...	...	...	...	...	...
995	100.915821	102.359955	1.1	0.100246	64.634159
996	109.173136	103.776462	3.1	0.016592	85.369137
997	101.368186	104.925926	1.1	0.661719	70.926118
998	109.502374	104.141396	3.1	0.602449	86.070568
999	104.460058	103.615158	1.1	0.163019	71.749909

1000 rows × 5 columns

Nomer A

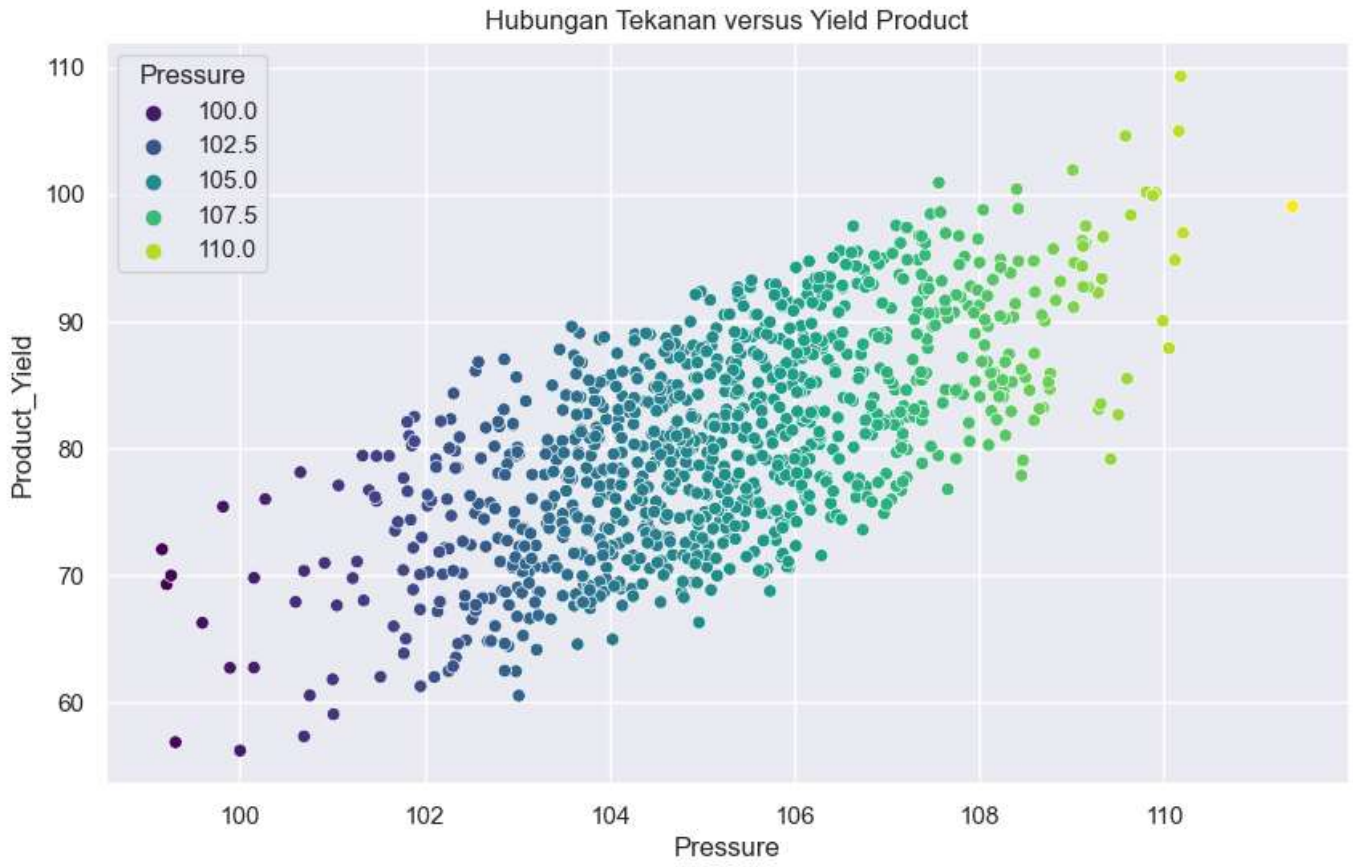
In [2]:
```
pt.figure(0,figsize=(10, 6))
pt.title('Hubungan Suhu versus Yield Product')
sns.scatterplot(x=df_T, y=df_y, hue=df_T, palette='viridis')
```

Out[2]:
```
<Axes: title={'center': 'Hubungan Suhu versus Yield Product'}, xlabel='Temperature', ylabel='Product_Yield'>
```



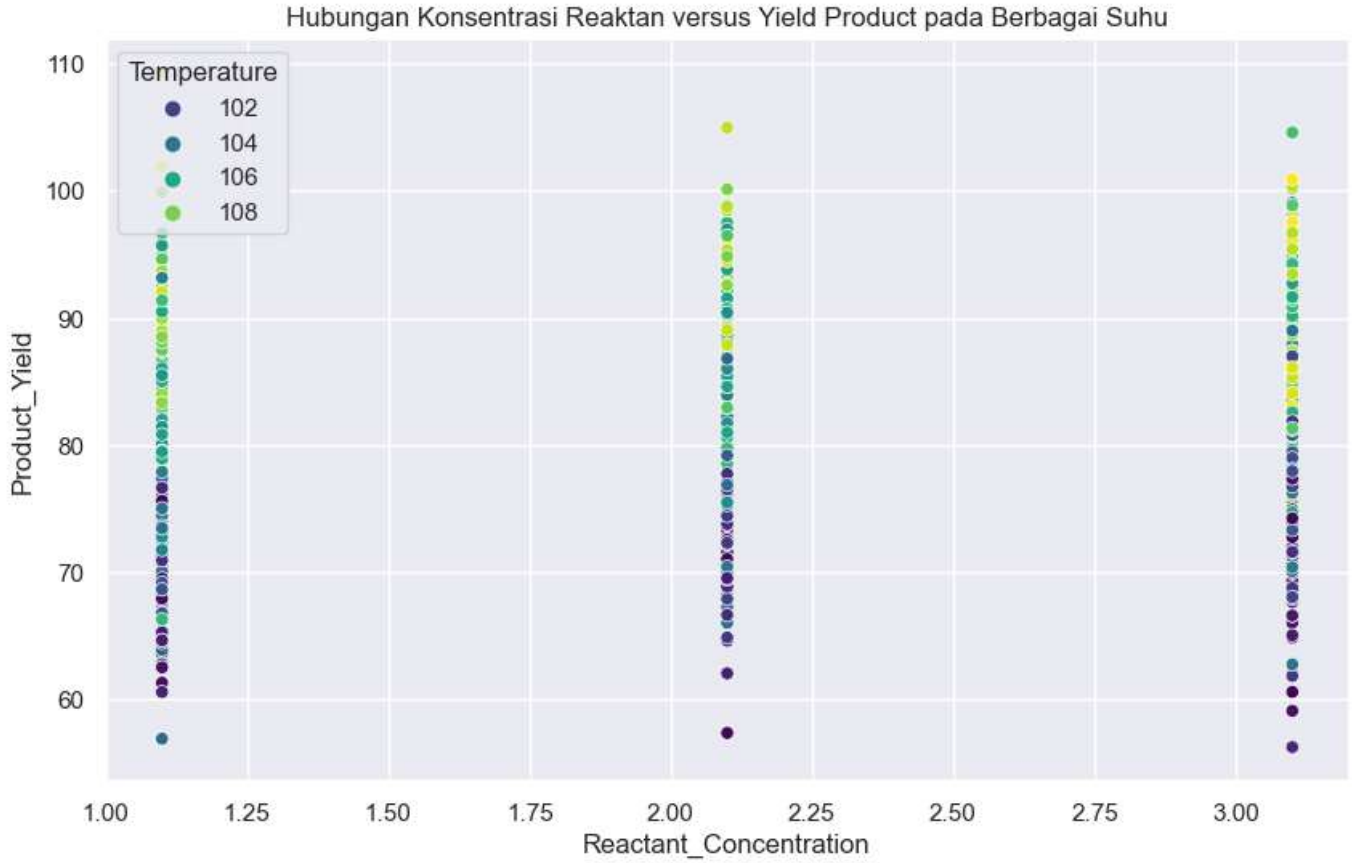
In [3]:
```
pt.figure(1,figsize=(10, 6))
pt.title('Hubungan Tekanan versus Yield Product')
sns.scatterplot(x=df_P, y=df_y, hue=df_P, palette='viridis')
```

Out[3]:
```
<Axes: title={'center': 'Hubungan Tekanan versus Yield Product'}, xlabel='Pressure', ylabel='Product_Yield'>
```



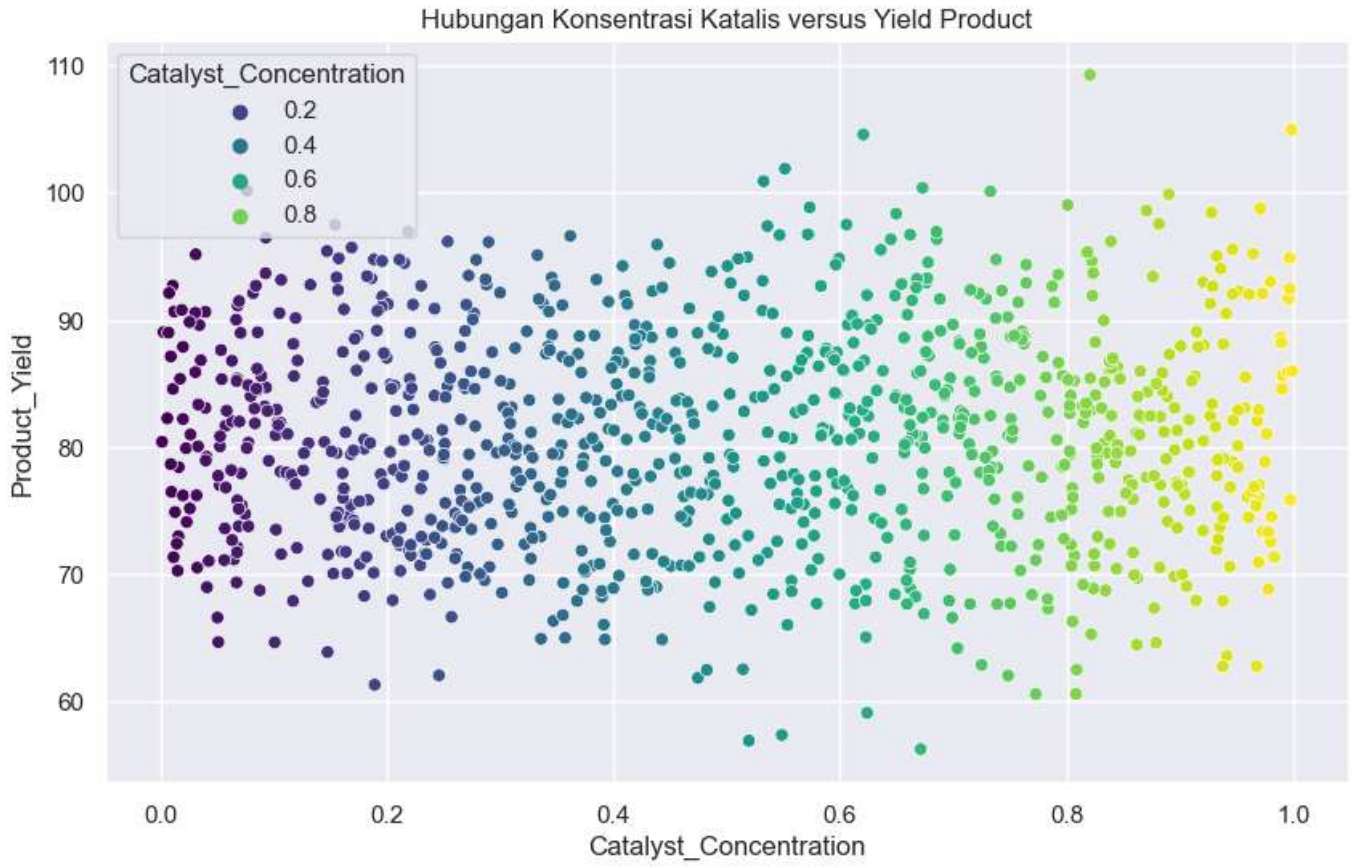
In [4]:
```
pt.figure(2,figsize=(10, 6))
pt.title('Hubungan Konsentrasi Reaktan versus Yield Product pada Berbagai Suhu')
sns.scatterplot(x=df_r, y=df_y, hue=df_T, palette='viridis')
```

Out[4]:
```
<Axes: title={'center': 'Hubungan Konsentrasi Reaktan versus Yield Product pada Berbagai Suhu'}, xlabel='Reactant_Concentration', ylabel='Product_Yield'>
```



In [5]:
```
pt.figure(3,figsize=(10, 6))
pt.title('Hubungan Konsentrasi Katalis versus Yield Product')
sns.scatterplot(x=df_k, y=df_y, hue=df_k, palette='viridis')
```

Out[5]:
```
<Axes: title={'center': 'Hubungan Konsentrasi Katalis versus Yield Product'}, xlabel='Catalyst_Concentration', ylabel='Pr
oduct_Yield'>
```



Nomer B

In [6]:
```
x = df.iloc[:, :4]
y = df.loc[:,'Product_Yield']

model = LinearRegression()
```

```
model.fit(x,y)
predictions = model.predict(x)
print('Coefficients:', model.coef_)
print('Intercept:', model.intercept_)

intercept =  model.intercept_
koef =  model.coef_
import sympy as sp
sp.init_printing()
from IPython.display import display
suhu, tekanan, reaktan, katalis = sp.symbols('suhu, tekanan, reaktan, katalis')
Y = intercept+ koef[0]*suhu +koef[1]*tekanan +koef[2]*reaktan+koef[3]*katalis
print('Persamaan untuk memprediksi product yield reactor yaitu :')
display (Y)
```

```
Coefficients: [2.00975867 2.98051155 1.22503388 1.19133597]
Intercept: -446.6122057385769
Persamaan untuk memprediksi product yield reactor yaitu :
```

$\displaystyle 1.19133596765199 katalis + 1.22503388141265 reaktan + 2.00975866790568 suhu + 2.98051155193085 tekanan - 446.612205738577$

Nomer C

In [7]:

```
T,P,r,k = 105,105,2,0.75
yield_product = intercept+ koef[0]*T+koef[1]*P+koef[2]*r+koef[3]*k
print('Product yield yang dihasilkan pada kondisi operasi tersebut = {:.4f}'.format(yield_product))
```

```
Product yield yang dihasilkan pada kondisi operasi tersebut = 80.7097
```