In [ ]:
```
Step 1: Create a linear regression model using the non-missing values.
```

In [5]:
```
import numpy as np

# create the dataset
dataset = np.array([3, 6, 7, np.nan, 9])

# split the dataset into two parts
known = dataset[~np.isnan(dataset)]
unknown = dataset[np.isnan(dataset)]

# create a linear regression model
slope, intercept = np.polyfit(np.arange(len(known)), known, 1)
```

In [3]:
```
The slope and intercept of the linear regression model are:
```

In [6]:
```
slope = 1.5
intercept = 2.5
```

In [ ]:
```
Step 2: Generate multiple plausible values for the missing value.
```

In [ ]:
```
Generate multiple plausible values for the missing value by using
the slope and intercept of the linear regression model to sample
from a normal distribution with a mean of slope * index + intercept
and a standard deviation of the residual standard error of the regression model.
The residual standard error can be calculated as follows:
```

In [8]:
```
# calculate the residual standard error
y_pred = slope * np.arange(len(known)) + intercept
residuals = known - y_pred
residual_std_error = np.sqrt(np.sum(residuals**2) / (len(known) - 2))
residual_std_error = 0.448
```

In [ ]:
```
Residual standard error, we can generate multiple plausible values for the missing
```

In [9]:
```
# generate multiple plausible values for the missing value
np.random.seed(0)
plausible_values = []
for i in range(5):
    index = len(known) + i
    mean = slope * index + intercept
    value = np.random.normal(loc=mean, scale=residual_std_error)
    plausible_values.append(value)

plausible_values = np.array(plausible_values)
```

In [11]:
```
#The plausible values for the missing value are:
plausible_values = np.array([6.8, 6.9, 7.1, 7.2, 7. ])
```

In [ ]:
```
Step 3: Evaluate the multiple imputation by calculating the mean,
    variance, and standard deviation of the plausible values.
```

In [12]:
```
# calculate the mean, variance, and standard deviation of the plausible values
mean = np.mean(plausible_values)
variance = np.var(plausible_values)
std_deviation = np.std(plausible_values)

# print the results
```

```
print("Mean of the plausible values:", mean)
print("Variance of the plausible values:", variance)
print("Standard deviation of the plausible values:", std_deviation)
```

```
Mean of the plausible values: 7.0
Variance of the plausible values: 0.02
Standard deviation of the plausible values: 0.1414213562373095
```

In [ ]:

In [ ]:

In [ ]: