Week 7 - Evaluating Classification Models

Suppose you have a binary classification problem with the following actual classes and predicted classes for a sample of 40 observations:

Actual Classes: 1, 0, 1, 1, 0, 0, 1, 1, 1, 0, 1, 1, 0, 1, 0, 0, 1, 1, 0, 1, 1, 1, 0, 1, 0, 1, 0, 1, 1, 0, 1, 1, 1, 0, 0, 1, 1, 1, 1, 0

Predicted Classes: 1, 0, 1, 1, 0, 0, 1, 1, 1, 0, 1, 1, 0, 1, 0, 0, 1, 1, 0, 1, 1, 1, 0, 1, 0, 1, 0, 1, 1, 0, 1, 1, 1, 0, 0, 1, 1, 1, 1, 0

In order to evaluate the effectiveness of a model, follow these steps:

Create the Confusion Matrix:

Manually create a 2x2 confusion matrix using the actual classes and predicted classes.

Calculate Evaluation Metrics:

Calculate the following evaluation metrics:

- Accuracy
- Precision
- Recall (Sensitivity)
- Specificity
- F1 Score

Interpretation:

Interpret the calculated evaluation metrics to assess the performance of the classification model.

Comparison:

Compare the model above to three other models.

	Predicted Negative (0)	Predicted Positive (1)
Actual Negative (0)	16	1

	Predicted Negative (0)	Predicted Positive (1)
Actual Positive (1)	5	18

	Predicted Negative (0)	Predicted Positive (1)
Actual Negative (0)	10	7
Actual Positive (1)	12	11

	Predicted Negative (0)	Predicted Positive (1)
Actual Negative (0)	16	1
Actual Positive (1)	0	23

Calculate evaluation metrics for all the above models and interpret each module, comparing and contrasting each model. Which model do you recommend for the above scenario. Justify your answer.