### Data Cleaning and Preprocessing Tasks:

1. **Handle Missing Values**: Identify and handle missing values in columns such as depth, keywords, topic\_group, and topic\_desc.
2. **Standardize Columns**: Convert relevant columns to consistent data types (e.g., price and old\_price).
3. **Price Processing**: Clean and standardize the old\_price column, which has non-numeric values (e.g., "No old price").
4. **Boolean Conversion**: Ensure the sellable\_online column is a proper boolean type.

### Exploratory Data Analysis (EDA) Tasks:

1. **Distribution Analysis**: Analyze the distribution of price, height, depth, and width.
2. **Category Insights**: Find the most common product categories and their average prices.
3. **Designer Analysis**: Identify the most prolific designers and the average price of products they designed.
4. **Online Availability**: Investigate the proportion of products available for online purchase.
5. **Price Change Analysis**: Determine how many products have a recorded change between price and old\_price.

### Feature Engineering Tasks:

1. **Price Difference Feature**: Create a new feature representing the difference between price and old\_price (where applicable).
2. **Dimension Ratios**: Create features like depth/width or height/depth for deeper analysis.
3. **Color Availability**: Convert the other\_colors column into a numerical feature (e.g., one-hot encoding for "Yes"/"No").
4. **Keyword Extraction**: Process the keywords column to extract useful terms for potential text analysis.

### Machine Learning Model Preparation:

1. **Feature Selection**: Select relevant columns that could be predictive of the current\_status (e.g., price, dimensions, category).
2. **Text Features**: Use NLP techniques to vectorize short\_description and product\_description for input into models.
3. **Label Encoding**: Encode categorical columns like category and designer for model input.

### Model Building and Evaluation:

1. **Classification Task**: Build a classification model to predict the current\_status (e.g., "in stock", "out of stock").
2. **Model Types**: Experiment with models such as logistic regression, decision trees, and gradient boosting.
3. **Cross-Validation**: Use cross-validation to evaluate model performance with metrics like precision, recall, and F1-score.
4. **Feature Importance Analysis**: Identify which features most influence the prediction of current\_status.

### Advanced Insights and Visualization:

1. **Price Trends**: Visualize the trend between price and old\_price to see common price changes.
2. **Dimension Correlations**: Create scatter plots to visualize relationships between height, width, and depth.
3. **Availability Analysis**: Create charts to show how availability varies by product category or designer.
4. **Online Sales Potential**: Analyze and visualize the characteristics of products that are sellable online versus those that aren't.