



# Planning with Code: A Python Engine for Fashion Collections

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Bridging assortment design and operational logic with  
Python, Excel, and Power BI.



# SUMMARY

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# THE CHALLENGE

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Assortment planning in fashion requires balancing trend responsiveness, brand identity, and efficiency. It's a complex process where creativity and commercial needs intertwine.

**This project explores a rule-based automation to streamline planning decisions.**

The project integrates Excel for quantitative research, Python for the development of the engine, and Power BI for data visualization. Together, these tools simulate how a planning engine can distribute silhouettes, colors, and design details based on predefined rules, while still reflecting brand aesthetics and trend signals.

# OBJECTIVES

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- Translate creative strategy into rule-based assortment planning.
- Build a scalable and automated engine for collection planning.
- Demonstrate integration of data tools (Python, Power BI visualization, Excel Proficiency) into fashion workflows.
- Showcase transferable skills for allocation, planning, and merchandising roles.

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# Planning

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# ASSORTMENT - proportions research

Analysis of the last Autumn/Winter collections from The Row and Loro Piana informed the category distribution.

Using a target gender balance of 65% feminine and 35% masculine, I developed a proposed collection plan, visualizing proportional distribution across categories and gender.

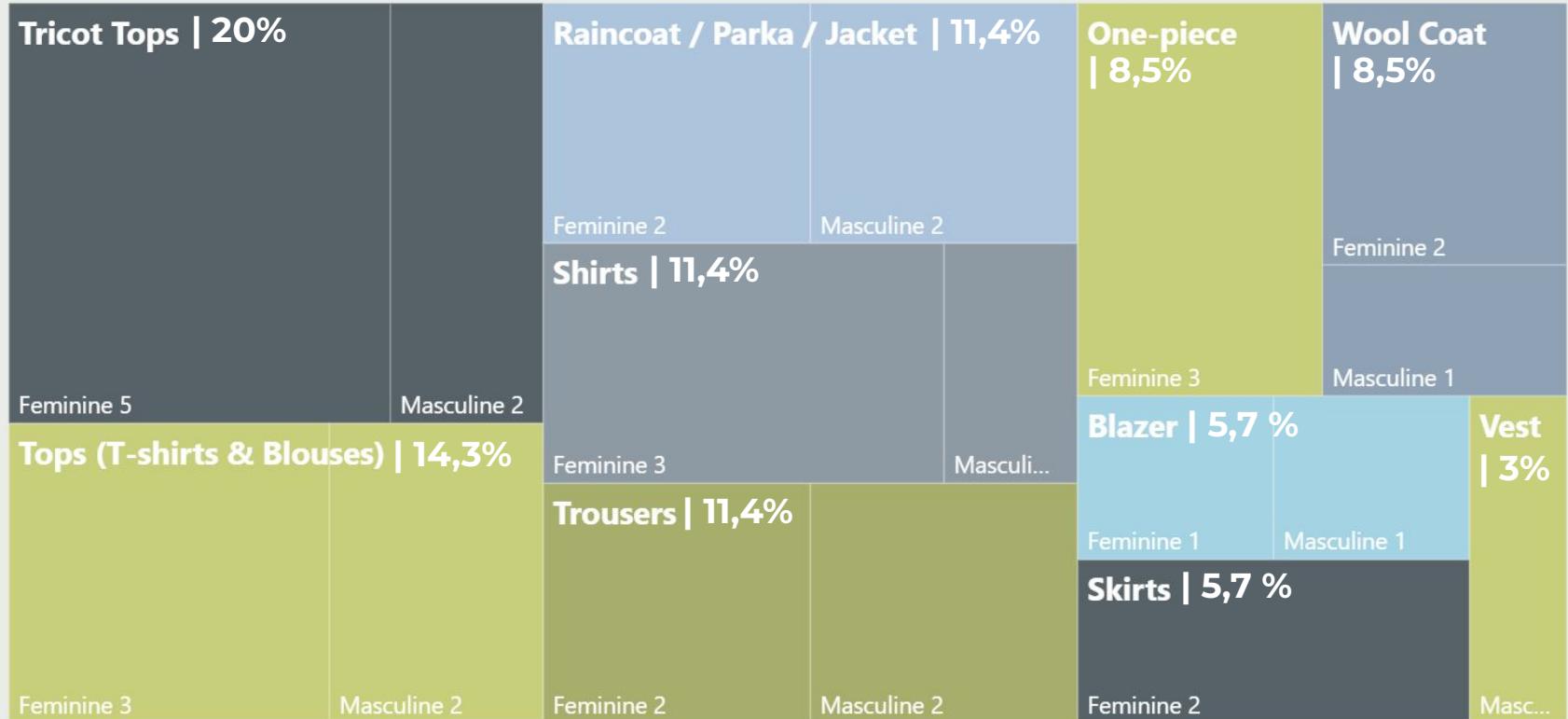
| Item                         | Proposition        | Loro Piana | The Row |
|------------------------------|--------------------|------------|---------|
| Tops - T-shirts and Blouses  | 14,3% - 5 designs  | 20%        | 10%     |
| Shirts                       | 11,4% - 4 designs  | 11%        | 11%     |
| Trousers                     | 11,4% - 4 designs  | 19%        | 12,5%   |
| Skirts                       | 5,7% - 2 designs   | 5%         | 7%      |
| Blazer                       | 5,7% - 2 designs   | 1,5%       | 9,5%    |
| Tricot tops                  | 20% - 7 designs    | 25%        | 11%     |
| One-piece                    | 8,5% - 3 designs   | 2%         | 15%     |
| Vest                         | 3% - 1 designs     | 5%         | 0%      |
| Rain Coat / Parkas / Jackets | 11,4 % - 4 designs | 10%        | 12%     |
| Wool Coat                    | 8,5% - 3 designs   | 1,5%       | 12%     |

Autumn/Winter Collection      Fall and Winter Collections Average

# ASSORTMENT - proportions

| Category                     | Proposition<br>35 designs | 65% Feminine<br>23 designs | 35% Masculine<br>12 designs |
|------------------------------|---------------------------|----------------------------|-----------------------------|
| Tops - T-shirts and Blouses  | 14,3% - 5 designs         | 3                          | 2                           |
| Shirts                       | 11,4% - 4 designs         | 3                          | 1                           |
| Trousers                     | 11,4% - 4 designs         | 2                          | 2                           |
| Skirts                       | 5,7% - 2 designs          | 2                          | 0                           |
| Blazer                       | 5,7% - 2 designs          | 1                          | 1                           |
| Tricot tops                  | 20% - 7 designs           | 5                          | 2                           |
| One-piece                    | 8,5% - 3 designs          | 3                          | 0                           |
| Vest                         | 3% - 1 designs            | 0                          | 1                           |
| Rain Coat / Parkas / Jackets | 11,4 % - 4 designs        | 2                          | 2                           |
| Wool Coat                    | 8,5% - 3 designs          | 2                          | 1                           |

# ASSORTMENT - proportions



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# Visual Research

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# VISUAL RESEARCH

Anchored in the aesthetic codes of quiet luxury, this research draws **inspiration from brands such as The Row and Loro Piana**, where premium materials, impeccable construction and understated design take precedence. The study focused primarily on Italian and American labels that embody this sensibility through approachable yet elevated collections. **Proenza Schouler, Bottega Veneta, Tory Burch and Prada were closely examined for their ability to merge quality craftsmanship with relaxed, versatile silhouettes.**

To introduce a directional edge, **the analysis also considered Spanish brands that inject a fresh, contemporary note into the quiet-luxury space** without compromising subtlety. **Loewe, Massimo Dutti and Phoebe Philo** were explored for their balance of luxurious fabrications, precision tailoring and seasonal colour palettes, complemented by discreet yet distinctive detailing. This approach reflects an evolution of quiet luxury: one that remains rooted in timeless **elegance while embracing modernity** and nuanced seasonal shifts.



# REFERENCE MOODBOARD



PANTONE®  
16-4451 TCX  
Autumn Glaze



PANTONE®  
12-0300 TCX  
White Down



PANTONE®  
16-4011 TCX  
Spellbound



PANTONE®  
15-5204 TCX  
Morning Mist



PANTONE®  
16-4823 TCX  
Winter Moss



PANTONE®  
12-3703 TCX  
Frosted Mint



PANTONE®  
19-1024 TCX  
Mocha



PANTONE®  
19-1119 TCX  
Cocoa



LORO PIANA, A/W 25/26



FROENZA SCHOUKER, FALL 25



PRADA, A/W 25/26



TORY BURCH, FALL 25



PRADA, A/W 25/26



THE ROW, FALL 25



LOEWE, FALL 25



GABRIELA HEARST, A/W 25



LOROPIANA, A/W 25/26



LOROPIANA, A/W 25/26

# VISUAL RESEARCH - colours

With [Vogue US declaring](#) 2025 “the year of Loro Piana” and the brand amplifying its celebrity-led marketing strategy, Loro Piana’s influence in the quiet-luxury space is accelerating and serving as a blueprint for other labels. Its A/W 25 palette anchors around grounded **dark neutrals** such as cocoa brown, dust navy, moss green and black, **balanced by soft, consumer-familiar light tones.** Key innovations include sandy beiges refreshed with mineral undertones, light blues shifting toward muted turquoise, and pale khakis infused with mint freshness.

This direction is echoed across other luxury players, reinforcing the season’s colour story. Loewe’s current collection mirrors Loro Piana’s turquoise notes, while Gabriela Hearst and Prada invest in burnt orange tones that vibrate against turquoise and mint for a subtle yet impactful contrast. Prada further experiments with neutrals, expanding their combinations into unexpected pairings that feel both modern and enduring, resulting in the creation of pieces with **long-term staple potential.**

A consistent pattern across brand research is the use of a signature highlight shade each season, acting as a **recognisable colour marker.** In an era of political uncertainty and post-pandemic recalibration, consumers favour trusted silhouettes reimagined in these directional palettes, reflecting fashion’s cyclical nature while **introducing fresh, investment-worthy updates.**



# VISUAL RESEARCH - colors

LOEWE, PRE-FALL 25



PRADA, A/W 25/26



LORO PIANA, A/W 25/26



HERMÈS, FALL 25



LOEWE, A/W 25/26



LOEWE, A/W 25/26

# VISUAL RESEARCH - silhouettes

Silhouette exploration this season leans into draping, tie details, and the **interplay between fitted and relaxed sections of garments**. Emphasis on the natural waist and strategic use of excess fabric enhances movement, softening traditionally structured tailoring. Poplin shapes and loose chemises introduce a feminine counterpoint to hard-edged constructions, offering versatility and ease within a wardrobe that might otherwise skew rigid.

Co-ords remain a key story, evolving from S/S into F/W with matching sets of tops and skirts, tops and shorts, and dresses with cardigans. Knit twin sets, in particular, are gaining traction across Prada, Loro Piana, Hermès and Massimo Dutti. Massimo Dutti presents a nuanced take by pairing the same material and construction **ton-sur-ton**, creating seamless combinations that can be worn as sets or individually. This approach presents a **strategic opportunity to increase Units Per Transaction** while maintaining a cohesive seasonal palette.

Accessories continue to play a supporting role in driving style versatility. Long, narrow scarves are re-emerging, offering a subtle upsell option. Worn in monochrome pairings with tops or co-ords, they enhance overall outfit composition and provide brands with easy avenues for collection complementation and merchandising impact.



# DRAPES AND CASCADES



LOEWE, PRE-FALL 25



THE ROW, FALL 25



PROENZA SCHOULER, FALL 25



PHOEBE PHILO, COLLECTION D2025/2026

PRADA, F/W 2025/2026



# TIED UP

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BOTTEGA VENETA, FALL 25



COS, FALL 25



LOEWE, PRE-FALL 25



PROENZA SCHOULER, FW25



THE ROW, FALL 25



PRADA, F/W 25



LORO PIANA, FALL/WINTER 25/26

# CO-ORDS

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# SHIRT DRESS

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THE ROW, FALL 25



BOTTEGA VENETA, FALL 25



HERMÈS, FALL 25



LOEWE, SPRING 25



THE ROW, FALL 25



THE ROW, FALL 25

# POPLIN VOLUMES



PHOEBE PHILO, COLLECTION D, 25



PROENZA SCHOULER, PRE-FALL 25



PROENZA SCHOULER, PRE-FALL 25



TORY BURCH, FALL 25



GABRIELA HEARST, A/W 25

LORO PIANA, F/W 25/26

# VISUAL RESEARCH - surface design

**Stripes** emerge as the season's core pattern, ranging from classic, thin pinstripes to wider variations that maintain delicacy while introducing casual ease. Expanding on linear motifs, **pleats** add volume and movement, creating soft, feminine silhouettes across both tailored and relaxed styles.

Knits continue to play a key role, with **3D braided effects** elevating everyday pieces. Loro Piana showcases delicate iterations, while Bottega Veneta presents statement cardigans, highlighting texture as a key opportunity for twin-set styling and layered looks.

**Sheer constructions** in lightweight knits add subtle sensuality, particularly in essentials like t-shirts and turtlenecks, allowing for versatile layering. Clean, minimalist **base layers in fresh seasonal colours** encourage repeat purchases, fostering consumer trust in high-quality, comfortable fabrics with thoughtful finishes, free from itching tags or excessive detailing.



# STRIPES

MASSIMO DUTTI, FALL 25



PRADA, FALL 25



TORY BURCH, FALL 25



PROENZA SCHOULER, FALL 25



THE ROW, FALL 25



# PLEATS

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MASSIMO DUTTI, FALL 25



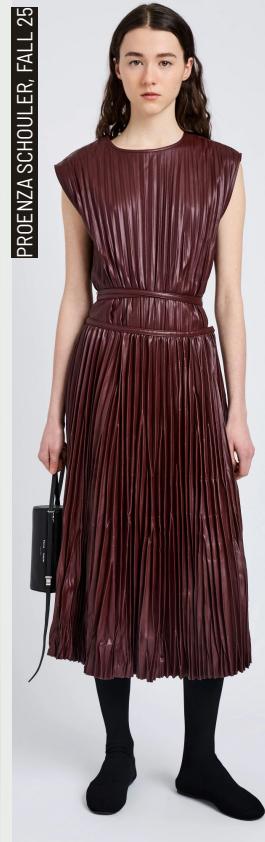
LORO PIANA, S/S 25



GABRIELA HEARST, A/W 25



PROENZA SCHOULER, FALL 25



PRADA, PRE FALL 25



# KNIT BRAIDS

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RALPH LAUREN, PRE-FALL 25



THE ROW, FALL 25



PRADA, A/W 25



LORO PIANA, A/W 25/26



BOTTEGA VENETA, FALL 25



# SHEER KNITS

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BOTTEGA VENETA, FALL 25



MASSIMO DUTTI, FALL 25



TORY BURCH, FALL 25



THE ROW, FALL 25



PROENZA SCHOULER, PRE-FALL 25



# VISUAL RESEARCH - details

Details this season lean toward soft, wearable iterations, with **buttons** emerging as a key design accent. Seen across multiple collections in mother-of-pearl, tonal, and contrasting colourways, buttons serve both functional and decorative purposes, adding quiet polish to minimalist silhouettes.

**Utility** remains a core design influence, integrated into refined collections through scrunch-adjustment ties, cargo pockets and other functional elements that double as embellishment. These details elevate wearability while reinforcing the **practical-luxury narrative**.

**Twist detailing** redefines otherwise simple pieces, adding directional interest through draped manipulations. Frequently placed at the shoulder—as in The Row's latest collection—or reinterpreted as focal points in accessories, such as Loewe's twisted shoe uppers, this technique **refreshes staple items with architectural nuance**.

Within quiet luxury's streamlined codes, **sailor collars** are re-emerging as a key neckline update. Offering a fresh take on polos, they bring structure while softening formality. The deliberate absence of buttons in these styles contrasts the season's broader button trend, introducing an ease and casual chicness that balances tailored construction.



LORO PIANA, A/W 25/26

MASSIMO DUTTI, FALL 25

# BUTTON UP

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MASSIMO DUTTI, FALL 25



LOEWE, FALL 25



THE ROW, FALL 25



THE ROW, FALL 25



PRADA, A/W 25



LORO PIANA, S/S 2025



# UTILITY

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# TWISTS

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LOEWE, PRE - FALL 25



PROENZA SCHOULER, PRE - FALL 25



THE ROW, FALL 25



COS, FALL 25



MASSIMO DUTTI, SPRING 25



THE ROW, FALL 25



# SAILOR COLLAR

MASSIMO DUTTI, FALL 25



PROENZA SCHOULER, FALL 25



BOTTEGA VENETA, PRE-FALL 25



LORDO PIANA, A/W 25/26



THE ROW, FALL 25



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# The Rule Engine

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# PYTHON CODING - the engine

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## What The Engine Does

**Input** - Research findings translated into structured data and probability distributions.

**Process** - Applies business rules and constraints to generate a balanced assortment.

**Output** - A complete, validated collection plan with design coherence and commercial viability.

**Validation** - Ensures all creative and commercial constraints (e.g., color rules, silhouette exclusions) are met.

## Technical Execution

Built with Python, leveraging key libraries for data manipulation, statistical sampling, and logic enforcement:

**random & Collections** - For implementing weighted probability distributions and managing complex data structures.

**Custom Rule Engine** - Logic that codifies design strategy (e.g., "No shirt dresses for men," "Sailor collars only on tops").



# PYTHON CODING - the rules

## Colors

Weighted distribution followed by random assignment of color

50% Group 01:



35% Group 2:



15% Group 3:



+ For categories that has fewer than 2 items per gender ,  
only use groups 1 and 2 for color assortment.

## Silhouettes

Weighted distribution followed by random assignment + extra logical rules

50% Group 01: basics, tied-up, drapes

35% Group 2: poplin volumes, shirt dress

15% Group 3: co-ords

- + At least one Shirt Dress
- + No Shirt Dress for Men
- + Co-ords only under the category 'Tops (T-shirts & Blouses)'

# PYTHON CODING - the rules

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## Surface Design

Weighted distribution followed by random chances

50% Group 01: basics/plain

40% Group 2: sheer, stripe #1, stripe #2

10% Group 3: braids

+ At least one of each for each gender

## Details

Random distribution: basics, utility, twists, sailor collar

+ At least one Shirt Dress

+ Sailor Collar only under the category 'Tops (T-shirts & Blouses)' and 'Tricot Tops'

# PYTHON CODING - the output

COLLECTION TABLE WITH COMPLETED COLUMNS

Total products: 35

| Category                  | Gender    | Colors       | Silhouettes | Surface   | Details       |
|---------------------------|-----------|--------------|-------------|-----------|---------------|
| Tops (T-shirts & Blouses) | Feminine  | cocoa        | co-ords     | basics    | basics        |
| Tops (T-shirts & Blouses) | Feminine  | winter moss  | drapes      | basics    | twists        |
| Tops (T-shirts & Blouses) | Feminine  | meteorite    | basics      | basics    | utility       |
| Shirts                    | Feminine  | winter moss  | poplin      | sheer     | basics        |
| Shirts                    | Feminine  | autumn glaze | poplin      | stripes 1 | twists        |
| Shirts                    | Feminine  | autumn glaze | poplin      | sheer     | basics        |
| Trousers                  | Feminine  | frosted mint | poplin      | basics    | twists        |
| Trousers                  | Feminine  | cocoa        | poplin      | stripes 1 | utility       |
| Skirts                    | Feminine  | white down   | basics      | basics    | basics        |
| Skirts                    | Feminine  | white down   | basics      | braids    | utility       |
| Blazer                    | Feminine  | meteorite    | drapes      | braids    | utility       |
| Tricot Tops               | Feminine  | meteorite    | drapes      | basics    | utility       |
| Tricot Tops               | Feminine  | spellbound   | poplin      | stripes 1 | sailor collar |
| Tricot Tops               | Feminine  | morning mist | basics      | basics    | utility       |
| Tricot Tops               | Feminine  | autumn glaze | shirt dress | basics    | basics        |
| Tricot Tops               | Feminine  | white down   | shirt dress | basics    | utility       |
| One-piece                 | Feminine  | meteorite    | basics      | sheer     | basics        |
| One-piece                 | Feminine  | autumn glaze | shirt dress | basics    | utility       |
| One-piece                 | Feminine  | morning mist | poplin      | stripes 2 | utility       |
| Raincoat / Parka / Jacket | Feminine  | spellbound   | tied up     | braids    | utility       |
| Raincoat / Parka / Jacket | Feminine  | white down   | shirt dress | sheer     | utility       |
| Wool Coat                 | Feminine  | cocoa        | poplin      | basics    | twists        |
| Wool Coat                 | Feminine  | winter moss  | shirt dress | basics    | utility       |
| Tops                      | Masculine | cocoa        | tied up     | sheer     | basics        |
| Tops                      | Masculine | spellbound   | tied up     | sheer     | utility       |
| Shirts                    | Masculine | cocoa        | poplin      | stripes 1 | utility       |
| Trousers                  | Masculine | spellbound   | poplin      | sheer     | twists        |
| Trousers                  | Masculine | cocoa        | poplin      | stripes 2 | utility       |
| Blazer                    | Masculine | winter moss  | tied up     | sheer     | basics        |
| Tricot Tops               | Masculine | autumn glaze | poplin      | basics    | sailor collar |
| Tricot Tops               | Masculine | spellbound   | drapes      | sheer     | sailor collar |
| Vest                      | Masculine | spellbound   | poplin      | stripes 1 | twists        |
| Raincoat / Parka / Jacket | Masculine | cocoa        | basics      | braids    | utility       |
| Raincoat / Parka / Jacket | Masculine | winter moss  | poplin      | sheer     | utility       |
| Wool Coat                 | Masculine | white down   | poplin      | basics    | twists        |

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SUMMARY STATISTICS:

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Color Distribution:

autumn glaze: 5 pcs (14.3%)  
 cocoa: 7 pcs (20.0%)  
 frosted mint: 1 pcs (2.9%)  
 meteorite: 4 pcs (11.4%)  
 morning mist: 2 pcs (5.7%)  
 spellbound: 6 pcs (17.1%)  
 white down: 5 pcs (14.3%)  
 winter moss: 5 pcs (14.3%)

Silhouette Distribution:

basics: 6 pcs (17.1%)  
 co-ords: 1 pcs (2.9%)  
 drapes: 4 pcs (11.4%)  
 poplin: 15 pcs (42.9%)  
 shirt dress: 5 pcs (14.3%)  
 tied up: 4 pcs (11.4%)

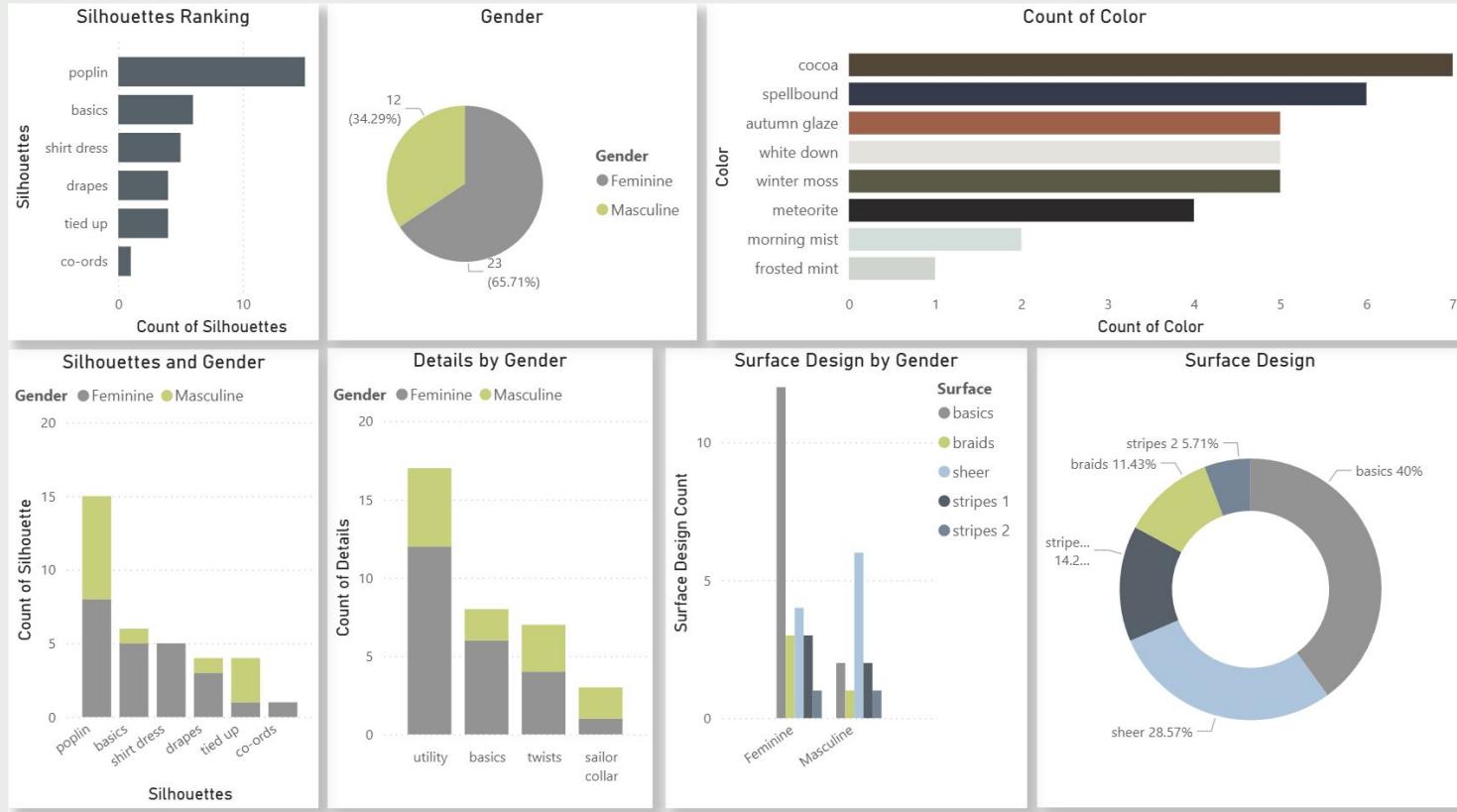
Surface Distribution:

basics: 14 pcs (40.0%)  
 braids: 4 pcs (11.4%)  
 sheer: 10 pcs (28.6%)  
 stripes 1: 5 pcs (14.3%)  
 stripes 2: 2 pcs (5.7%)

Details Distribution:

basics: 8 pcs (22.9%)  
 sailor collar: 3 pcs (8.6%)  
 twists: 7 pcs (20.0%)  
 utility: 17 pcs (48.6%)

# OUTPUT OVERVIEW (PowerBI)



# INSIGHTS ABOUT THE OUTPUT

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## Colors

The palette is anchored in **cocoa** (20%) and **spellbound** (17.1%), establishing a strong neutral base as intended.

There is a mismatch among dark neutrals, with **cocoa** dominating while **meteorite** accounts for only 11.4%.

**Frosted mint** is underrepresented, with just one piece, limiting its impact as an accent color.

## Details

**Utility** details (48.6%) are strongly emphasized, aligning with current trends for functionality and practicality.

## Silhouette

**Poplin** (15 pieces) is heavily featured, while **co-ords** remain minimal with only one piece, reducing silhouette diversity.

## Surface Design

Distribution is generally balanced, but sheer (10 pieces) could be fine-tuned by reallocating some pieces toward stripes 2 to justify print investments.

# INSIGHTS ABOUT THE OUTPUT

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## General Evaluation

The output delivers a commercially safe assortment with a **strong basics** foundation and **utility** focus.

Opportunities exist to boost elements such as **co-ords**, accent colors, and diversified **prints** for a more dynamic mix.

Final adjustments should align with brand strategy: either leaning into bold trend statements or pursuing a more balanced, risk-averse approach.

# CONCLUSION AND IMPACT

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## Conclusion

This project shows how data analytics and creative design can merge to make assortment planning more structured and insightful. By combining Python automation, Excel analysis, and Power BI visualization, **the proof of concept demonstrates how trend research can translate into rule-based, data-informed decisions.**

## Proof of Concept Delivered

The engine successfully generated a complete assortment plan, providing clear insights into color balance, silhouette distribution, surface designs, and details. The Power BI dashboard turned these outputs into actionable visuals for quick evaluation.

## Key Impact

Showcased how data-driven creativity can guide planning decisions without replacing design intuition.

Identified opportunities for fine-tuning assortments, such as rebalancing accent colors, silhouettes, and print investments.

Highlighted the potential for iterative improvement and long-term exploration, including predictive analytics or system integrations.

# NEXT STEPS

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## Enhance the Engine

Add more rules, categories, and flexibility to handle different seasons or product lines.

## Pilot & Validate

Compare outputs with historical sales and design data to check accuracy and relevance.

## User Feedback & Iteration

Share results with peers or industry professionals to gather insights and refine the logic.

## Explore Future Potential

Experiment with AI forecasting or system integrations as optional, longer-term directions.



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