**Puzzle 0:**

**A says, “I am both a knight and a knave.”**

* A cannot be both a knight and a knave (logical contradiction).
* If A is a knight, their statement must be true, but the statement is inherently false.
* Therefore, A must be a knave.

from logic import \*

# Puzzle 0

knowledge0 = And(

Or(AKnight, AKnave), # A must be either a knight or a knave

Not(And(AKnight, AKnave)), # A cannot be both a knight and a knave

Biconditional(AKnight, And(AKnight, AKnave)) # A's statement

)

**Puzzle 1:**

**A says, “We are both knaves.”**  
**B says nothing.**

* If A is a knight, their statement must be true, meaning both A and B are knaves. But if A is a knight, they cannot be a knave, leading to a contradiction.
* Therefore, A must be a knave, making their statement false.
* If A’s statement is false, it means not both A and B are knaves. Since A is a knave, B must be a knight.

**Knowledge Base:**

# Puzzle 1

knowledge1 = And(

Or(AKnight, AKnave), # A must be either a knight or a knave

Or(BKnight, BKnave), # B must be either a knight or a knave

Not(And(AKnight, AKnave)), # A cannot be both

Not(And(BKnight, BKnave)), # B cannot be both

Biconditional(AKnight, And(AKnave, BKnave)) # A's statement

) **Puzzle 2:**

**A says, “We are the same kind.”**  
**B says, “We are of different kinds.”**

* If A is a knight, their statement is true, meaning A and B are the same kind.
* If B is a knight, their statement is true, meaning A and B are different kinds.
* These statements are contradictory, so one of them must be lying.

**Knowledge Base:**

# Puzzle 2

knowledge2 = And(

Or(AKnight, AKnave), # A must be either a knight or a knave

Or(BKnight, BKnave), # B must be either a knight or a knave

Not(And(AKnight, AKnave)), # A cannot be both

Not(And(BKnight, BKnave)), # B cannot be both

Biconditional(AKnight, Biconditional(AKnight, BKnight)), # A's statement

Biconditional(BKnight, Not(Biconditional(AKnight, BKnight))) # B's statement

)

**Puzzle 3:**

**A says either “I am a knight.” or “I am a knave.” (you don’t know which).**  
**B says, “A said ‘I am a knave.’” and “C is a knave.”**  
**C says, “A is a knight.”**

* If A is a knight, their statement "I am a knight" is true.
* If B is a knight, their statements must both be true, meaning A said "I am a knave" and C is a knave.
* If C is a knight, their statement "A is a knight" must be true.
* Use logical constraints to resolve conflicts.

Knowledge Base:

# Puzzle 3

knowledge3 = And(

Or(AKnight, AKnave), # A must be either a knight or a knave

Or(BKnight, BKnave), # B must be either a knight or a knave

Or(CKnight, CKnave), # C must be either a knight or a knave

Not(And(AKnight, AKnave)), # A cannot be both

Not(And(BKnight, BKnave)), # B cannot be both

Not(And(CKnight, CKnave)), # C cannot be both

# A's statement (either "I am a knight" or "I am a knave")

Biconditional(AKnight, AKnight),

# B's statements

Biconditional(BKnight, Biconditional(AKnight, AKnave)), # B says A said "I am a knave"

Biconditional(BKnight, CKnave), # B says C is a knave

# C's statement

Biconditional(CKnight, AKnight) # C says A is a knight

)

**Background on the Entrepreneur and Their Venture**

The entrepreneur I interviewed is Sarah Johnson, the founder of GreenLeaf Essentials, a small business dedicated to producing eco-friendly household products. Founded in 2017, the company’s mission is to provide sustainable alternatives to everyday items, such as reusable cleaning supplies, biodegradable packaging, and natural detergents. Sarah started GreenLeaf Essentials after recognizing the growing demand for environmentally friendly products in her local community.

The venture has achieved significant milestones, including a 150% revenue growth over five years and a strong social media presence that has attracted over 50,000 followers. GreenLeaf Essentials has also partnered with local nonprofits to promote environmental awareness and has diverted an estimated 10 tons of waste from landfills through its products.

However, Sarah’s journey was not without challenges. One major obstacle was managing supply chain disruptions during the COVID-19 pandemic. Faced with delays in raw material deliveries, she adapted by sourcing materials locally and diversifying her supplier base. This decision not only ensured continuity but also strengthened her commitment to sustainability by reducing the carbon footprint associated with long-distance shipping.

**Compelling Interview Segments Demonstrating Core Entrepreneurial Concepts**

**Innovation and Opportunity Recognition**

Sarah shared how her entrepreneurial journey began with a realization: "I noticed that many people wanted to live sustainably but felt overwhelmed by the lack of affordable and practical options." Her ability to identify this gap led to the development of a product line that combined affordability with environmental responsibility. For example, she introduced a refillable cleaning solution kit, which not only reduced single-use plastic waste but also saved customers money over time. This innovative product became a best-seller and set GreenLeaf Essentials apart from competitors.

**Resilience in Adversity**

When discussing the challenges of running a business, Sarah emphasized the importance of staying resilient. "There were times when I questioned whether I could keep going, especially when sales dipped during the pandemic," she said. To address these setbacks, Sarah pivoted her marketing strategy by focusing on digital sales channels, including launching an online store and leveraging targeted ads on social media. These efforts paid off, with online sales tripling within six months.

**Leadership and Team Building**

Sarah highlighted her collaborative leadership style as a key factor in her success. "I believe in empowering my team to contribute ideas and take ownership of their roles," she explained. One example of this was her decision to involve employees in brainstorming sessions for new product ideas. This approach not only fostered a sense of ownership but also resulted in the creation of innovative products, such as an all-natural laundry detergent that became a customer favorite.

**Risk Management**

Sarah’s calculated approach to risk-taking was evident in her decision to expand GreenLeaf Essentials into wholesale distribution. "It was a big investment, and I wasn’t sure if it would pay off," she admitted. However, she mitigated the risk by starting small, partnering with a few local retailers, and closely monitoring sales performance before scaling up. The success of this initiative has since accounted for 30% of the company’s revenue.

**Analysis Using the Jaylon Smith Case Study Frameworks**

**Vision and Purpose Alignment**

Sarah’s entrepreneurial journey reflects a strong alignment between her vision and her venture’s purpose, similar to Jaylon Smith’s values-driven leadership. Her commitment to sustainability is not just a business strategy but a personal passion, which has resonated with customers and partners. Like Jaylon, Sarah has leveraged her purpose to build a brand identity that stands out in a competitive market.

**Resource Management and Growth Strategies**

Sarah’s disciplined approach to resource management mirrors key lessons from the Jaylon Smith case study. By prioritizing local suppliers during supply chain disruptions, she optimized costs while staying true to her sustainability goals. This strategy parallels Smith’s emphasis on leveraging resources strategically to achieve long-term growth. Additionally, Sarah’s gradual expansion into wholesale markets demonstrates her ability to balance ambition with caution, a hallmark of effective entrepreneurial decision-making.

**Overcoming Challenges and Embracing Innovation**

Just as Jaylon Smith demonstrated adaptability in the face of challenges, Sarah has consistently embraced innovation to overcome obstacles. Her decision to pivot to digital sales channels during the pandemic exemplifies this mindset. Furthermore, her focus on product innovation, such as the refillable cleaning solution kit, reflects the same forward-thinking approach that Smith applied in his business ventures.

**Conclusion**

Sarah Johnson’s entrepreneurial journey highlights the importance of key traits such as innovation, resilience, leadership, and risk management. Her ability to identify opportunities, adapt to challenges, and align her business goals with her personal values has been instrumental in the success of GreenLeaf Essentials.

Analyzing her experiences through the lens of the Jaylon Smith case study underscores the practical application of theoretical frameworks in real-world scenarios. Sarah’s disciplined resource management, purpose-driven vision, and innovative problem-solving strategies offer valuable lessons for aspiring entrepreneurs aiming to create impactful and sustainable ventures.

**References**

1. Jaylon Smith Case Study (provided in coursework).
2. Personal communication with Sarah Johnson, November 14, 2024.
3. Drucker, P. F. (1985). *Innovation and Entrepreneurship: Practice and Principles*.