GRAET

Planning Hockey Careers *with Python*

Jaroslav Bezdek · 9 December 2025

```python
AGENDA: list[str] = [...]

for i, item in enumerate(AGENDA, start=1):
    print(f"{i:02} - {item}")

# 01 - About Me
# 02 - About GRAET
# 03 - The Problem
# 04 - The Theory
# 05 - The Inference
# 06 - Summary
```

About Me

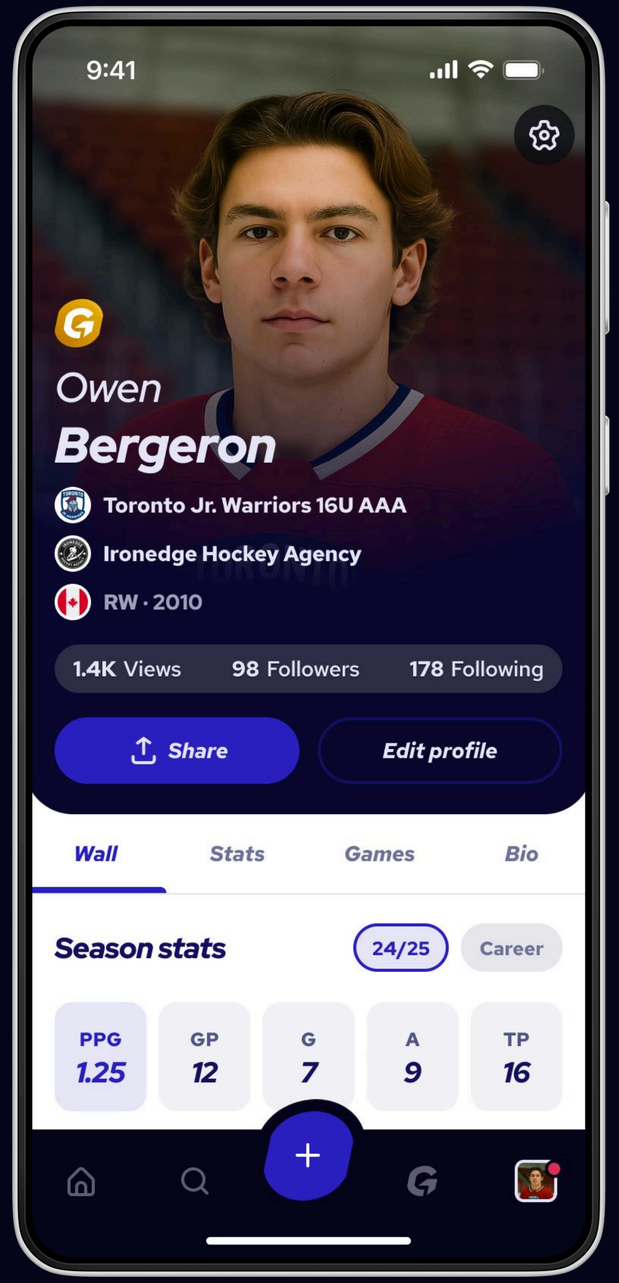
01

```
name = "Jaroslav Bezdek"
nationality = "Czech Republic"

full_time_job = "Head of Sports Intelligence"
full_time_job_company = "GRAET"

part_time_job = "Hockey Data Analyst"
part_time_job_company = "HC Sparta Prague"
```

About GRAET

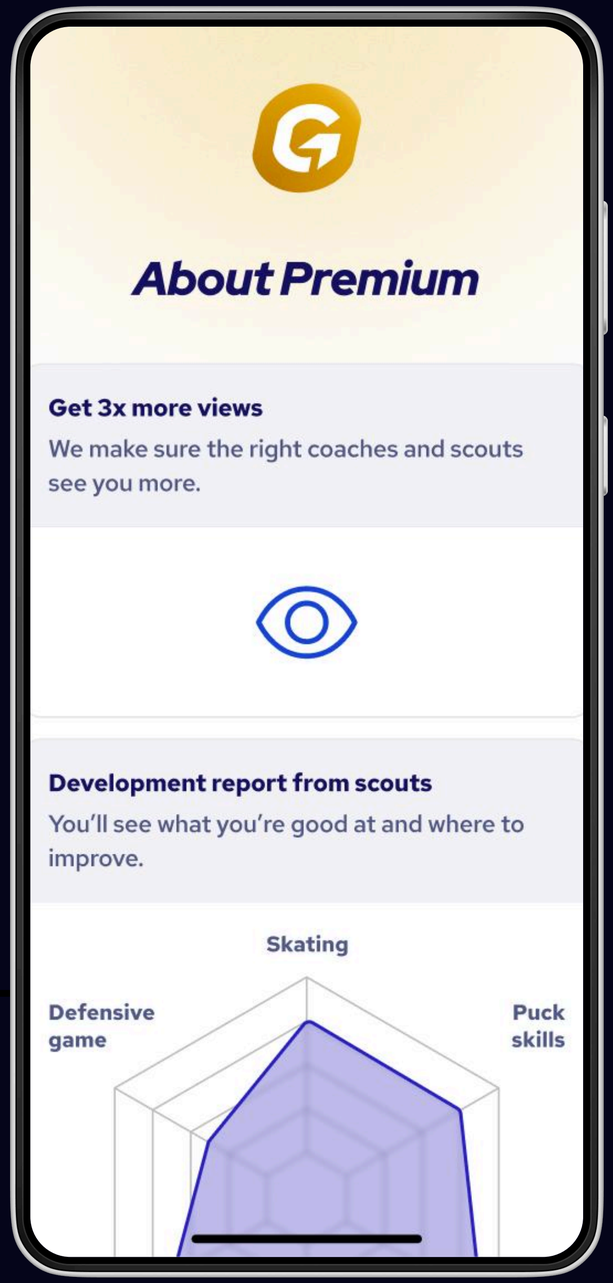
02

```python
graet = MobileApp(
  nickname="LinkedIn for hockey players",
  registered_players=25_000,
)

assert graet.is_actually_great()
```



The Problem

03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Development report from scouts
You'll see what you're good at and where to improve.
Skating
Defensive game
Puck skills

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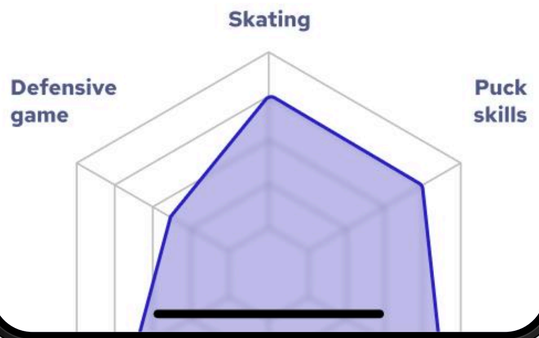

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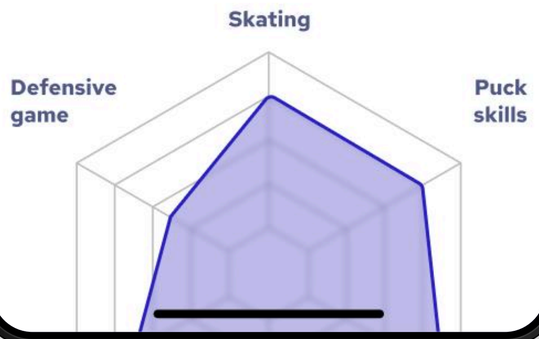

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Blue Activity Career

Career path

Explore the most potentially successful paths to reach your goal and discuss each season with Blue.

Your goal
NCAA

Path #1 Path #2 Path #3

Season 25/26
15U AAA league

PPG target Needs growth

0.94

0.87 1.07 1.22 1.49

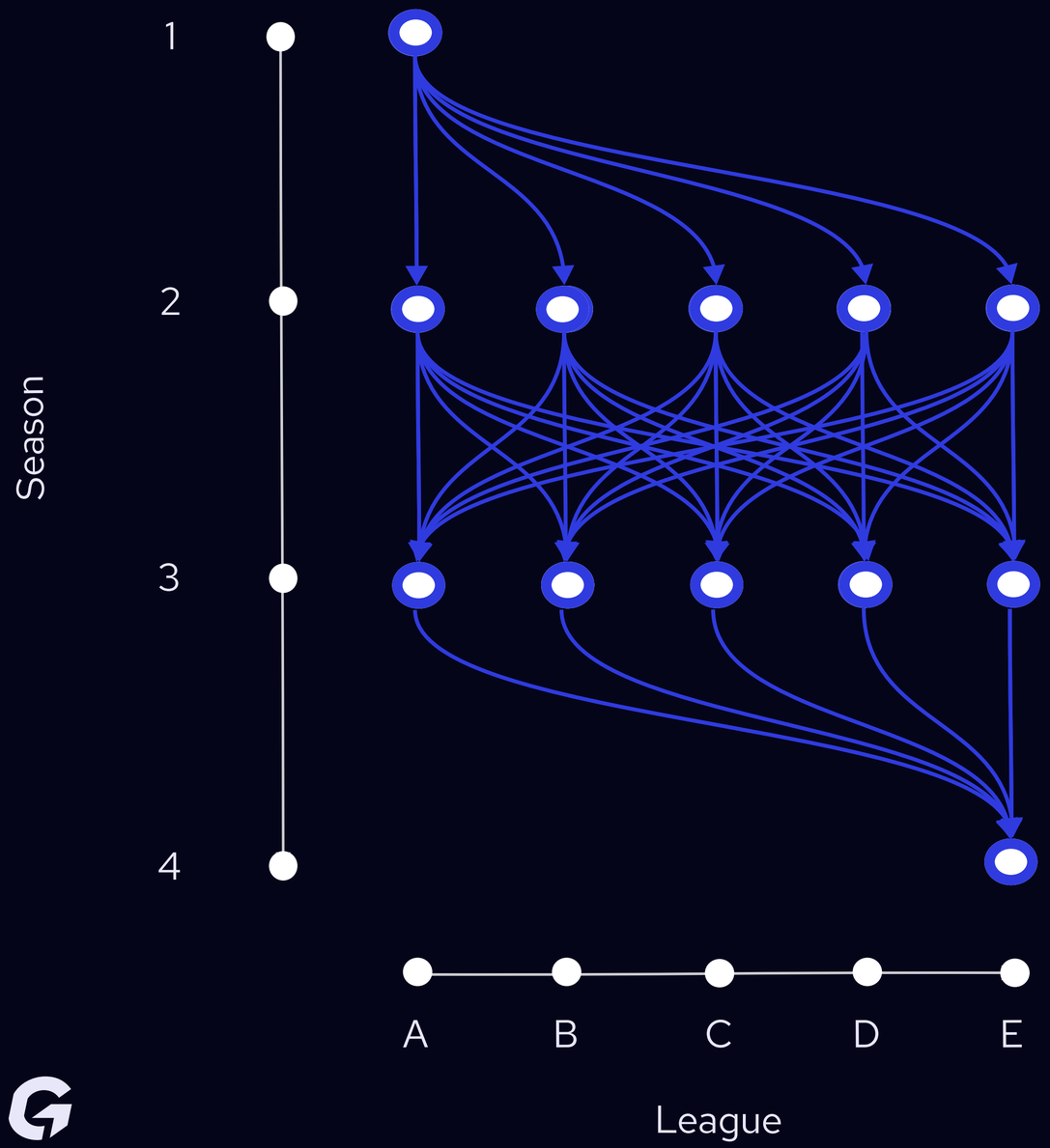
Season 26/27
16U AAA league

Season 27/28
NAHL

Season 28/29
NCAA

The Theory

04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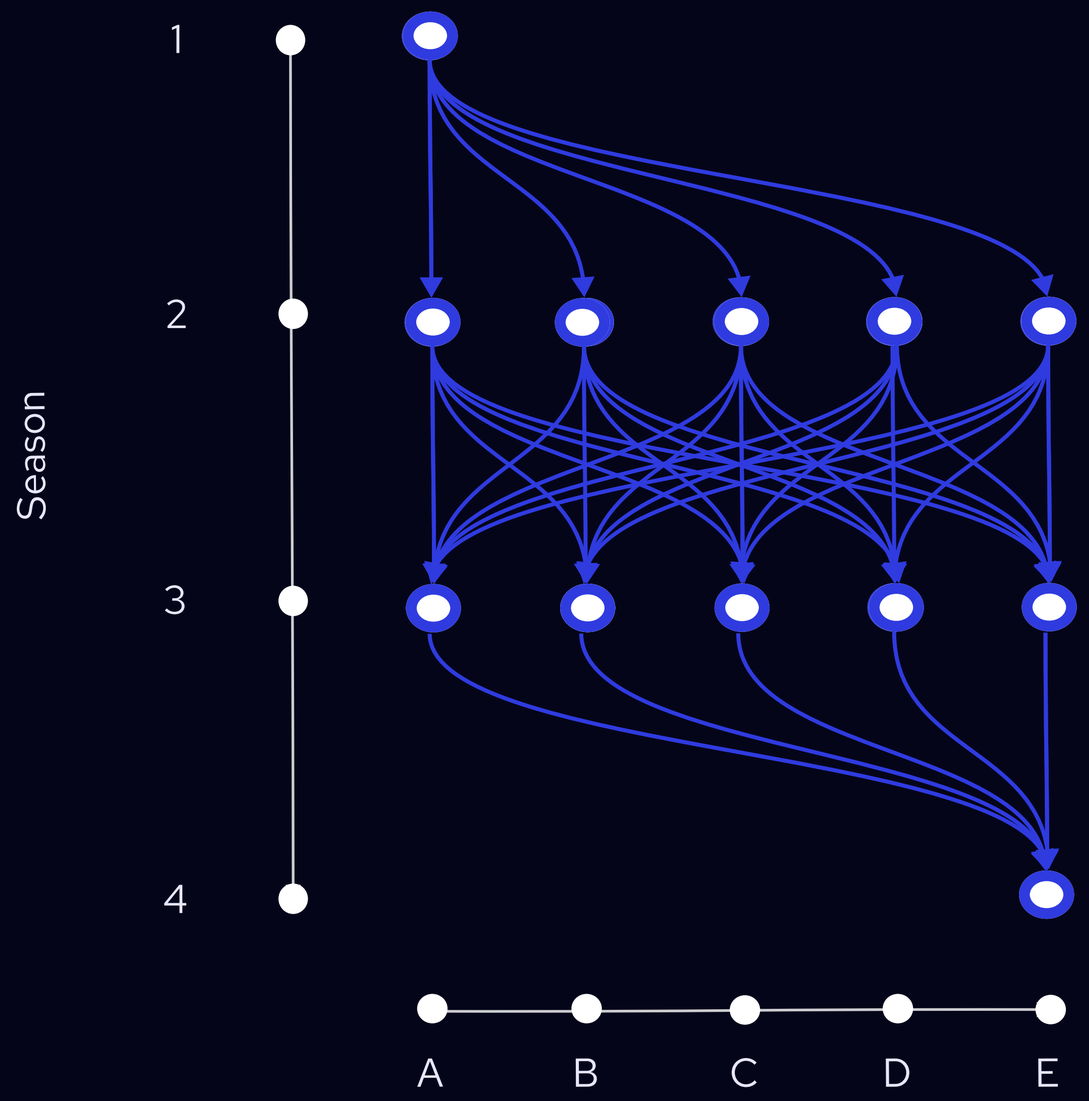
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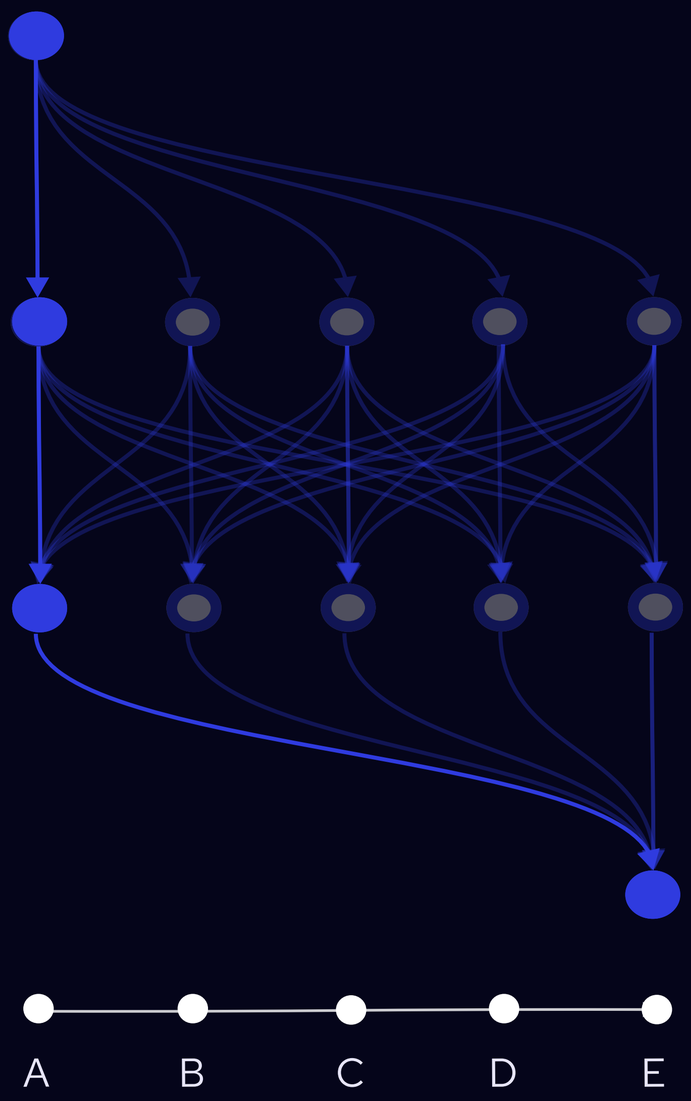
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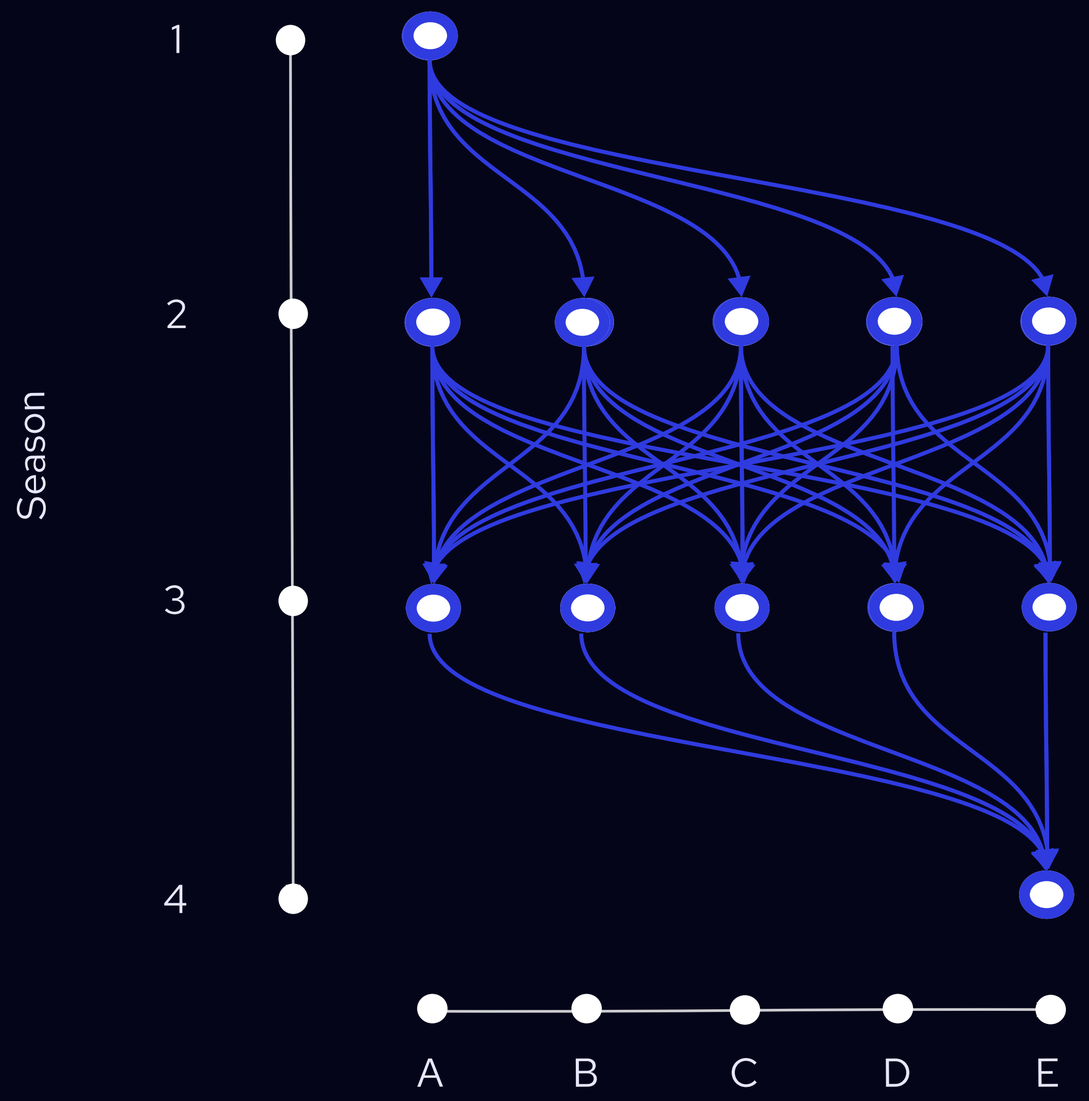
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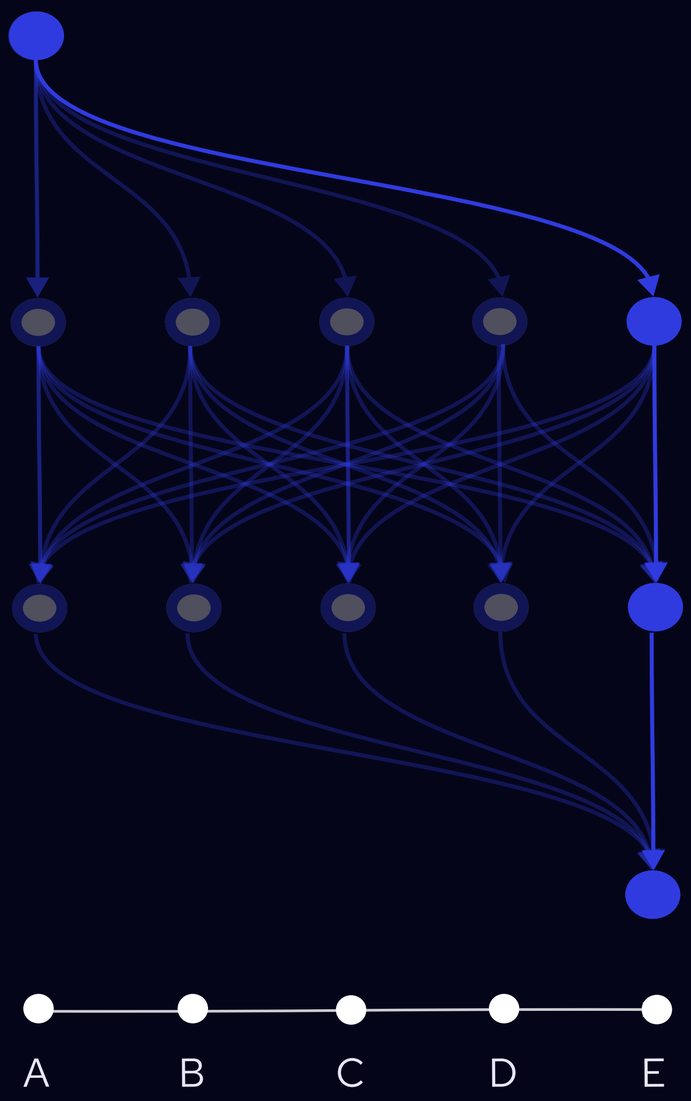
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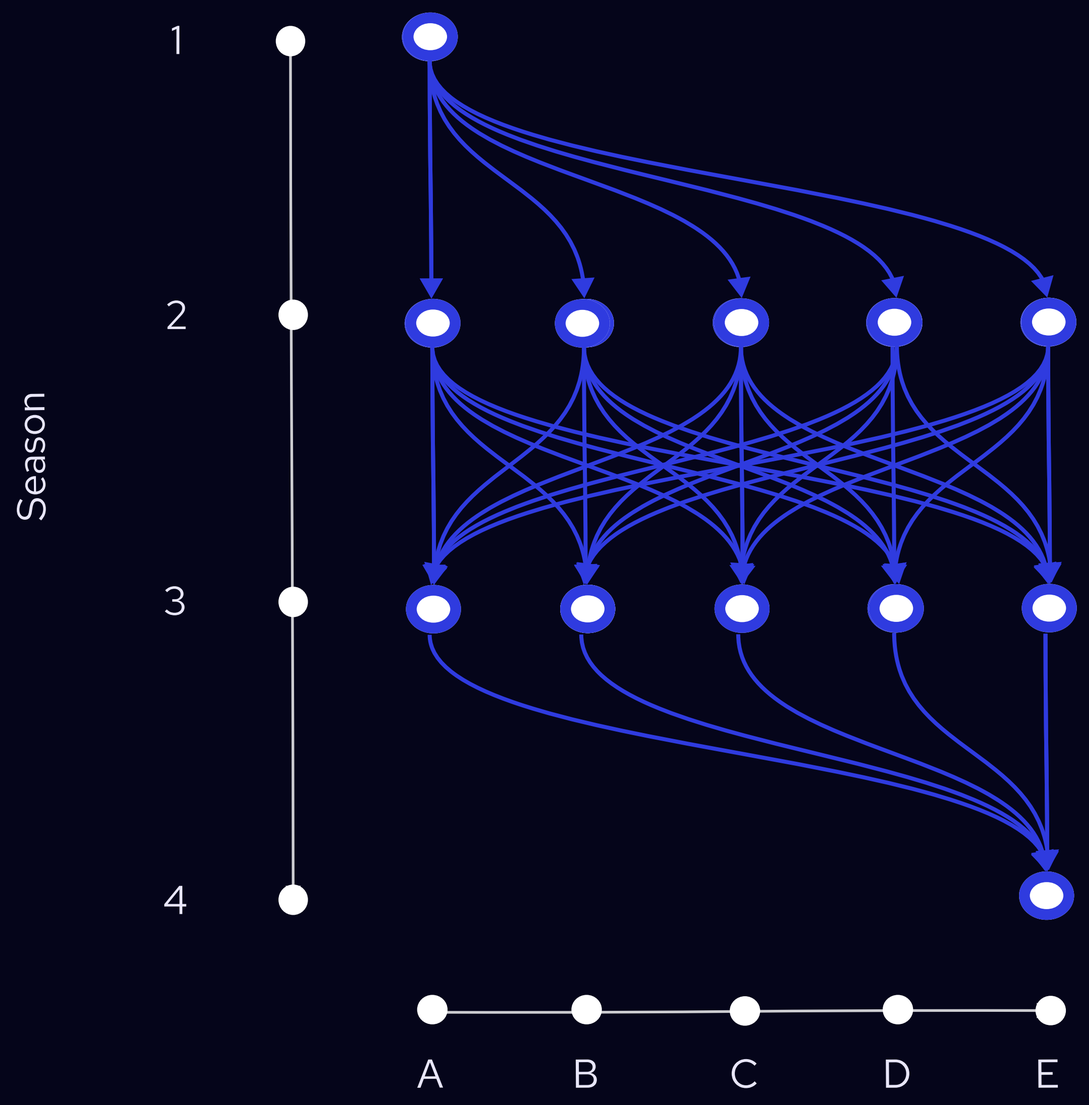
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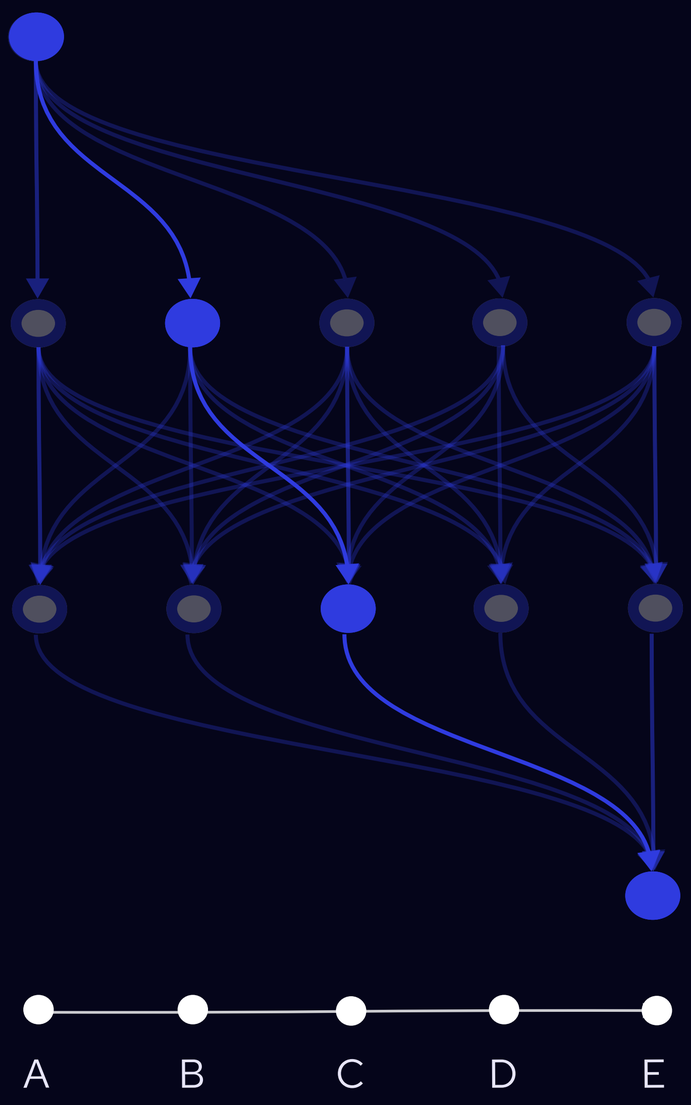
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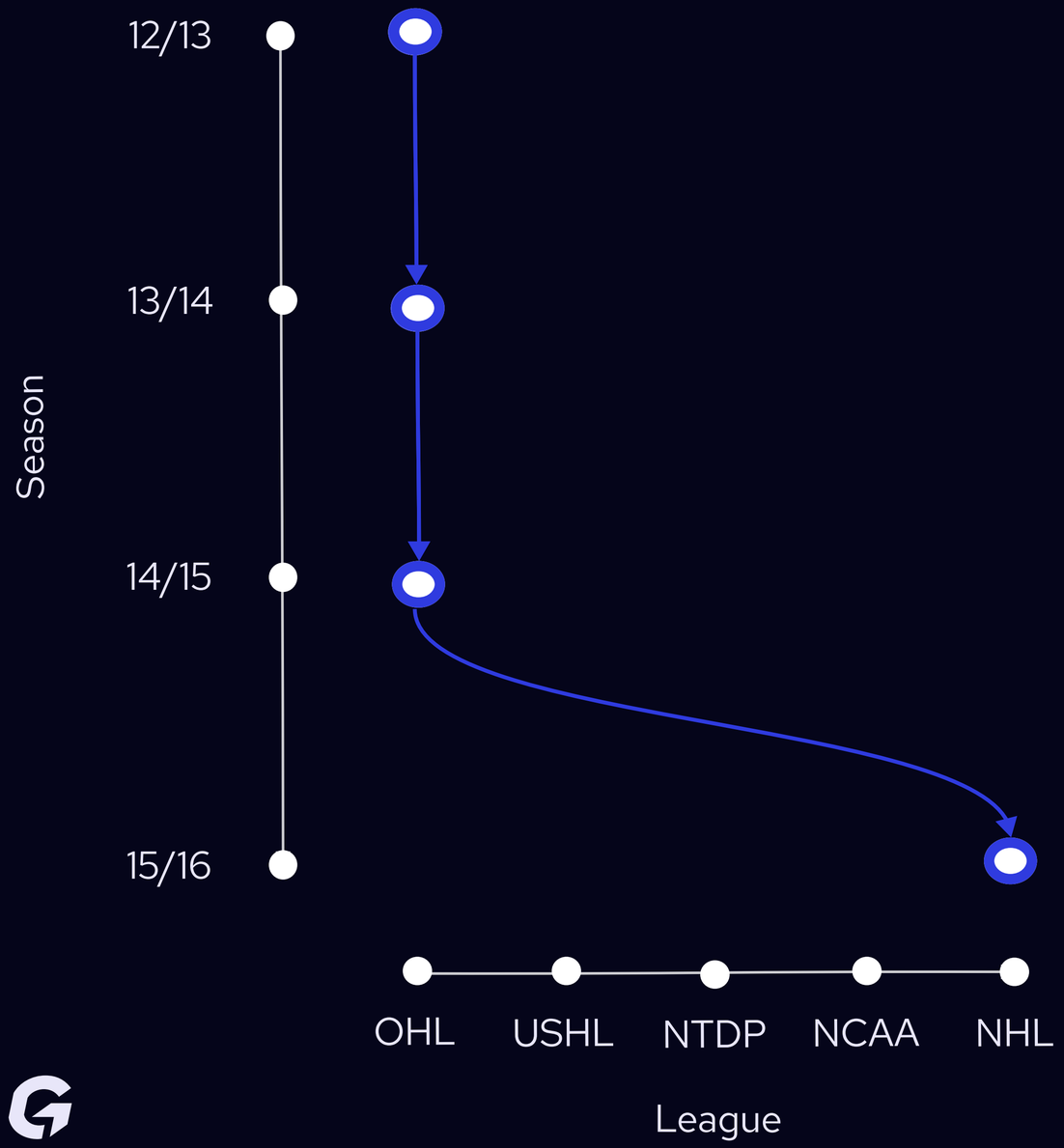
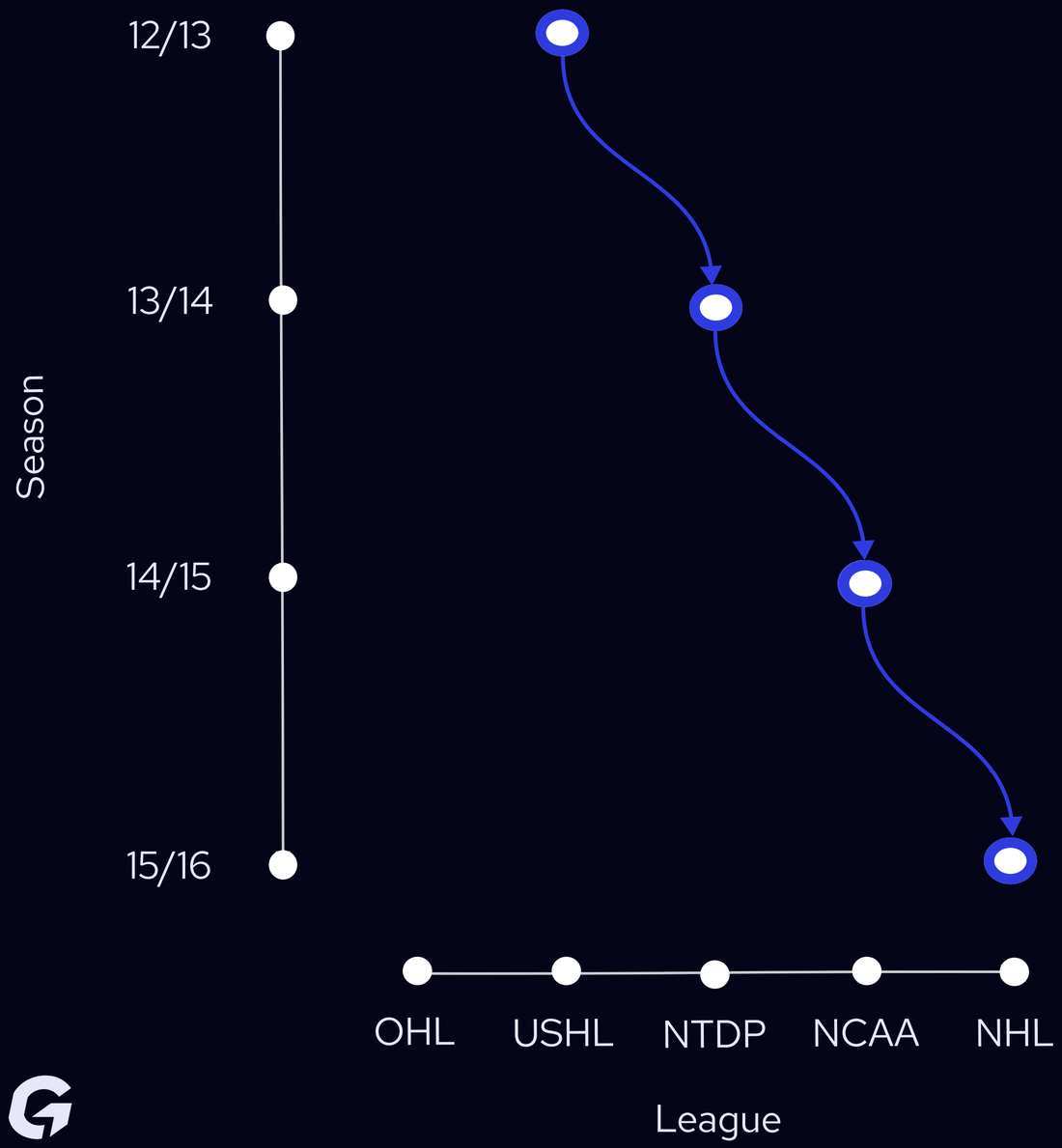


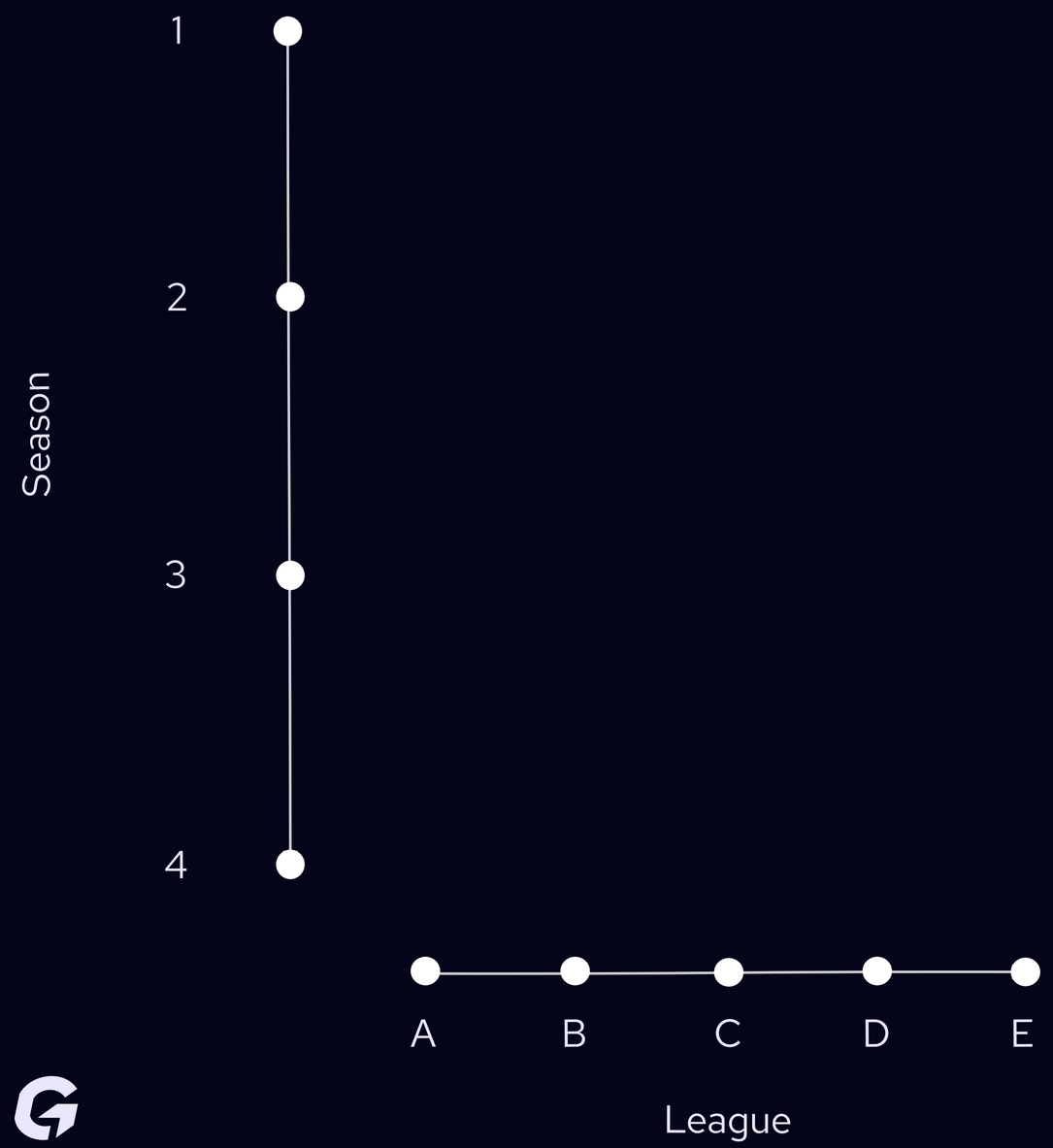
Connor McDavid

Edmonton Oilers | #97 | C



Jack Eichel

Vegas Golden Knights | #9 | C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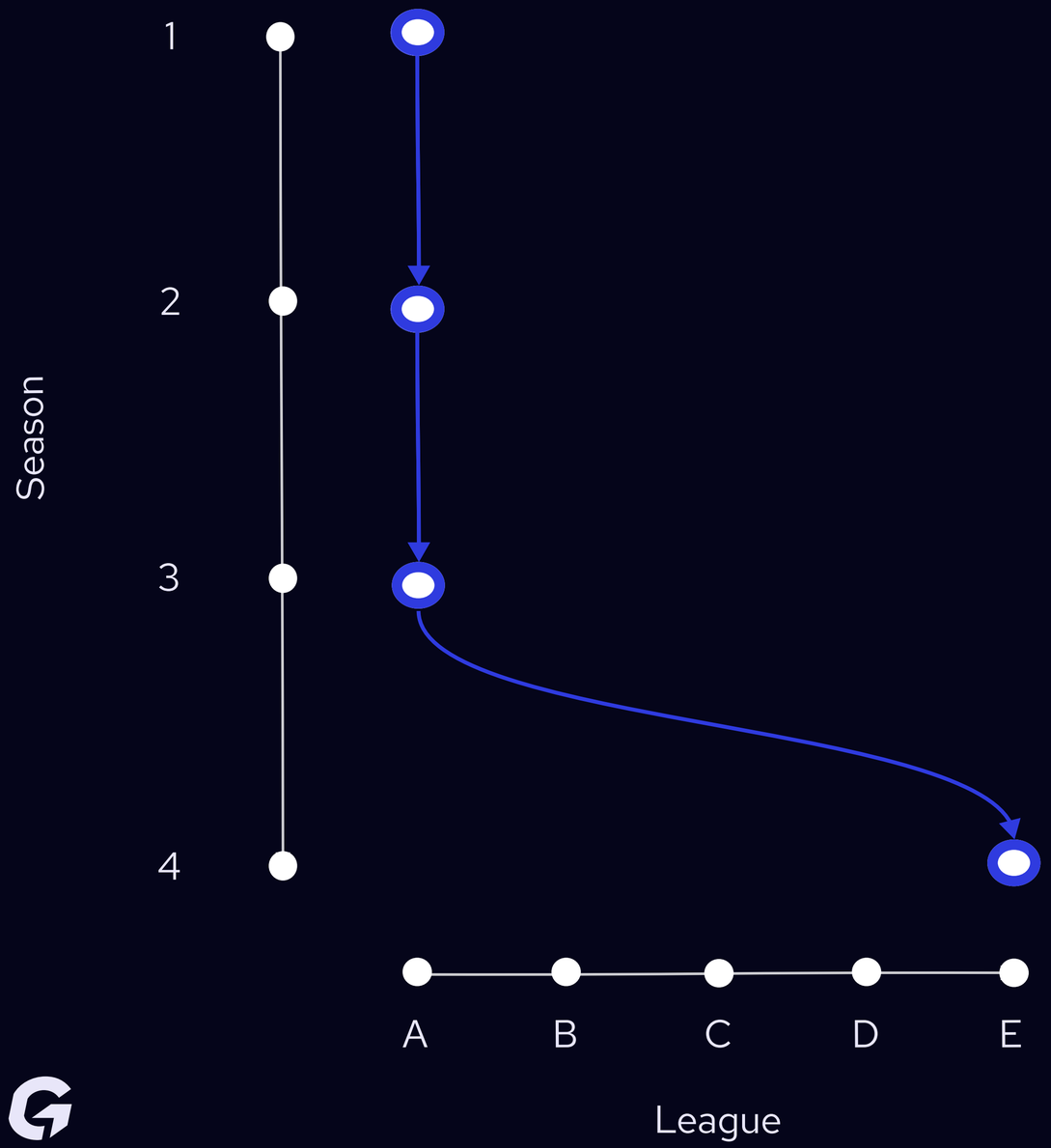
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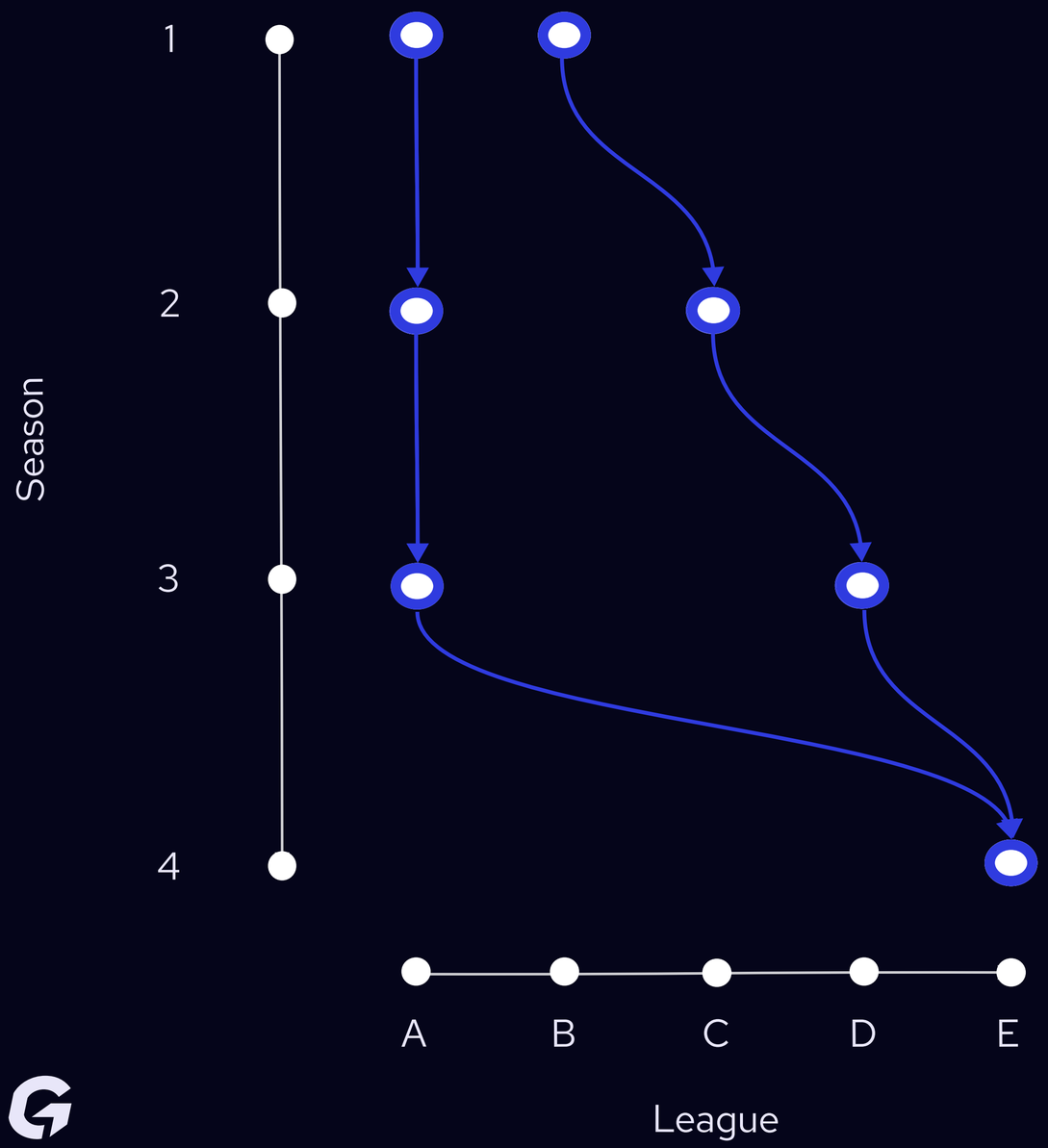
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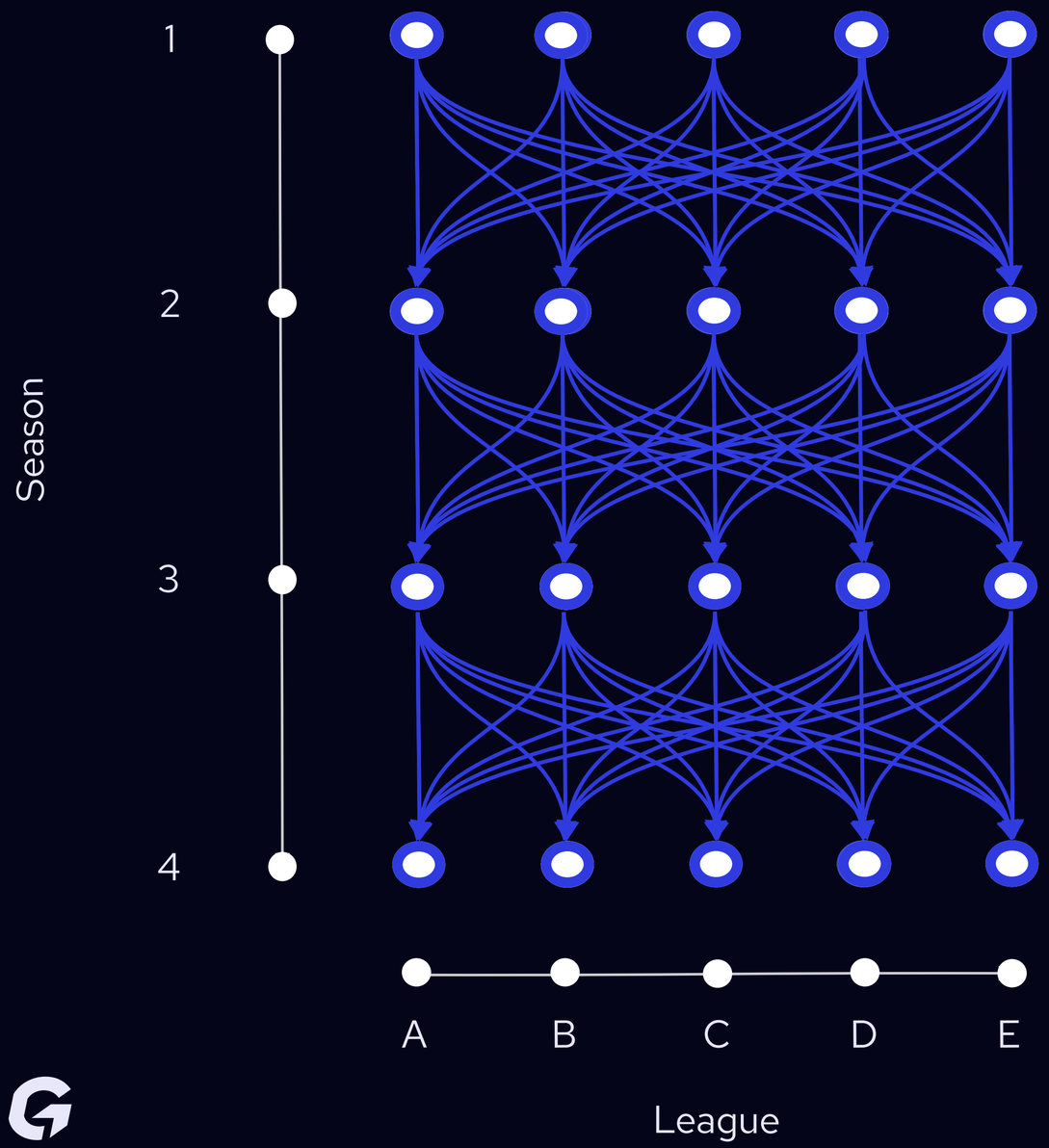
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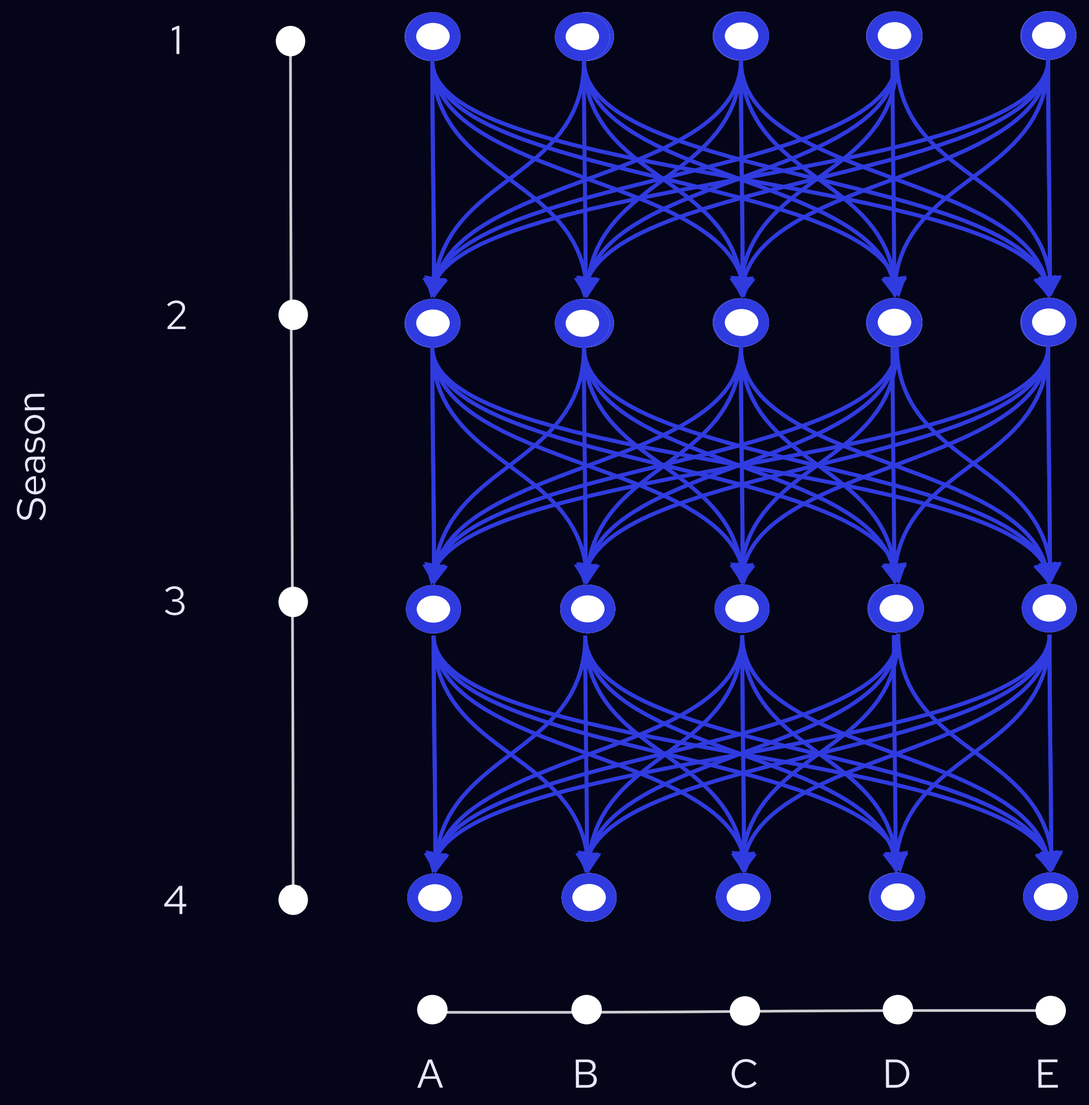
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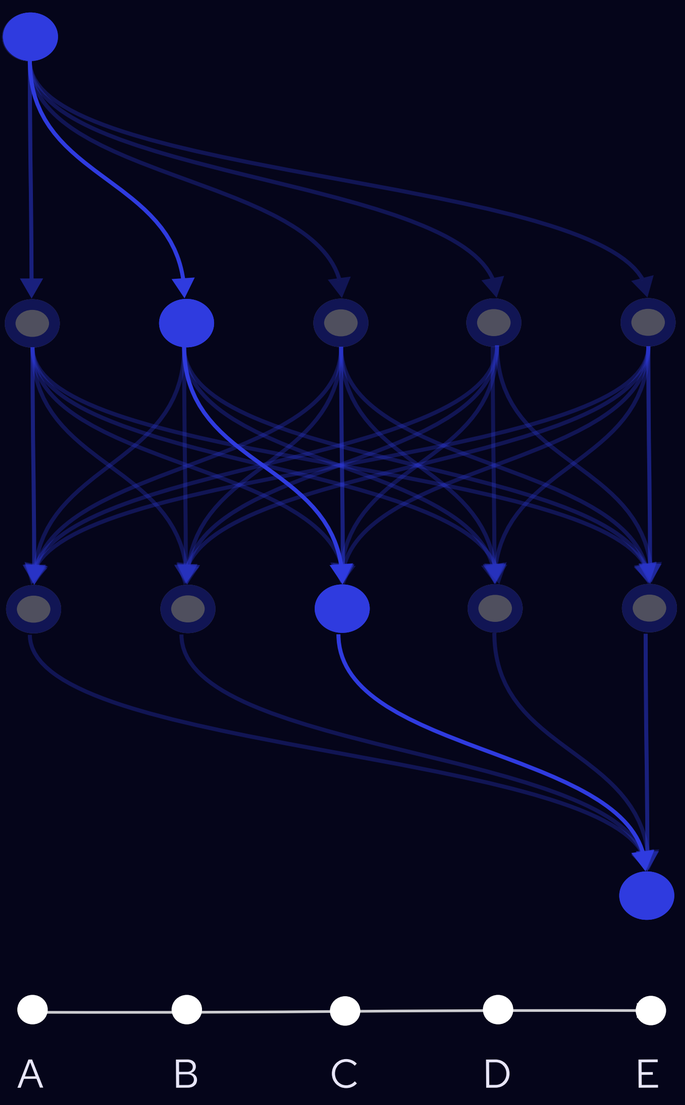
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The Inference

05

```
request = {
    "current_age": 15,
    "current_league": "Czechia U17",
    "target_league": "NHL",
}


from operator import itemgetter


current_age, current_league, target_league = itemgetter(
    "current_age", "current_league", "target_league"
)(request)
```

```python
import duckdb


df = duckdb.read_csv(path_or_buffer=...)
print(df.limit(5))
```

```
# +----------+----------+-----------+-----------------+-----+----------+
# | position | country  | handedness| age_10          | ... | age_20   |
# | ---      | ---      | ---       | ---             | ... | ---      |
# | str      | str      | str       | str             | ... | str      |
# +----------+----------+-----------+-----------------+-----+----------+
# | D        | CA       | RIGHT     | Ontario U10 AAA | ... | NHL      |
# | F        | CZ       | RIGHT     | Czechia U10     | ... | AHL      |
# | G        | CA       | RIGHT     | Quebec U11 AA   | ... | OHL      |
# | F        | SE       | RIGHT     | Sweden U10      | ... | Sweden   |
# | F        | US       | RIGHT     | Alaska U10 A    | ... | NCAA     |
# +----------+----------+-----------+-----------------+-----+----------+
```

```python
def get_players_with_similar_start(current_age: int, current_league: str):
    filter_expr = f"age_{current_age} = '{current_league}'"
    return df.filter(filter_expr)
```

```python
def get_players_with_similar_start(current_age: int, current_league: str):
    filter_expr = f"age_{current_age} = '{current_league}'"
    return df.filter(filter_expr)


def get_players_with_similar_target(
    current_age: int, target_league: str, max_age: int = 20
):
    filter_expr = or_conditions([
        f"age_{age} = '{target_league}'"
        for age in range(current_age + 1, max_age + 1)
    ])
    return df.filter(filter_expr)
```

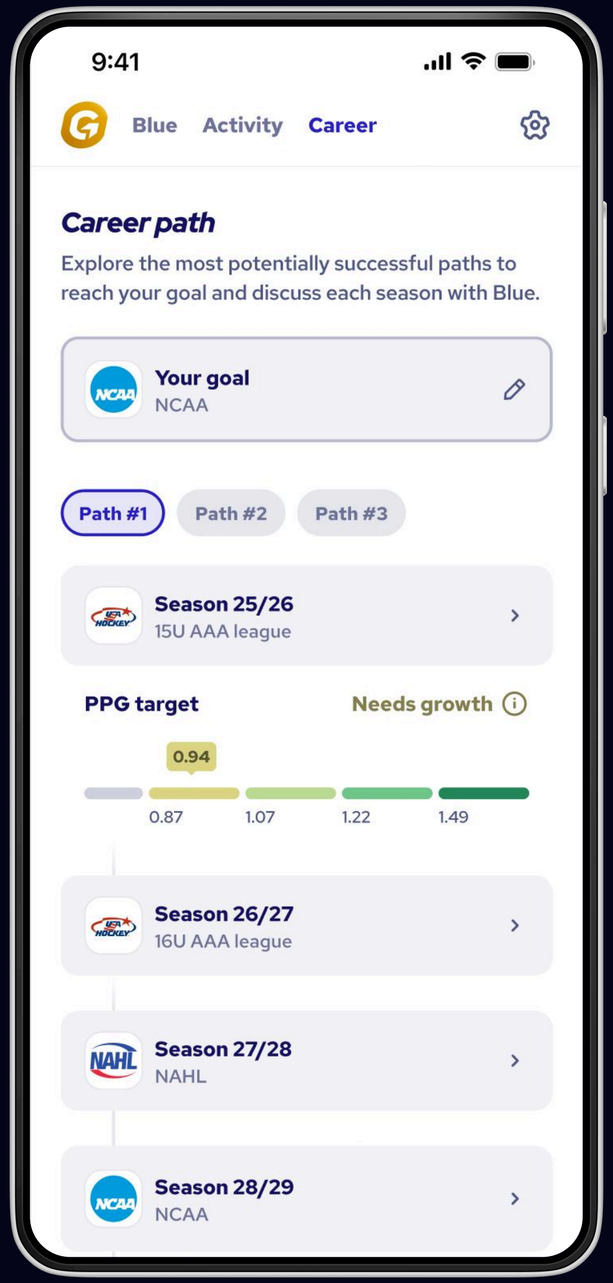
```
players_with_similar_start = get_players_with_similar_start(current_age, current_league)
players_with_similar_target = get_players_with_similar_target(current_age, target_league)


def get_similar_players(
    players_with_similar_start: duckdb.DuckDBPyRelation,
    players_with_similar_target: duckdb.DuckDBPyRelation,
):
    return duckdb.sql(
        """
        select * from players_with_similar_start
        union
        select * from players_with_similar_target
        """
    ).to_df()
```

```python
import networkx as nx


def create_graph(similar_players: pd.DataFrame):
    G = nx.DiGraph()

    age_cols = [col for col in similar_players.columns if col.startswith("age_")]

    for src_age, dst_age in zip(age_cols[:-1], age_cols[1:]):

        for row in similar_players.itertuples():
            src_node, dest_node = (src_age, row[src_age]), (dst_age, row[dst_age])
            G.add_edge(src_node, dest_node, weight=G[src_node][dest_node]["weight"] + 1)

    # compute distance
    for _, _, data in G.edges(data=True):
        data["distance"] = 1 / data["weight"]

    return G
```

```python
def find_shortest_path(
    G: nx.DiGraph, current_age: int, current_league: str, target_league: str
):
    start = (current_age, current_league)
    targets = [
        node for node in G.nodes
        if node[0] > current_age and node[1] == target_league
    ]

    # pick the cheapest path among all target nodes
    shortest_path, shortest_distance = None, float("inf")

    for target in targets:
        path = nx.shortest_path(G, start, target, weight="distance")
        distance = sum(G[u][v]["distance"] for u, v in zip(path[:-1], path[1:]))

        if distance < shortest_distance:
            shortest_path, shortest_distance = path, distance

    return shortest_path or []
```

Summary

06


9:41
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Career path
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Needs growth
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Thank you!