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# ORANGE HOOPS

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## Data Science Challenge

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# Assumptions

- 2023-24 rosters are the same as 2024-25 rosters
  - Due to extensive player movement and lack of data on incoming freshman
- Score without free throws
  - Don't want to leave it up to the referees
- Based on 2023-24 CBB regular season and conference tournaments
  - No post-season tournaments ex. NIT, March Madness



# Variables

**Usage Rate** (from Sports Reference)

**Weighted Two Pointers**

**Weighted Three Pointers**

**Weighted End of Shot Clock Scoring**

(Shots with  $\leq 2$  secs on shot clock)

**Weighted Halftime Closers**

(Shots with  $\leq 5$  secs in the 1st half)

**Weighted Game Winners**

(Shots with  $\leq 5$  secs in the game and scores are within 5)

**Weighted Clutch Scoring**

(Shots with  $\leq 2$  mins in the game and scores are within 5)

**Weighted Three Pointers =  
 $3P\% \times \text{square root of } 3PA$**

**3P%**

Chris Bell
Maliq Brown
Kyle Cuffe Jr.
JJ Starling

**W3P's**

Chris Bell
JJ Starling
Justin Taylor
Judah Mintz

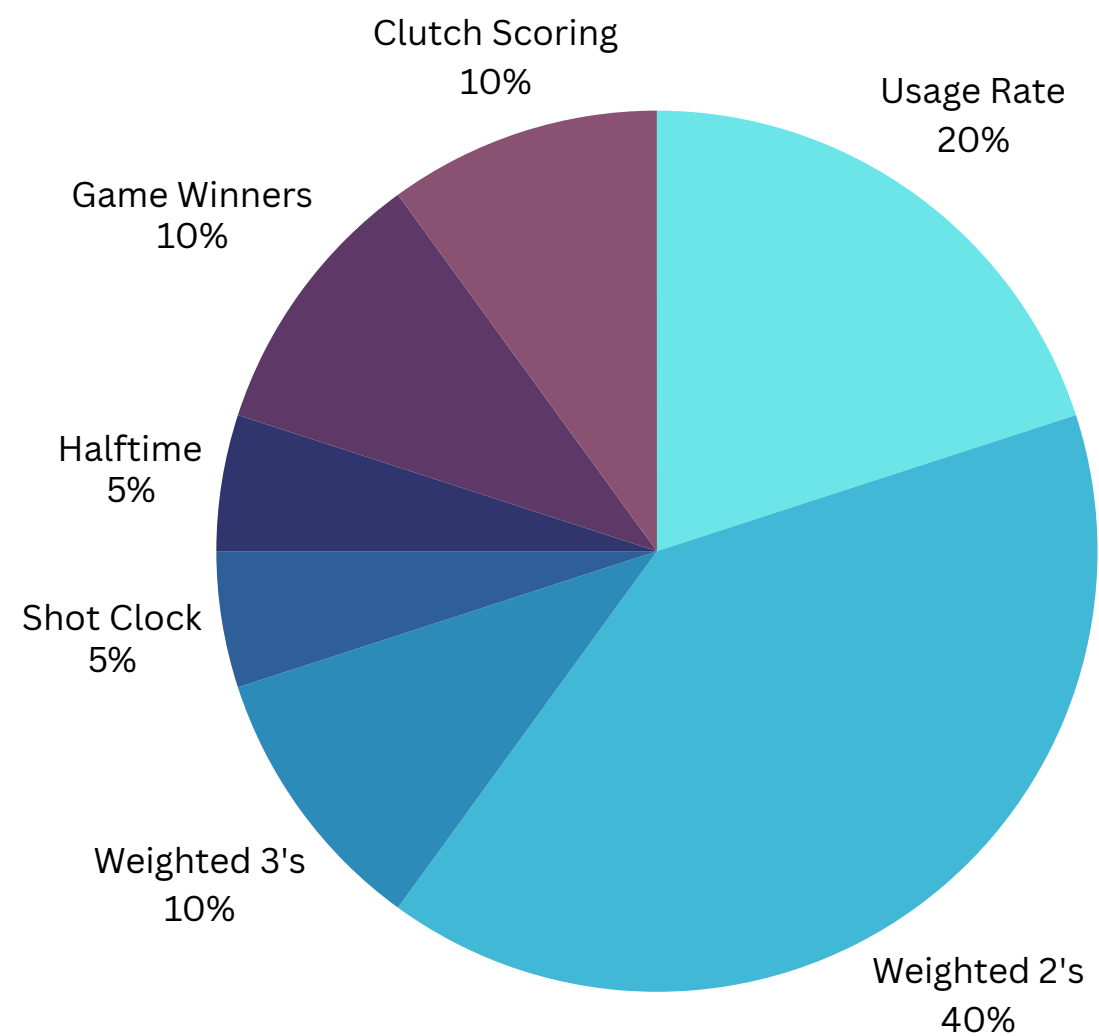


# Modeling

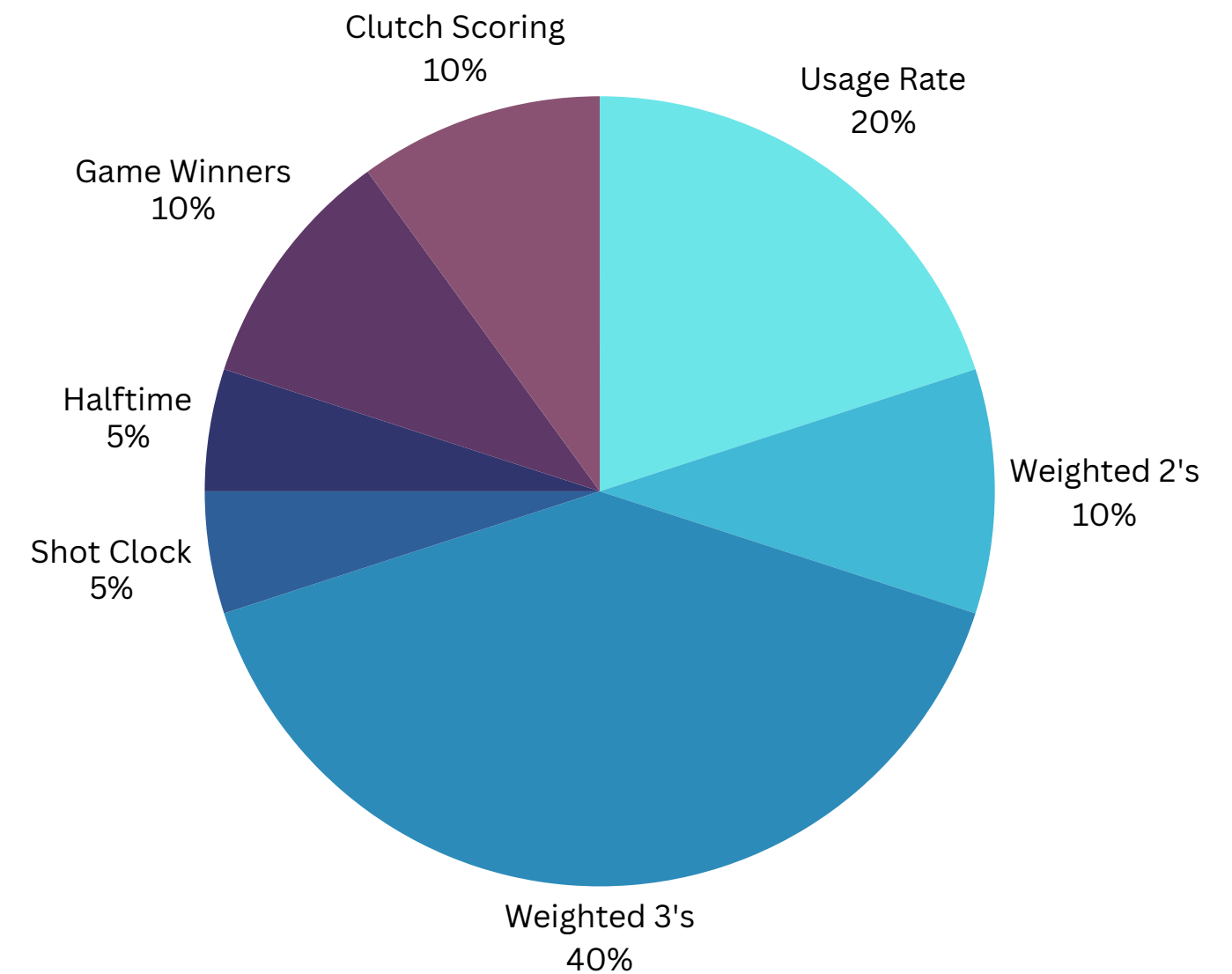
## Multi-Objective Optimization (Pareto Front)

Optimize multiple objectives simultaneously

### Need Two Points



### Need Three Points



# Cluster Variables

## Variables for K-Means Clustering

**Usage Rate** (from Sports Reference)

**Height** (from Sports Reference)

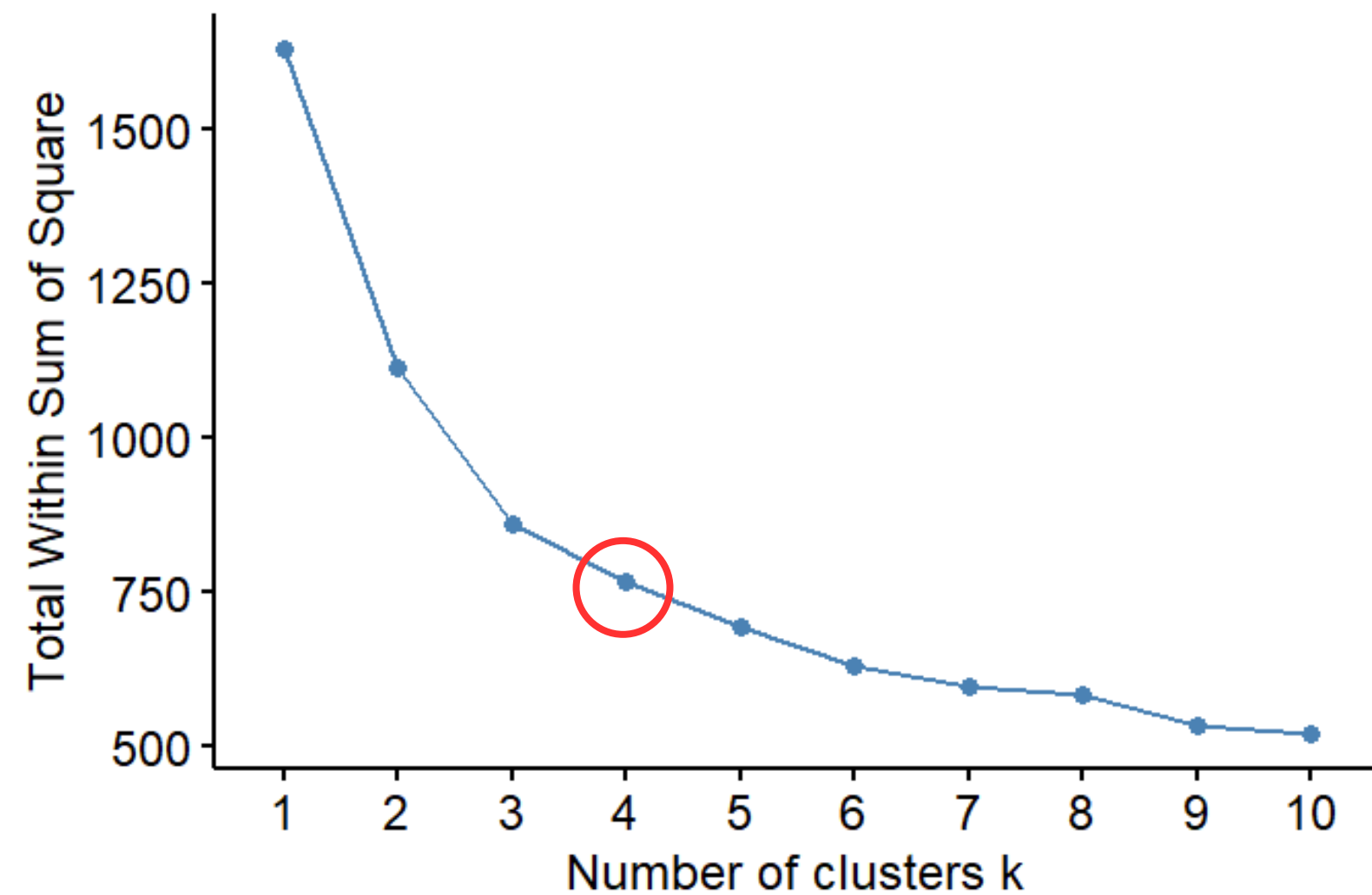
**Shot Frequency** (Percent of shots that are \_)

- Threes
- Two Point Jumpers
- Layups
- Dunks

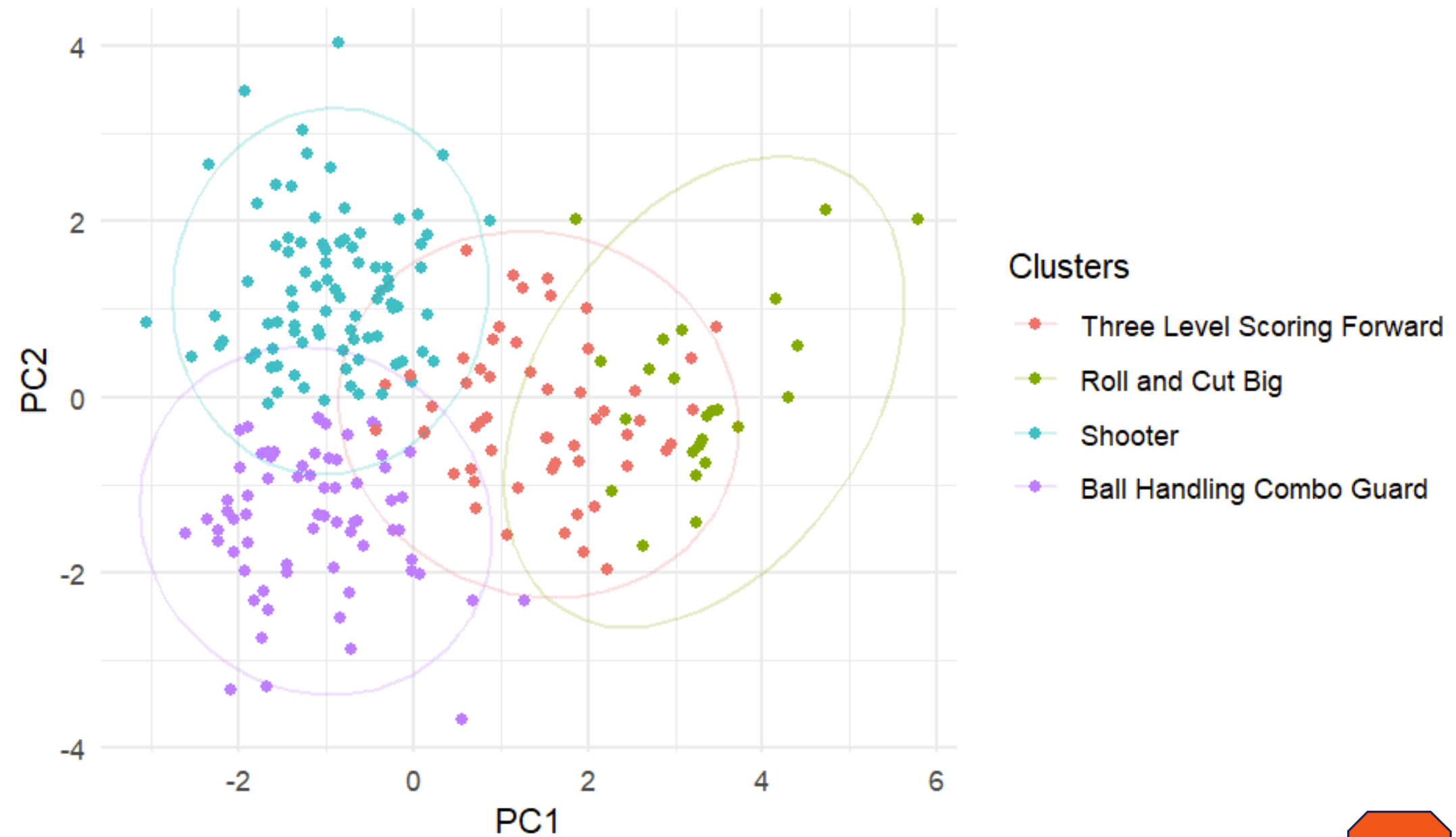


# Clustering

Optimal number of clusters



K-means Clustering with Ellipses



# Clusters

## Averages across clusters:

6-3



**Ball Handling Combo Guard**

Shot Frequency  
3's: **36%**  
2pt Jumper's: **35%**  
Dunk's: **2%**  
Layups: **27%**

Assisted on **16%** of shots  
**23%** Usage Rate

6-5



**Shooter**

Shot Frequency  
3's: **60%**  
2pt Jumper's: **18%**  
Dunk's: **2%**  
Layups: **20%**

Assisted on **26%** of shots  
**17%** Usage Rate

6-8



**Three Level Scoring Forward**

Shot Frequency  
3's: **21%**  
2pt Jumper's: **23%**  
Dunk's: **7%**  
Layups: **49%**

Assisted on **28%** of shots  
**19%** Usage Rate

6-10



**Roll and Cut Big**

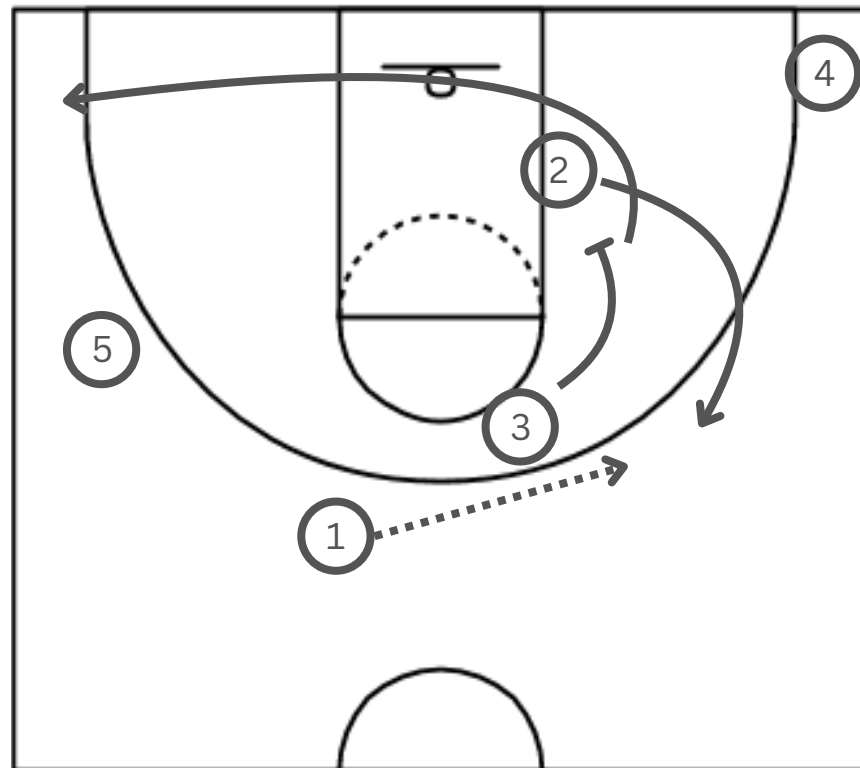
Shot Frequency  
3's: **9%**  
2pt Jumper's: **26%**  
Dunk's: **20%**  
Layups: **45%**

Assisted on **40%** of shots  
**18%** Usage Rate

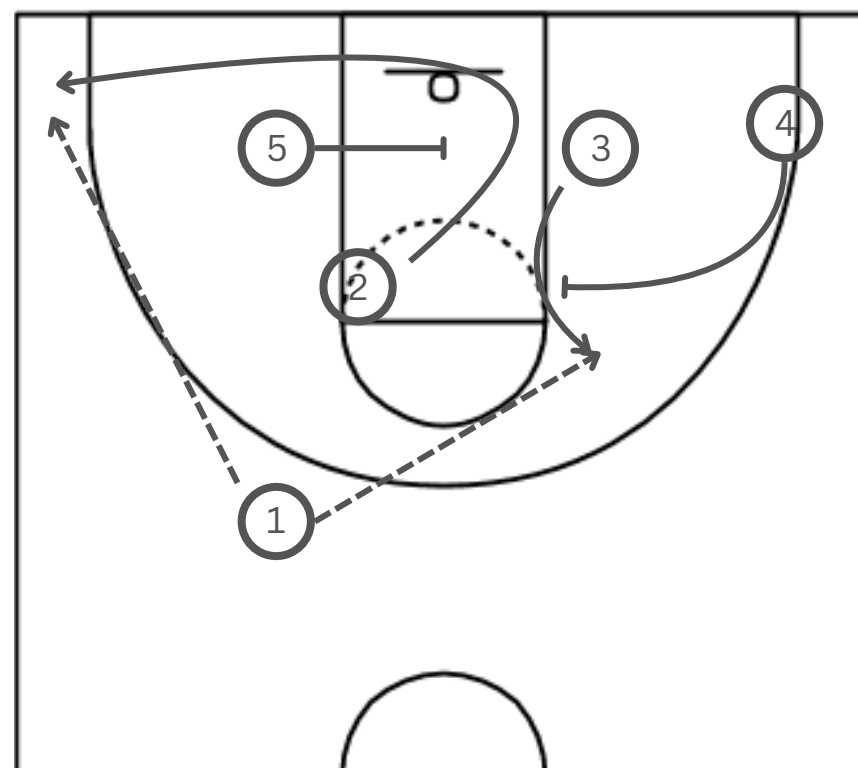




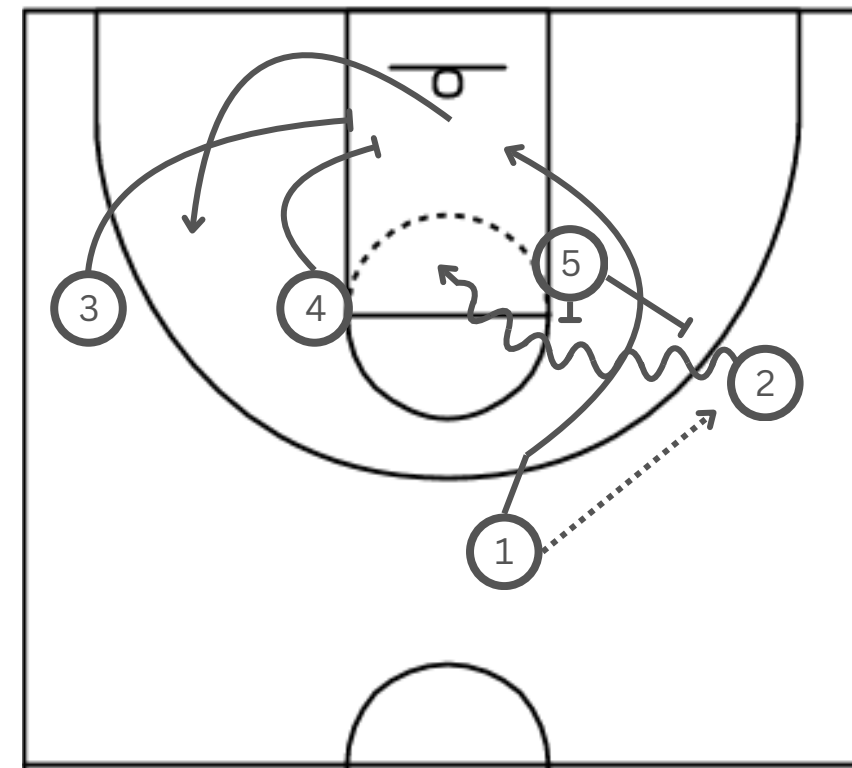
# Play Designs



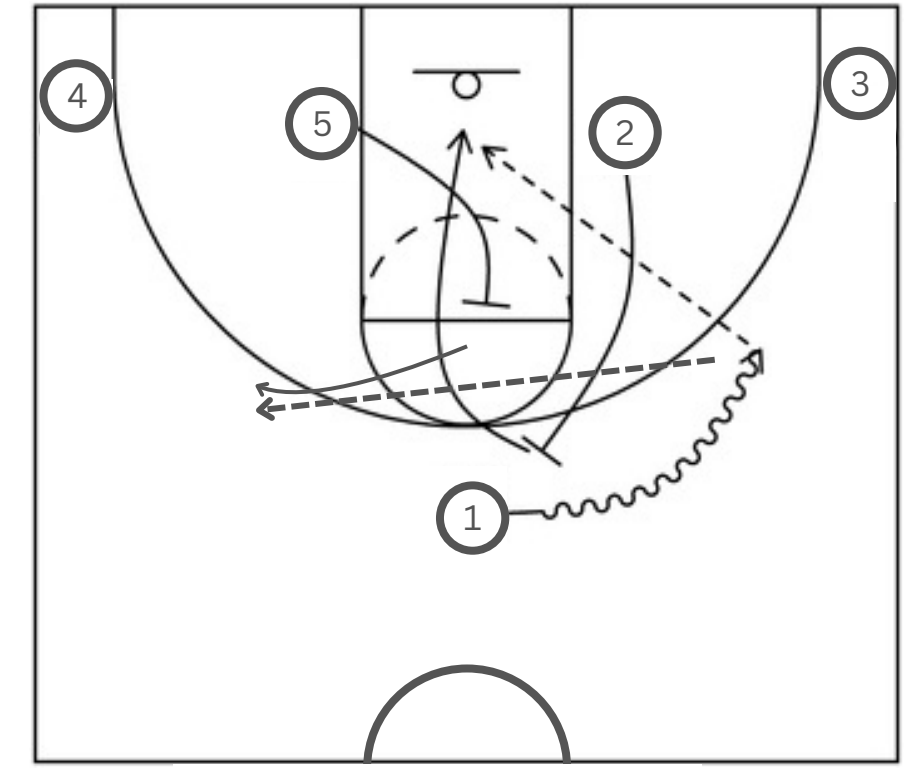
**5-Out Isolation:**  
Ball Handling Combo Guard



**Flare Screen:**  
Shooter



**UCLA:**  
Three Level Scoring Forward



**Spain Pick and Roll:**  
Roll and Cut Big

Shiny App:

[https://cadenlippie.shinyapps.io/SUBBALL\\_Data\\_Comp\\_2024/](https://cadenlippie.shinyapps.io/SUBBALL_Data_Comp_2024/)

