

# Understand



goal: gather, observe, and research available information to find the needs of the user

artifacts: design requirements

## 1) identify the challenge & users

generate

think big! what is the problem? who is affected by it?  
what is known/unknown? orient yourself with all of the project's who, where, when, & how

- ① people who have ~~themselves~~ basketball
- ② people who don't need excessive data which is used by technical and professional analysts.
- ③ provide an efficient method and well-designed tool.
- ④

## 3) check with users or explore data

datatype for each player

data type: attributes, items and position.

Each player has an id, data has hierarchical structure.

~~general performance~~: points, assists, turnover.

2 point field goal

Could be displayed as table, parallel coordinates.

!! get the real data and talk to real users if possible!

## 2) find questions & tasks

what can you ask about the challenge? what do users want to do with data? think high and low level, revisit this worksheet to break these down further.

- ① ~~Display~~ search for players.
- ② Display player's basic information
- ③ Display player's general performance by using some attributes, such as points, assists, turnovers ...
- ④ Display each attribute's detailed data
- ⑤ Query by year (time)

## 4) brainstorm design requirements

what are recurring trends? what are key design opportunities? are there constraints worth listing?

- ① filter
- ② ~~on~~ basis information
- ③ ranking
- ④ points, assists, turnover.  
2-point field goal, Game played.  
3-point field goal made / percentage

## 5) compare and rank design requirements

evaluate

choose a method for comparison: pros/cons table, rank based on your findings/user needs/tasks, cross out the list based on listed justifications, or pick top 3 to keep and why. explain and review with peers.

top 3. ① basic information

② ranking

③ 5 or 6 attributes

④ ~~filter~~

↓  
excessive data attributes  
(skill) are not necessary

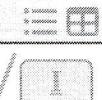
for basketball fan.

for non-technical people.

can't understand the meaning

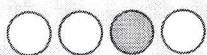
of number, but ranking could represent player's skill

!! is this the right challenge to tackle? is there enough detail? or too much? too many or not enough requirements? complete this worksheet again to refocus the project.



Make

# Milestone prototype



goal: concretize ideas into tangible prototypes which are approximations of a product in some aspects

artifacts: prototypes

generate

## 1) set an achievable goal

what should the prototype achieve? what are the specific criteria for success? break a larger goal into parts with clearer feature sets.

1. Display basic information of one player

2. Display a bar chart for general performance information

3. Display ranking based on design view 1

4. Display heat map

## 3) plan support for interactions

what can the user do? what is required given the chosen encodings? justify your design decisions

① Select on one attribute on bar chart to expand ranking and heat map

② brush on ranking chart to zoom

③ tooltip on ranking and heat map

## 5) build the prototype and check-in

are your goals met by the prototype? test with users if possible. are design decisions properly justified? do any need to be revisited? were any new constraints or limitations discovered? write down your progress and additional justifications below. review this progress and the prototype with a partner or your group.

- Goals of prototype are met.

- Need to revisit

redesign or choose a better view. for ranking chart.

① parallel coordinates can't show number of attributes.

② Ranking chart with ~~reel~~ <sup>also</sup> need to ~~redesign~~ redesign details

③ Every year, the number of players is different

!!! did the prototype meet its goal/s? measure its success. make sure you have addressed all design requirements in the prototype

④ For some years, a player that user choose may have no game

Hence, no ranking...

## 2) plan encodings & layouts

what are good visualization encodings or layouts for which data? use the ideas you just came up with, and remember to justify for users and their tasks

① general performance information → bar chart

② Ranking (Design View 1)



③ Heat map



## 4) sketching additional views

what other parts of the data must be seen? brainstorm how to show this data in the tool.

① team transfer

with year time line

② filter \*



!! if you are thinking up new ideas to visualize, go back to the Ideate activity!

evaluate



# notes

progress. : ① Heat map view looks good and could be ~~more~~ encoded with data.

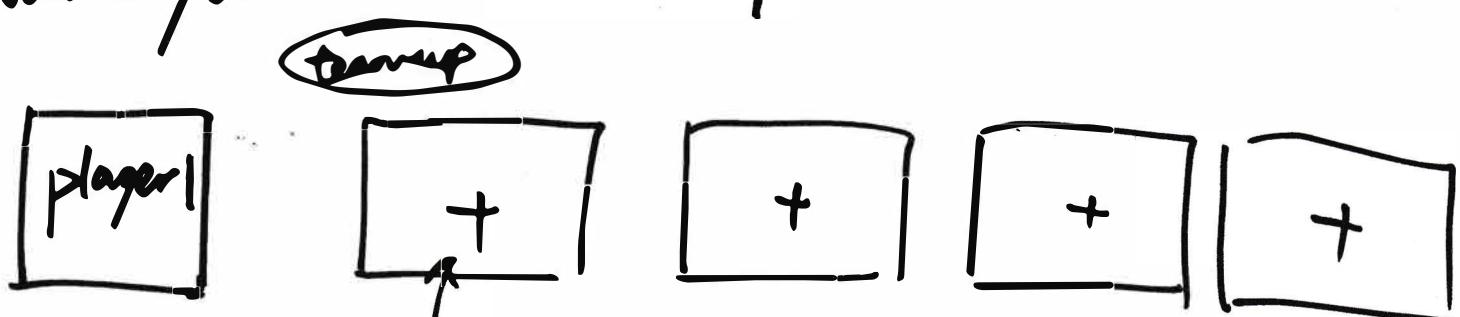
② Conclude problems of Ranking view  
Need to rediscuss ?

③ Find limitations from data:

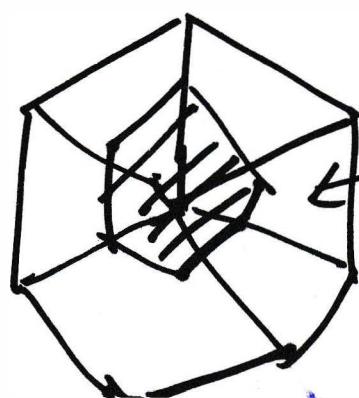
- 1) Some players may ~~don't~~ have no game some years, with the result of no ranking
- 2) The number of players is not small.

## Extra Ideas (P4–5)

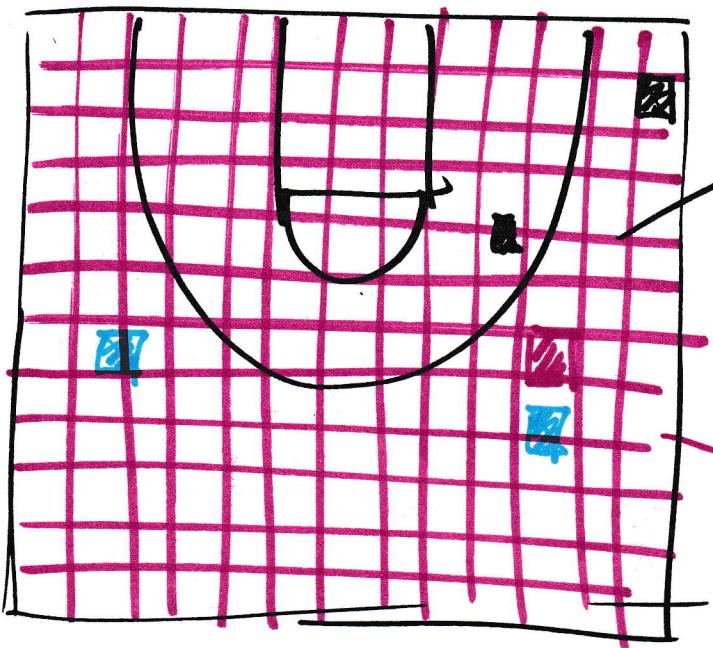
Make your own teamup



add another player



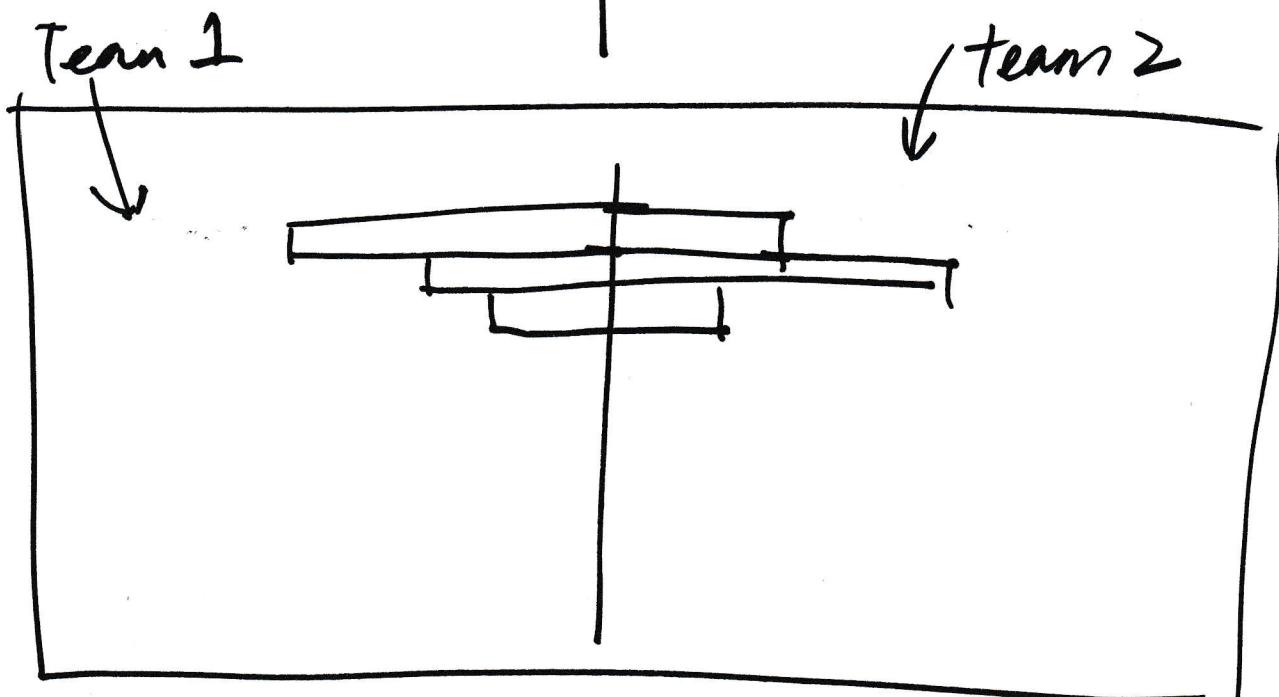
show team  
performance.



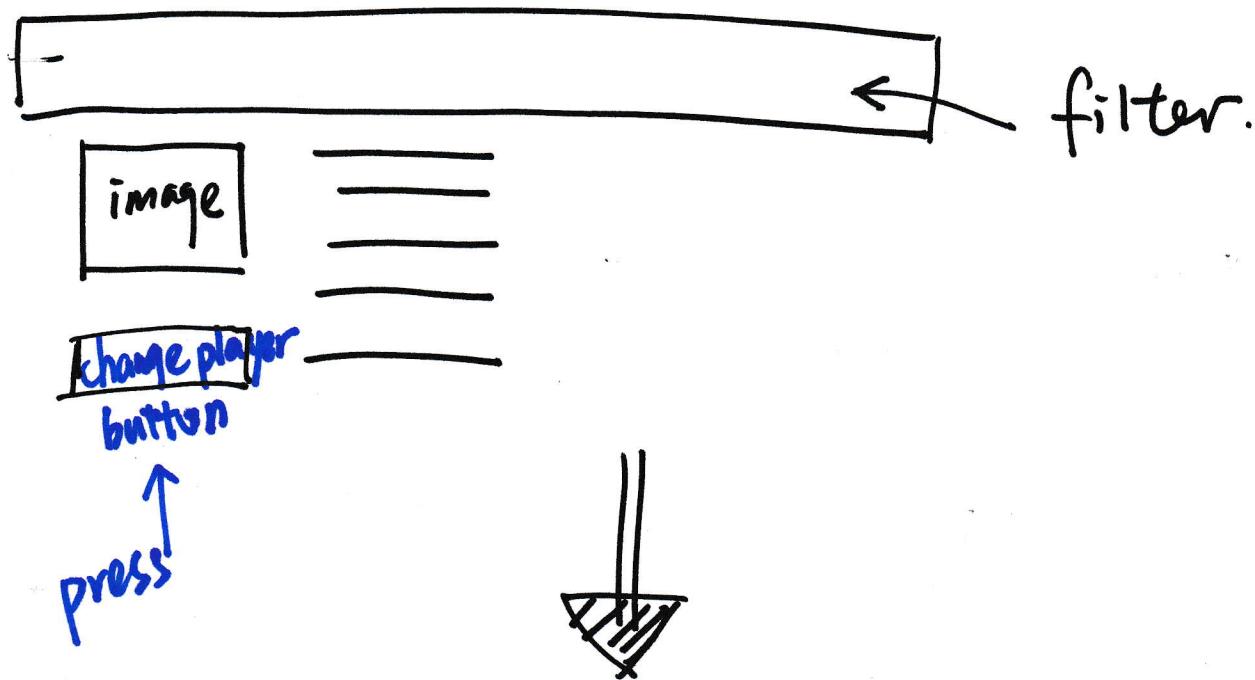
PST with position  
show the team  
point area.

use color value.

## Compare Teamup



# Interaction.



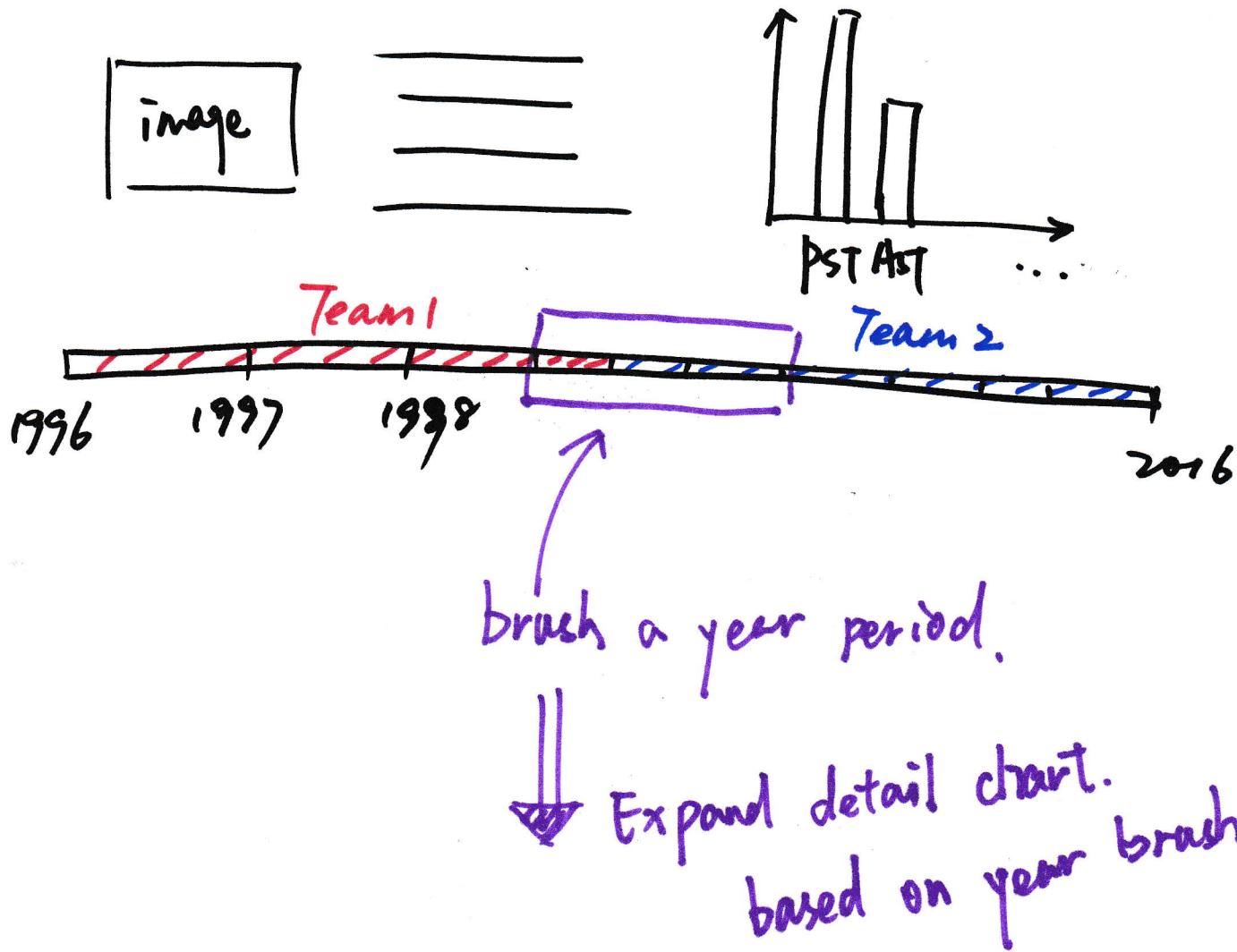
Layout of filter by . Name, team or position

player name  , ~~play~~ team   
position

Operation : ① select  
② type .

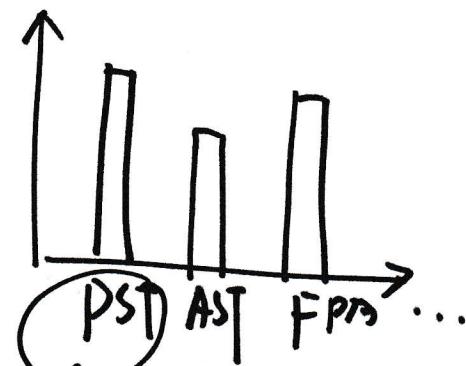
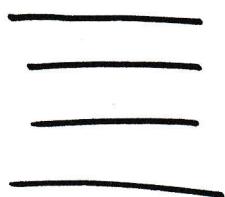
change player button  
click ...

After filtering, the filter  
would hide. until users  
click on "change player"

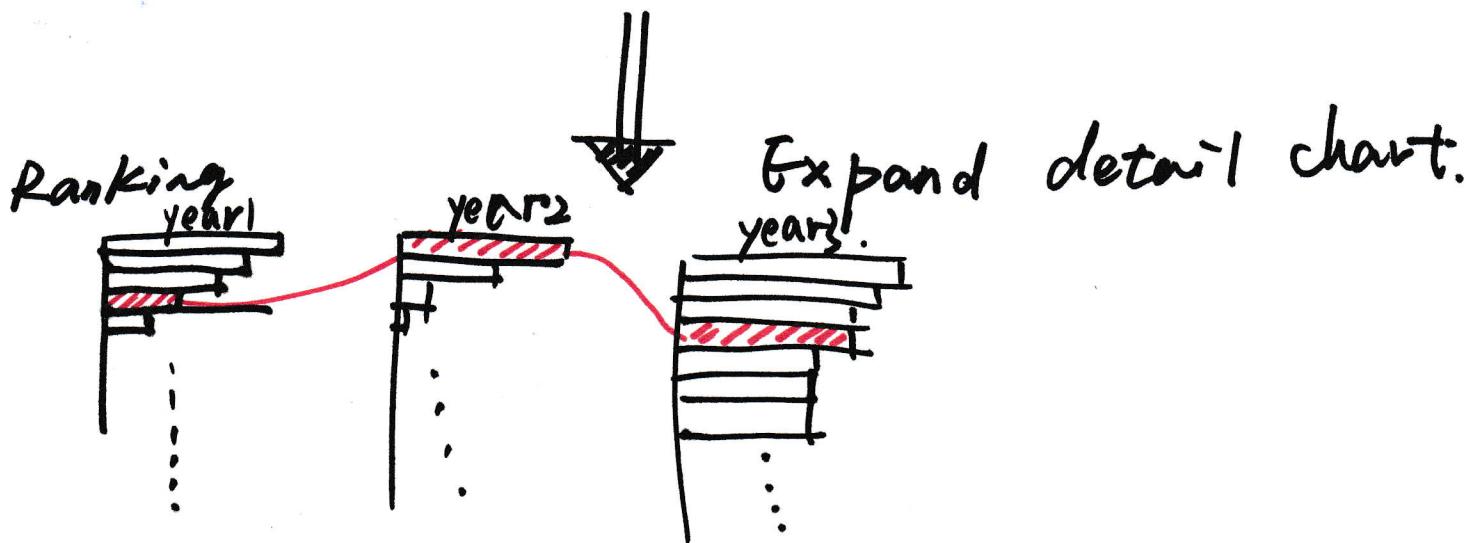


Operation: brush.

image



click on.

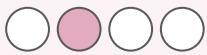


Heat map  
1996 97 ....

1						
2						
3						
4						
5						
6						

3.

# Ideate



generate

*goal:* generate good concepts and ideas for supporting some of the project's design requirements

*artifacts:* ideas & sketches

## 1) select a design requirement

*how might we address the challenge using the requirement? which questions would a user ask? revisit this worksheet for each important design requirement.*

Display a player's team association information in terms of time

!! revisit this worksheet for all important design requirements for your project



## 3) sketch another idea

try another **sketch**, think of a new perspective, be different, do not build off of your previous sketch.



## 2) sketch first idea

*show how to address this requirement using an **informal sketch** - focus on the big idea not the details.*

## 4) sketch a final idea

*think of a different abstraction. challenge constraints and assumptions to **draw** something new or surprising.*

!! is three enough? not always. have other ideas? fill out another worksheet!

## 5) compare and relate your ideas

*for each sketch, break apart **what works well (+)** and **what doesn't (-)** in the **table** below. make connections. reflect on best parts. can you **combine ideas?** review the table with a partner or group.*

- 1) Map can show actual geometric information, but it is not really needed and it takes a lot of spaces
- 2) A time line is clean and accurate, which can display all information needed with small space
- 3) Texts are accurate, but there is nothing much for visualization

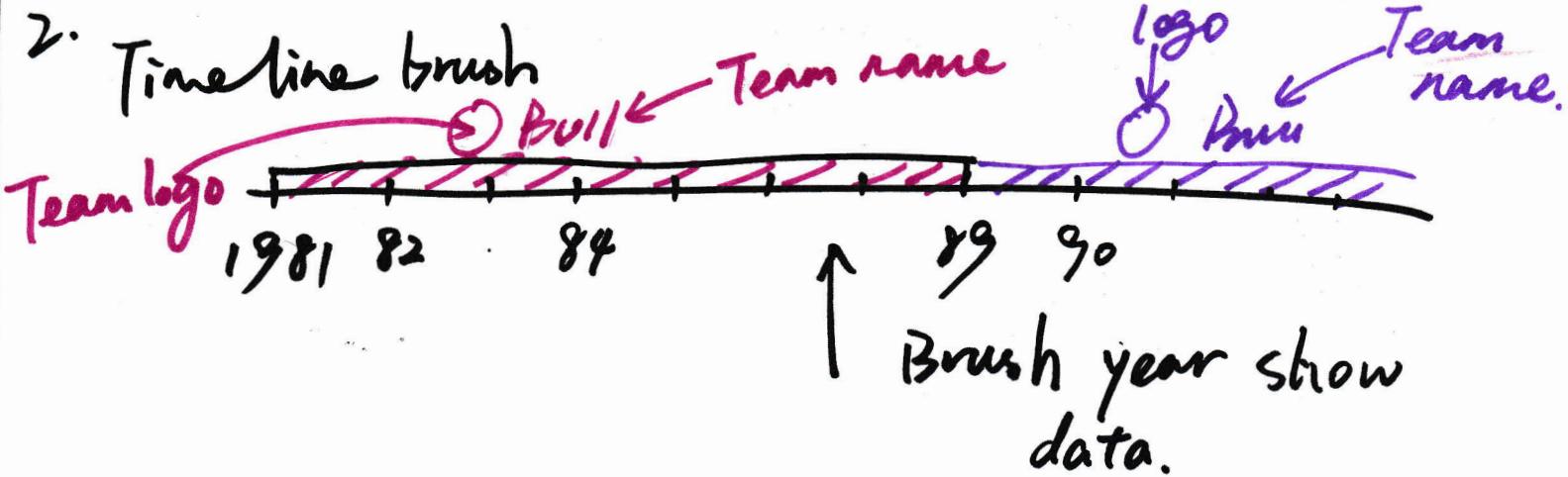
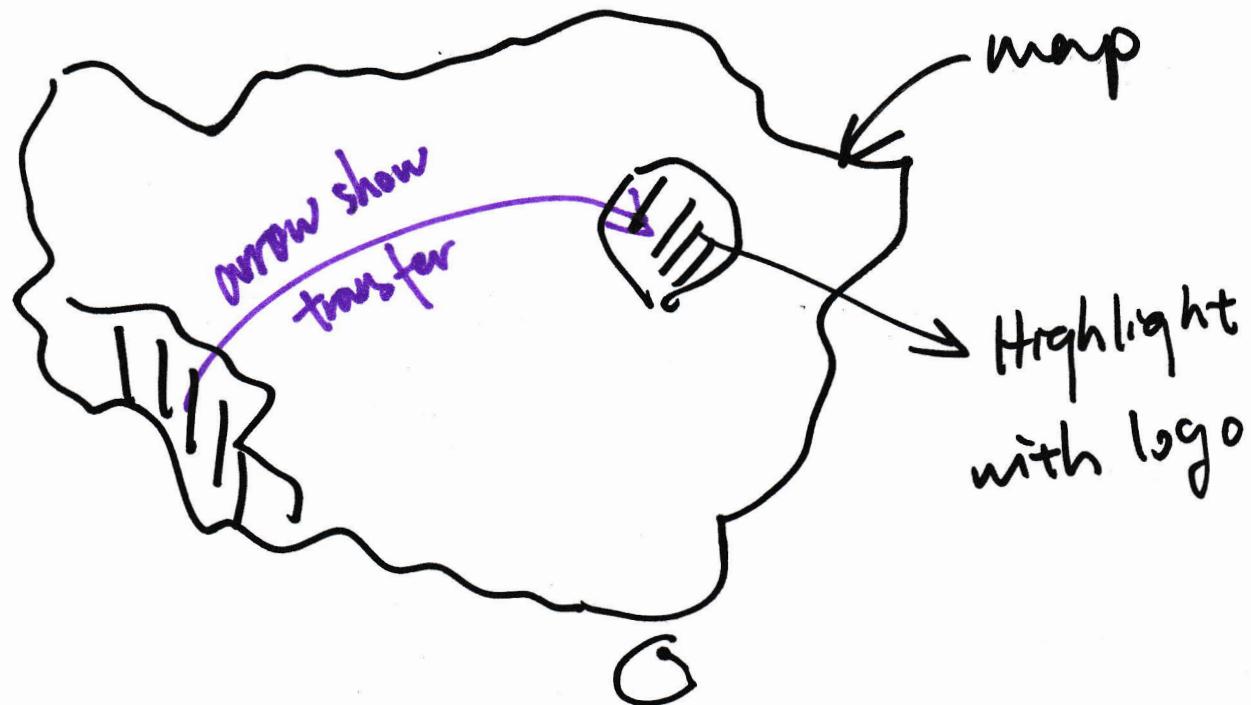
!! combining ideas and sketches is not easy. sometimes it may open up new possibilities and ideas - guess what, ideate again!



U / I / M

# Team Transfer

## 1. map



## 3. text

Bull 1981 - 1989

~ 1990 ~ ..

# Ideate



generate

*goal:* generate good concepts and ideas for supporting some of the project's design requirements

*artifacts:* ideas & sketches

## 1) select a design requirement

*how might we address the challenge using the requirement? which questions would a user ask? revisit this worksheet for each important design requirement.*

Provide player's general information in different aspects, including offense and defense

!! revisit this worksheet for all important design requirements for your project



## 3) sketch another idea

try another **sketch**, think of a new perspective, be different, do not build off of your previous sketch.



## 2) sketch first idea

*show how to address this requirement using an **informal sketch** - focus on the big idea not the details.*

!! is three enough? not always. have other ideas? fill out another worksheet!

## 5) compare and relate your ideas

for each sketch, break apart **what works well (+)** and **what doesn't (-)** in the **table** below. make connections. reflect on best parts. can you **combine ideas?** review the table with a partner or group.

- 1) Can easily see if the player is all rounded, but there are lines between attributes, which could be misleading
- 2) Table is clean and accurate, but there is no "real" visualization from that
- 3) Bar chart is clean and accurate, but since different attributes should not be compared, it is not a good idea to put them in parallel (since we compare things in parallel automatically)
- 4) It displays the information with parallel coordinate, which is similar to a bar chart in some sense.

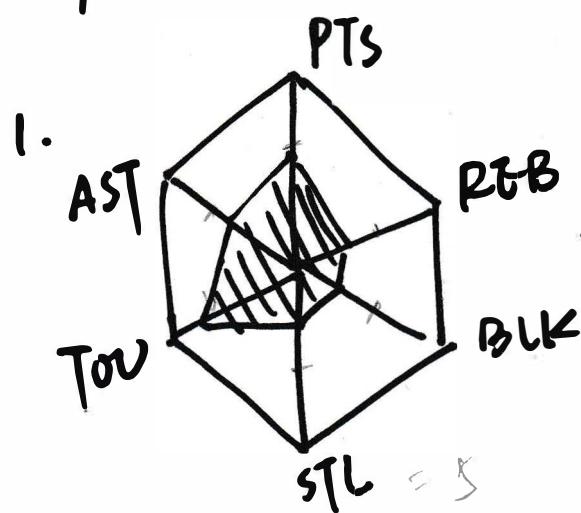
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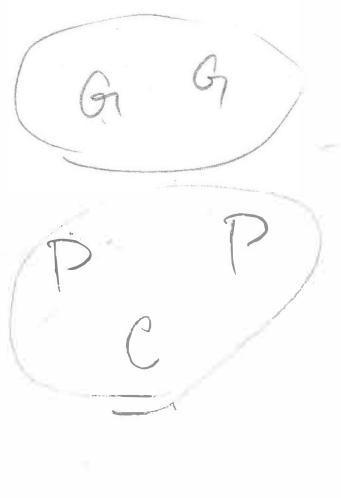
U / I / M

evaluate

# players' performance balance.



radar chart



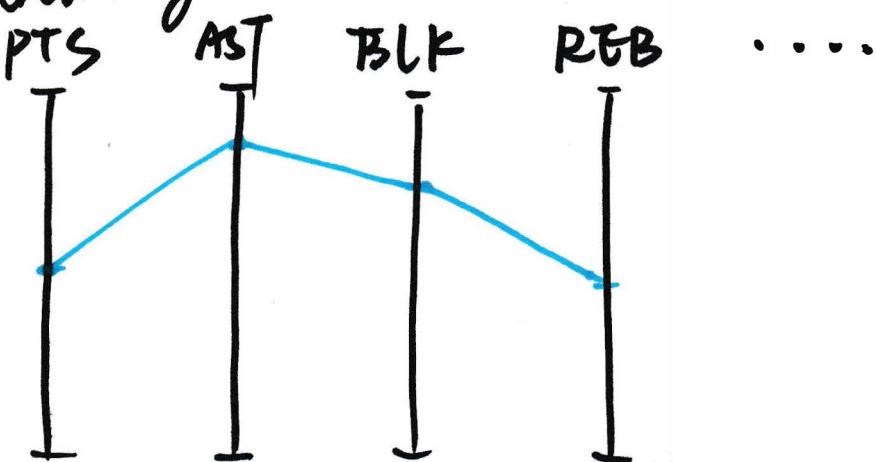
## 2. Table

PTS	AST	TOU		

## 3. bar chart



## 4. Ranking.



# Ideate



generate

**goal:** generate good concepts and ideas for supporting some of the project's design requirements

**artifacts:** ideas & sketches

## 1) select a design requirement

*how might we address the challenge using the requirement? which questions would a user ask? revisit this worksheet for each important design requirement.*

Provide player's detail information in terms of different attributes

!! revisit this worksheet for all important design requirements for your project



## 3) sketch another idea

try another **sketch**, think of a new perspective, be different, do not build off of your previous sketch.



## 5) compare and relate your ideas

for each sketch, break apart **what works well (+)** and **what doesn't (-)** in the **table** below. make connections. reflect on best parts. can you **combine ideas?** review the table with a partner or group.

- 1) Map shows the spatial distribution of an attribute, however we don't have data for all attributes. Also, it takes a lot of spaces
- 2) Line chart shows the temporal changes, we can focus on the material by brushing
- 3) A chessboard shows not only the temporal changes, but also some temporal correlations. It is kind of better than a simple line chart, because it provides extra information, but color is less intuitive (accurate) than a line chart

!! combining ideas and sketches is not easy. sometimes it may open up new possibilities and ideas - guess what, ideate again!



## 2) sketch first idea

*show how to address this requirement using an **informal sketch** - focus on the big idea not the details.*



## 4) sketch a final idea

*think of a different abstraction. challenge constraints and assumptions to **draw** something new or surprising.*



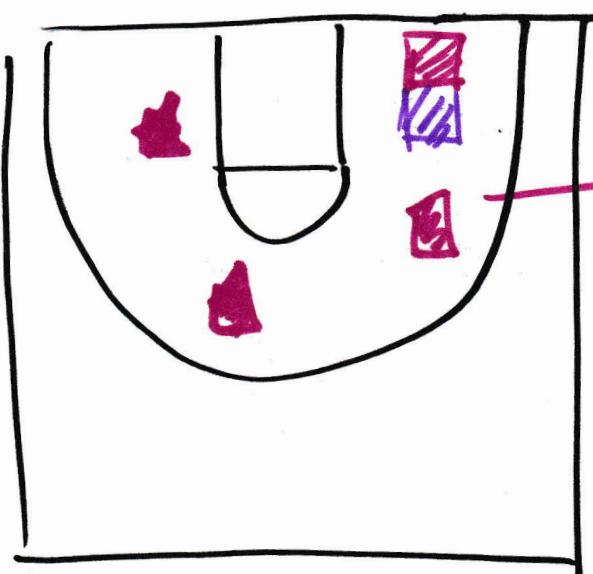
evaluate



U / I / M

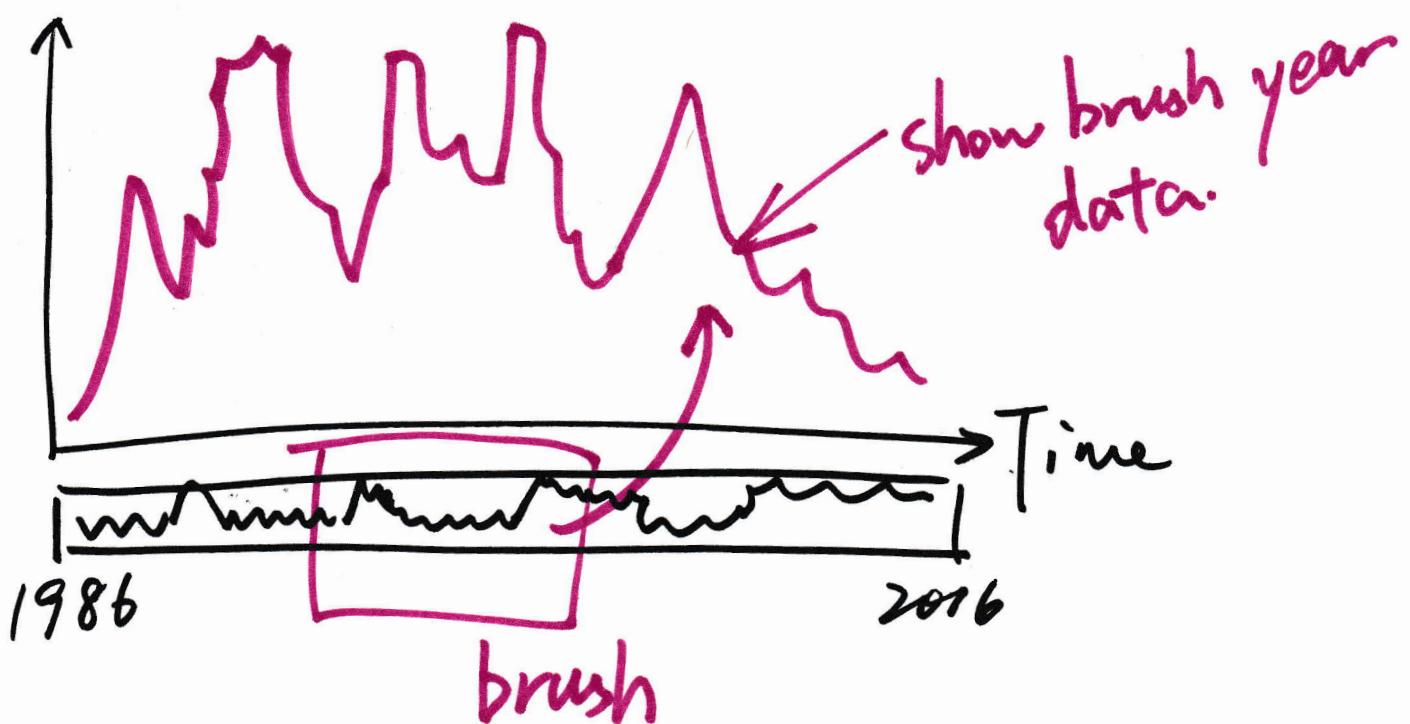
# Data Detail. eg. PST, AST ....

1.

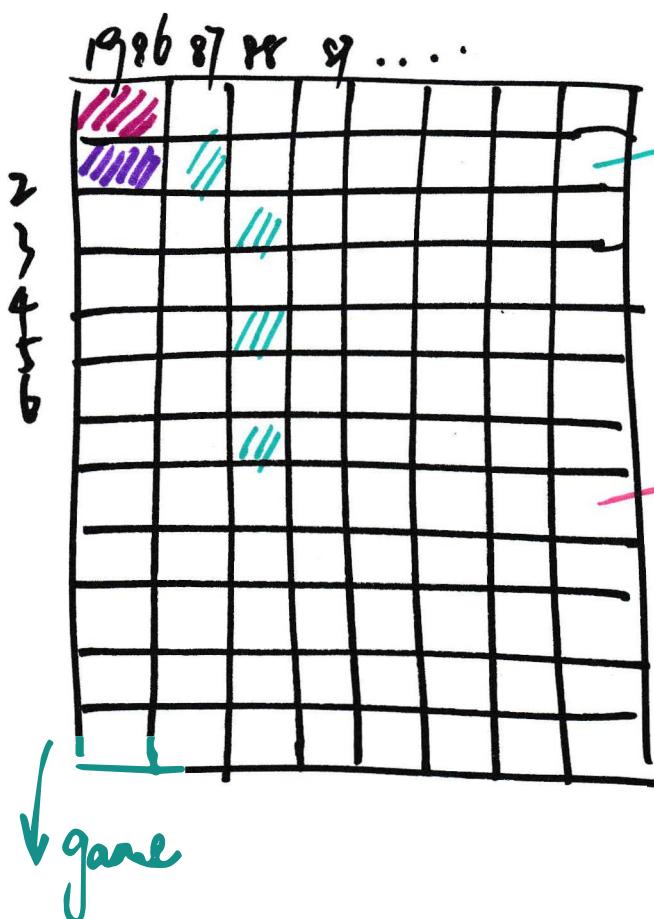


color  
use value show  
relation between data and  
position.

2.



3.



use color value  
show data , such as  
PCT, ASP ....

**USE Color Values**  
Not hue.  
Like heat map.

# Ideate



generate

*goal:* generate good concepts and ideas for supporting some of the project's design requirements

*artifacts:* ideas & sketches

## 1) select a design requirement

*how might we address the challenge using the requirement? which questions would a user ask? revisit this worksheet for each important design requirement.*

Display a player's ranking in terms of each attribute

!! revisit this worksheet for all important design requirements for your project



## 3) sketch another idea

try another **sketch**, think of a new perspective, be different, do not build off of your previous sketch.



## 2) sketch first idea

*show how to address this requirement using an **informal sketch** - focus on the big idea not the details.*



## 4) sketch a final idea

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*for each sketch, break apart **what works well (+)** and **what doesn't (-)** in the **table** below. make connections. reflect on best parts. can you **combine ideas?** review the table with a partner or group.*

!! is three enough? not always. have other ideas? fill out another worksheet!

evaluate

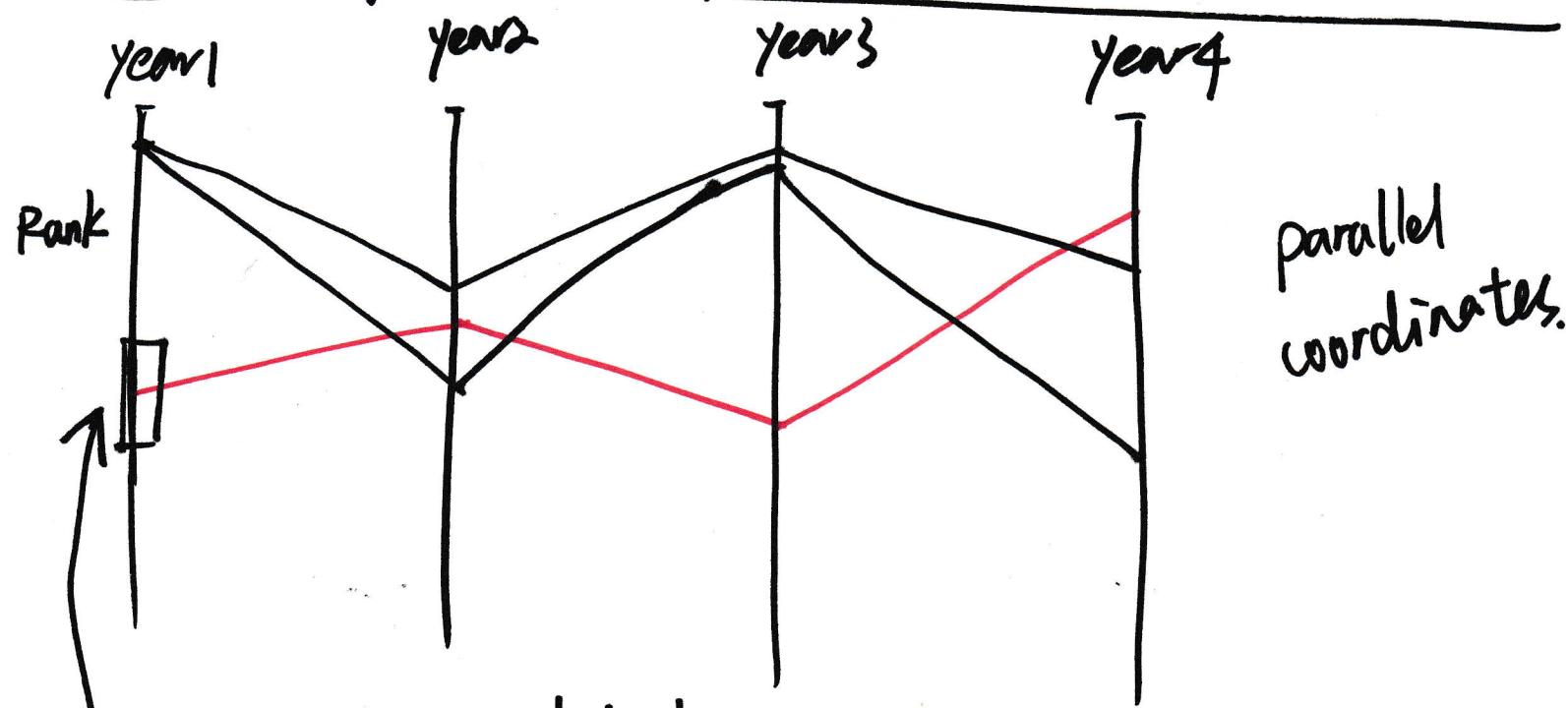
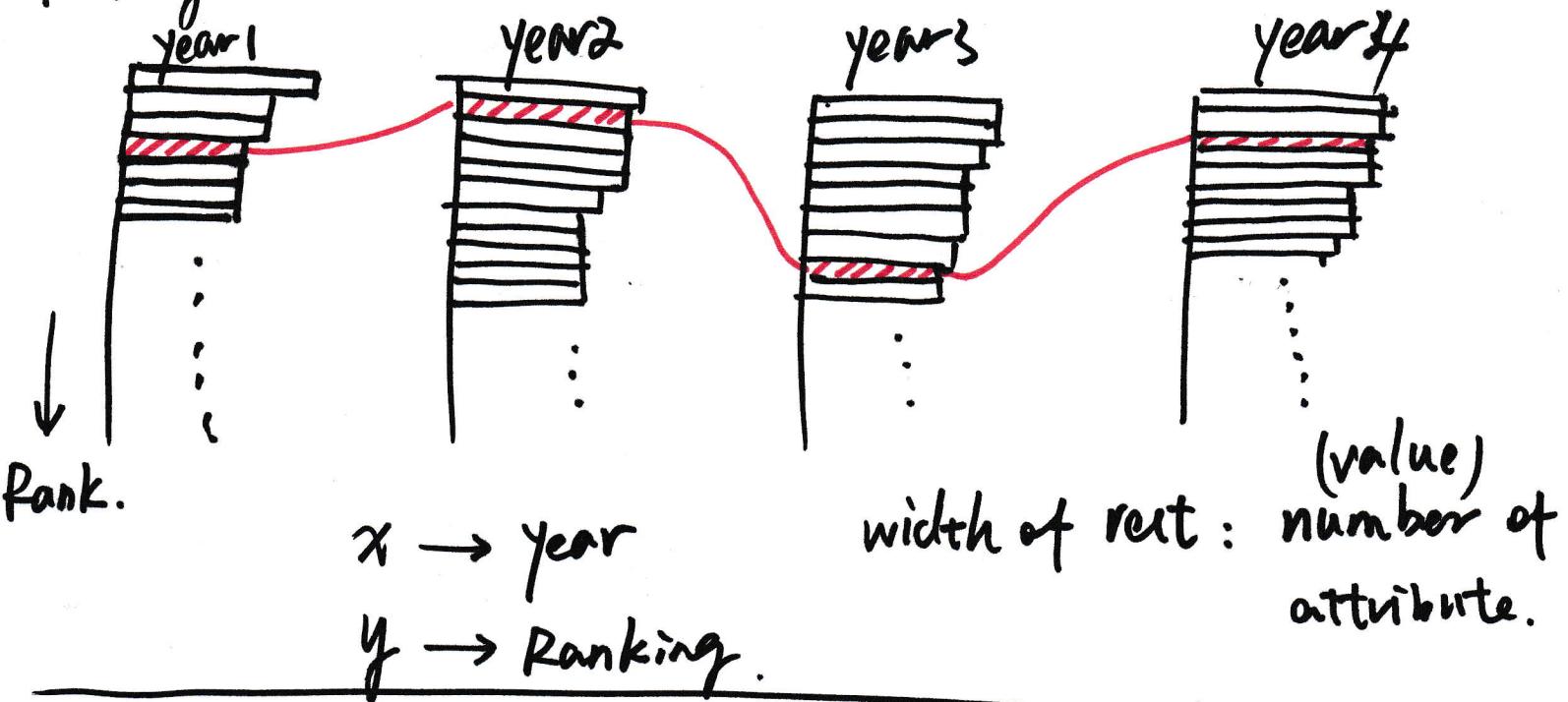
- 1) bar chart can display both attribute value and attribute ranking. By linking bars, it can also show the temporal changes. bar chart can have different length here
- 2) parallel coordinate shows the distribution of attribute values. It's hard to observe ranking, it shows temporal changes

!! combining ideas and sketches is not easy. sometimes it may open up new possibilities and ideas - guess what, ideate again!



U / I / M

Ranking for an aspect attribute.



brush to show detail  
zoomed

parallel  
coordinates.

# Ideate



generate

## 1) select a design requirement

*how might we address the challenge using the requirement? which questions would a user ask? revisit this worksheet for each important design requirement.*

Provide player's general information comparison

!! revisit this worksheet for all important design requirements for your project

*goal:* generate good concepts and ideas for supporting some of the project's design requirements

*artifacts:* ideas & sketches

## 2) sketch first idea

*show how to address this requirement using an **informal sketch** - focus on the big idea not the details.*

## 3) sketch another idea

*try another **sketch**, think of a new perspective, be different, do not build off of your previous sketch.*

## 5) compare and relate your ideas

*for each sketch, break apart **what works well (+)** and **what doesn't (-)** in the **table** below. make connections. reflect on best parts. can you **combine ideas?** review the table with a partner or group.*

- 1) Bar chart is good for comparison, clean and accurate. People are good at observing symmetries
- 2) Overlapping radial chart is a bit misleading, although it shows the difference in terms of abilities

!! combining ideas and sketches is not easy. sometimes it may open up new possibilities and ideas - guess what, ideate again!

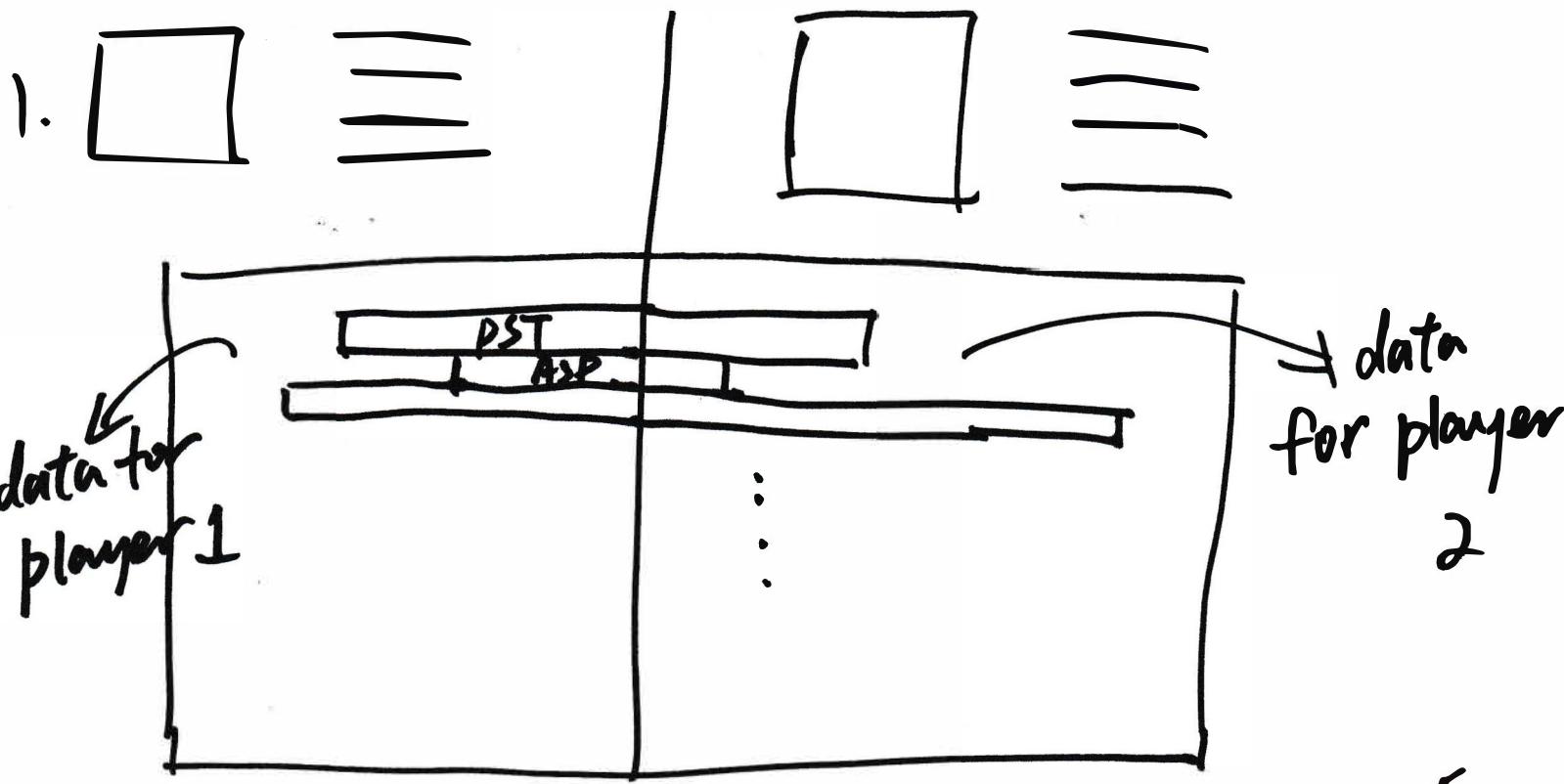
## 4) sketch a final idea

*think of a different abstraction. challenge constraints and assumptions to **draw** something new or surprising.*

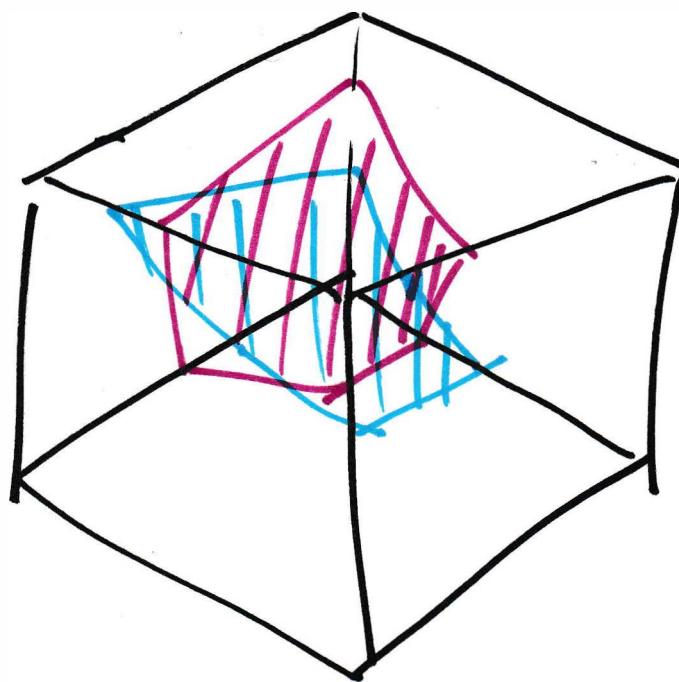
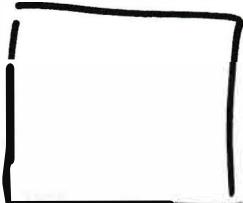
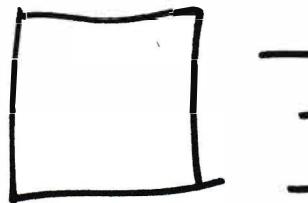
!! is three enough? not always. have other ideas? fill out another worksheet!

evaluate

Compare two players.



2.



— player 1  
— player 2.