

INTERNATIONAL FORUM ON SKILLS INTELLIGENCE, 2025

Leveraging Generative AI with Semantic Searching to build Custom Skills Frameworks

Skills intelligence for Career Guidance & Student Support

Aljaž Leben, Kamarul Adha



skilldata.info

Projects

- Quality standards and skill frameworks
- Building personalised career guidance platforms





Knowledge
INNOVATION
Centre

LET'S TALK SKILLS



JOB SEEKERS

Skills indicate prior experience and learning achievements.



EDUCATION PROVIDERS

Skills describe learning outcomes of learning opportunities.



EMPLOYERS

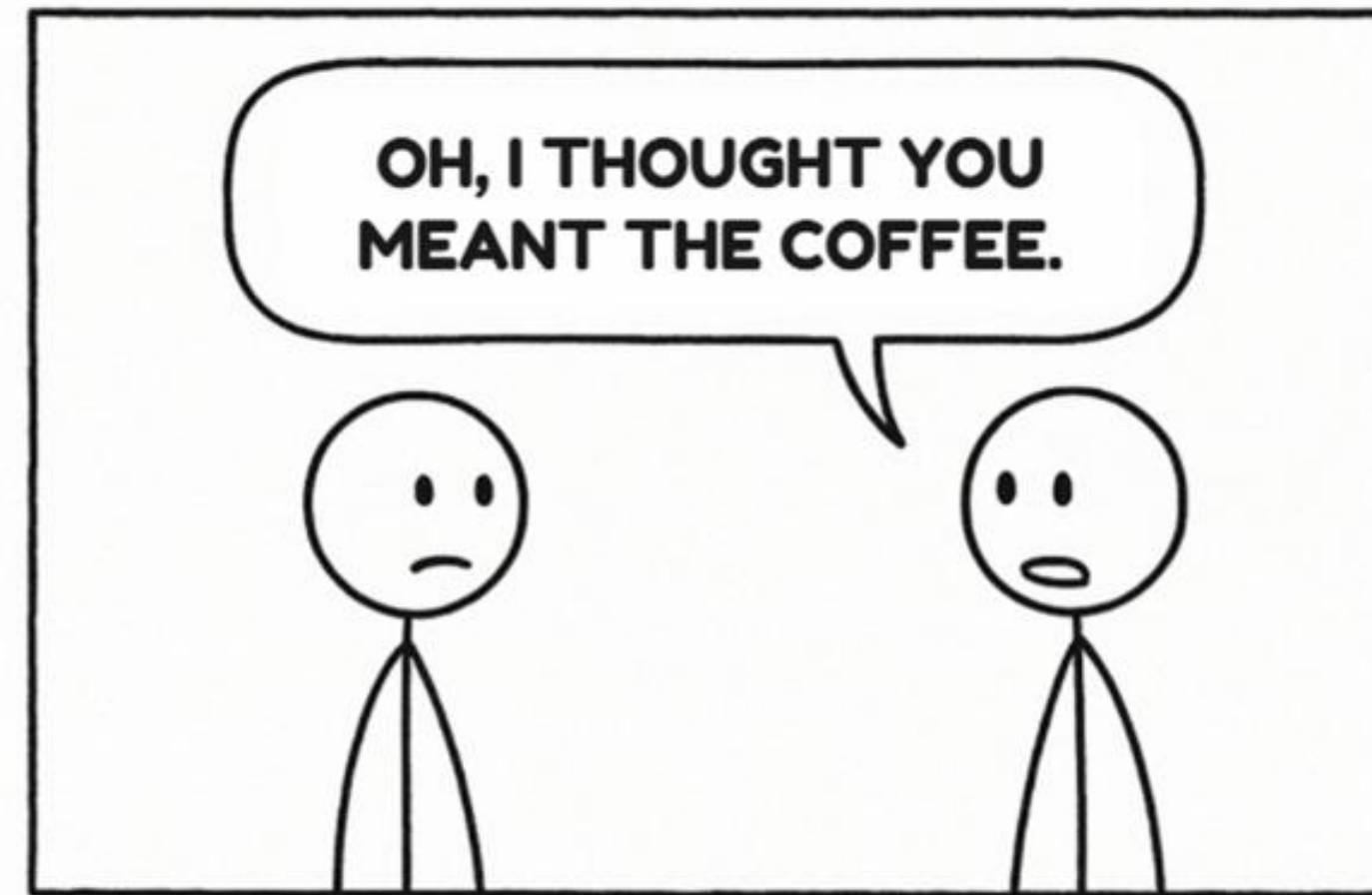
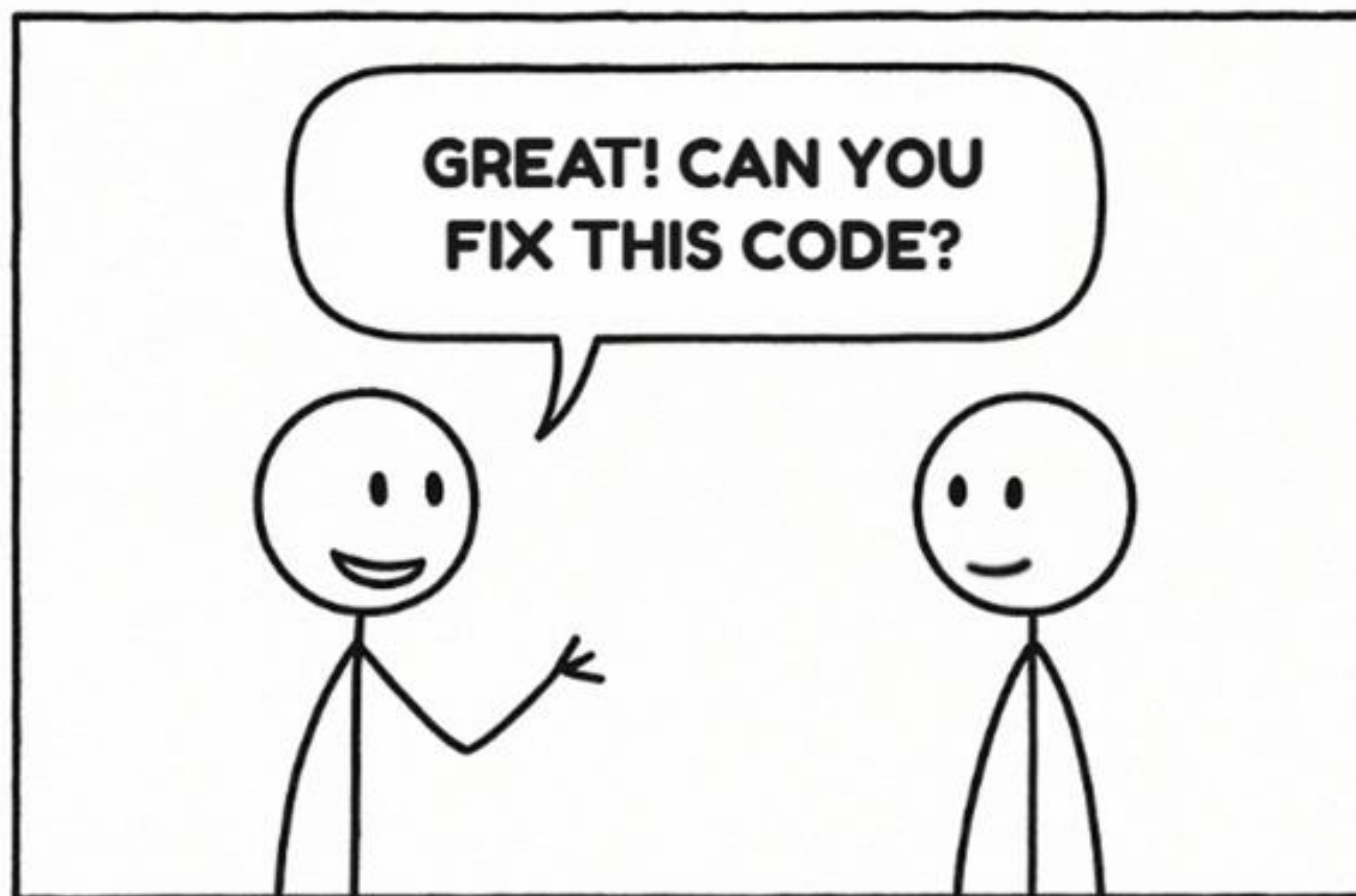
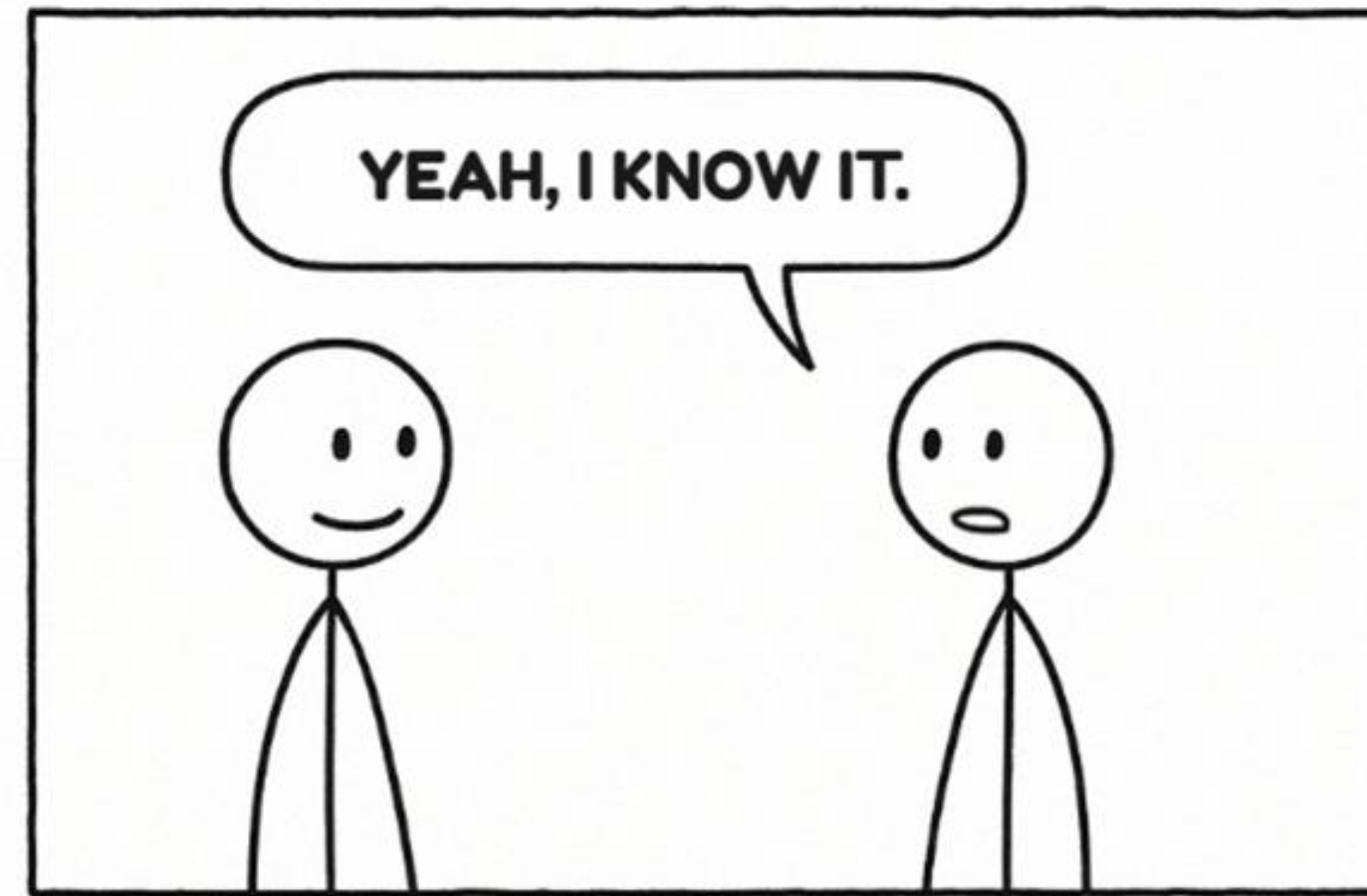
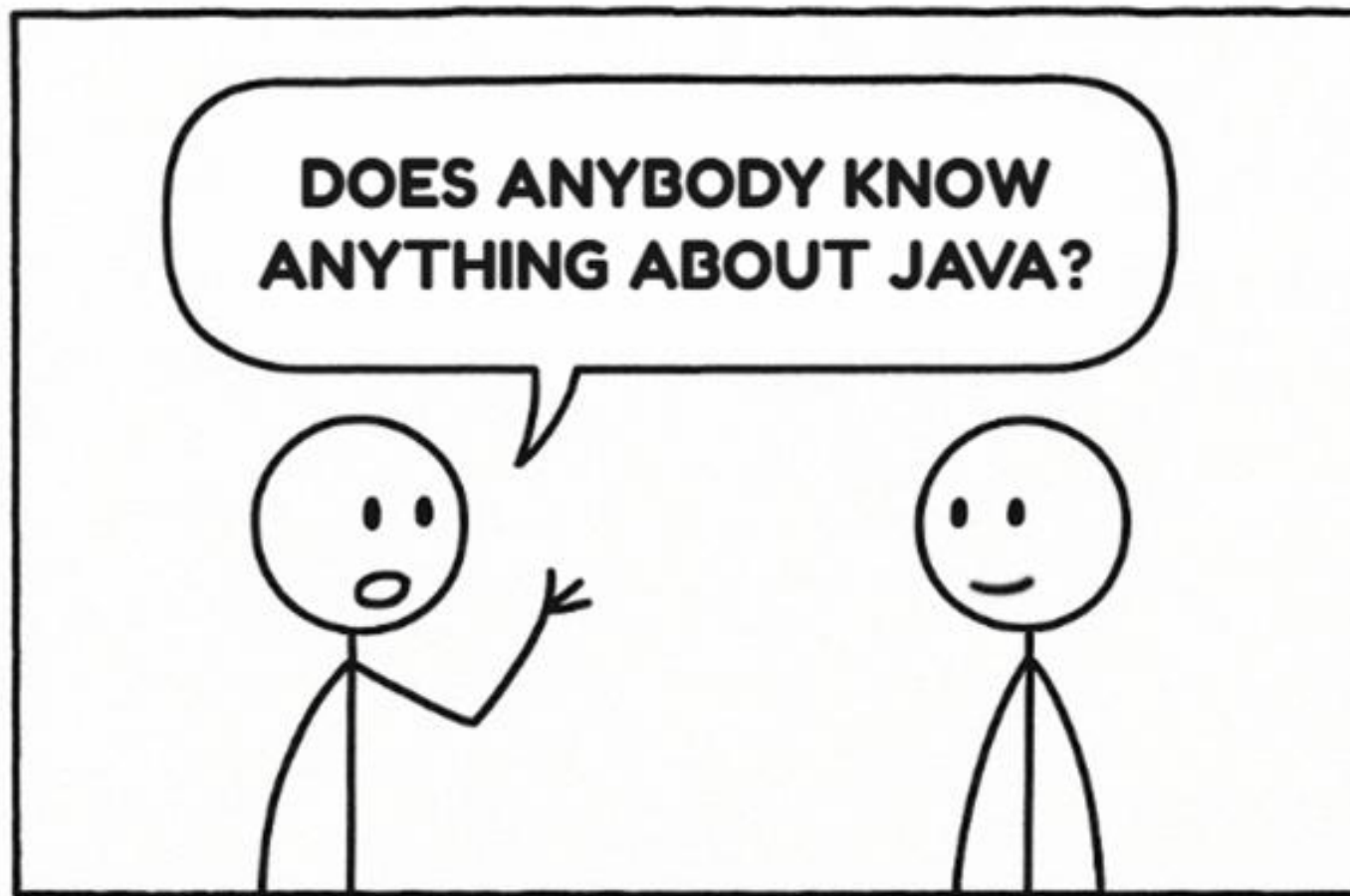
Skill describe required competences for occupations.

Skills based language can help identify educational pathways.



Knowledge
INNOVATION
Centre

THE PROBLEM



Examples of Skill Frameworks & Standards

ESCO

European Skills, Competences, Qualifications and Occupations

DigComp

The Digital Competence Framework

GreenComp

the European sustainability competence framework

SFIA

Skills Framework for the Information Age

SkillFuture

Skills Frameworks to support the Industry Transformation Maps

RSD

Rick Skill Descriptors Schema

THE SECRET SAUCE

SEMANTIC SEARCH

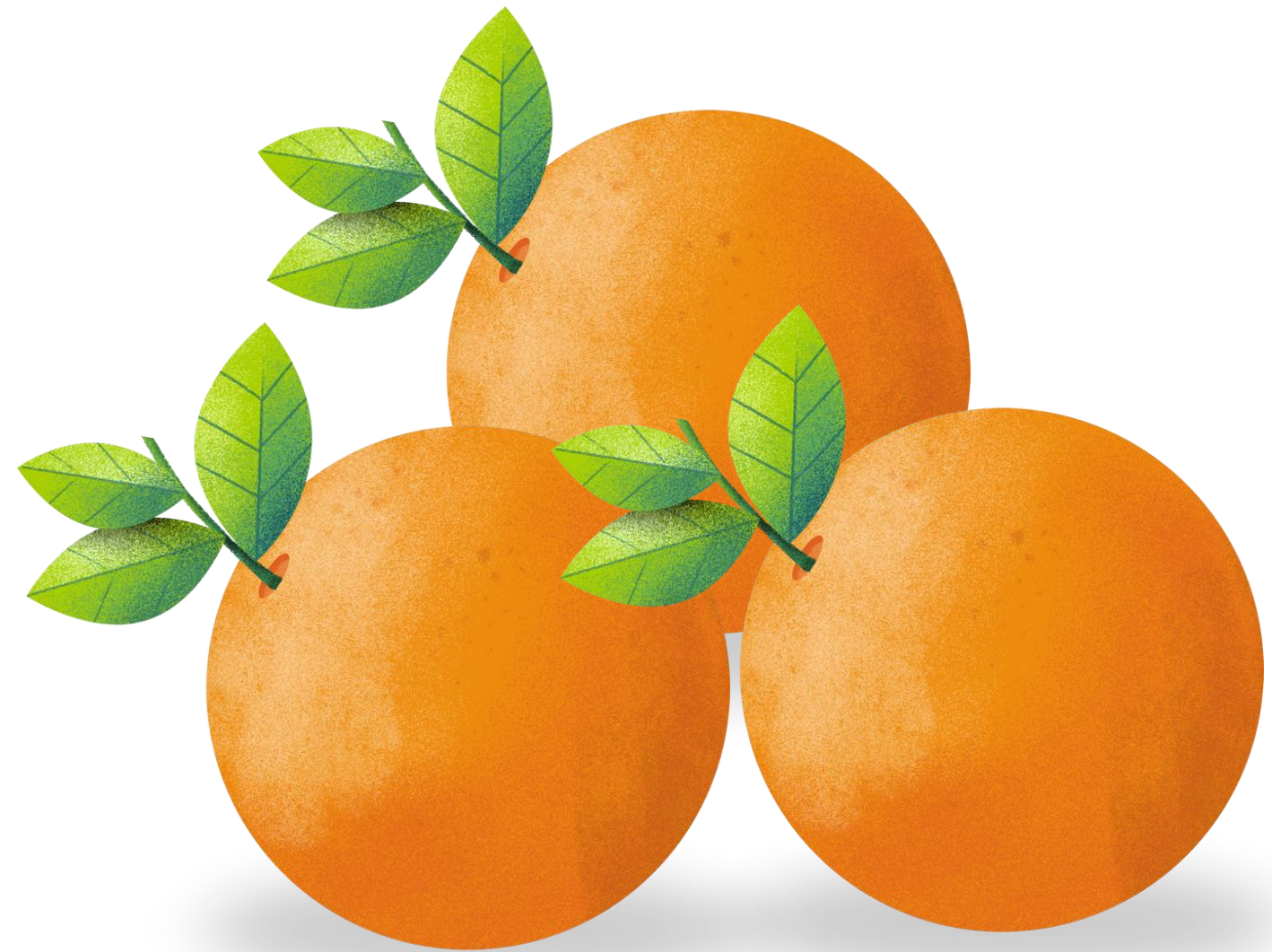
Step-by-Step with Kamarul Adha

The what

The how

The why

How can we train an AI to recognise between Apples & Oranges?



What if we extract features?



What if we extract features?

*Level of **Sweetness***

&

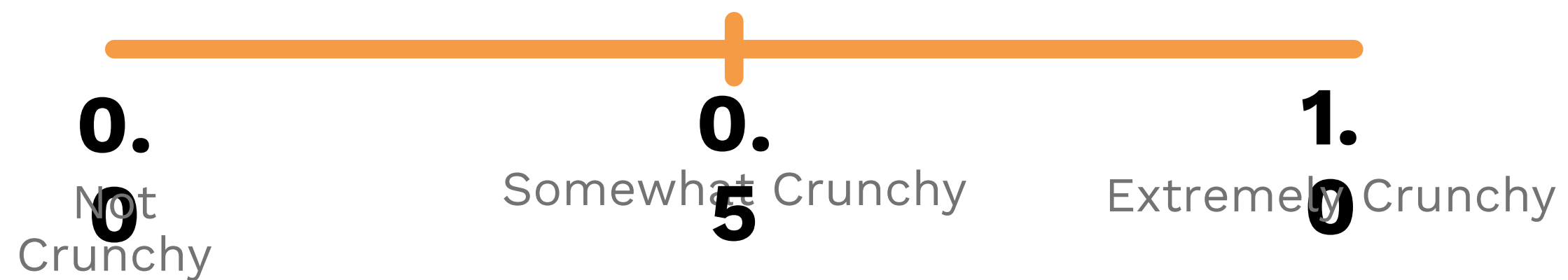
*Level of **Crunchiness***



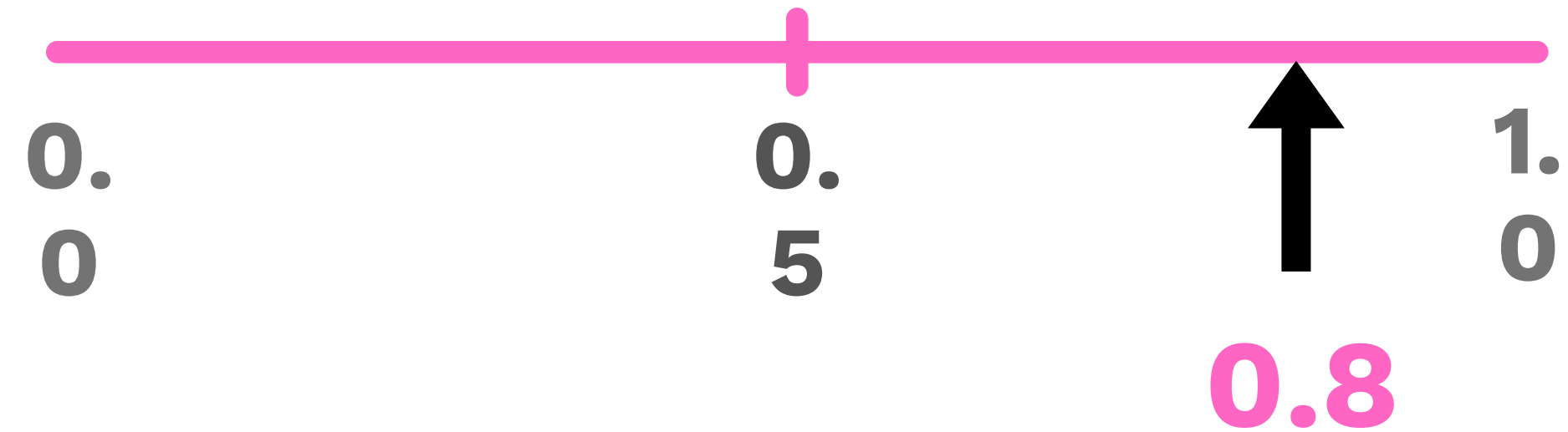
Level of Sweetness (S)



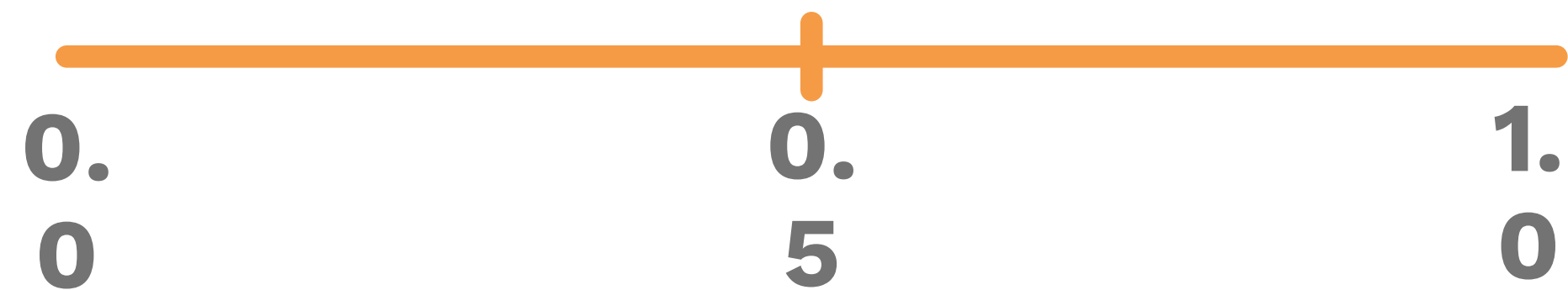
Level of Crunchiness (C)



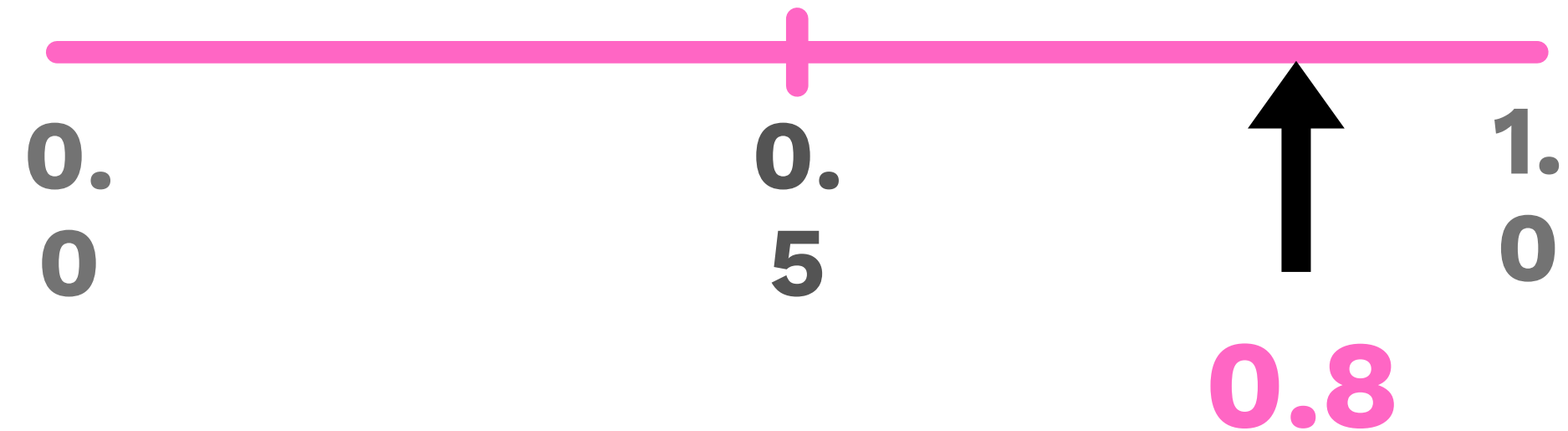
Level of Sweetness (S)



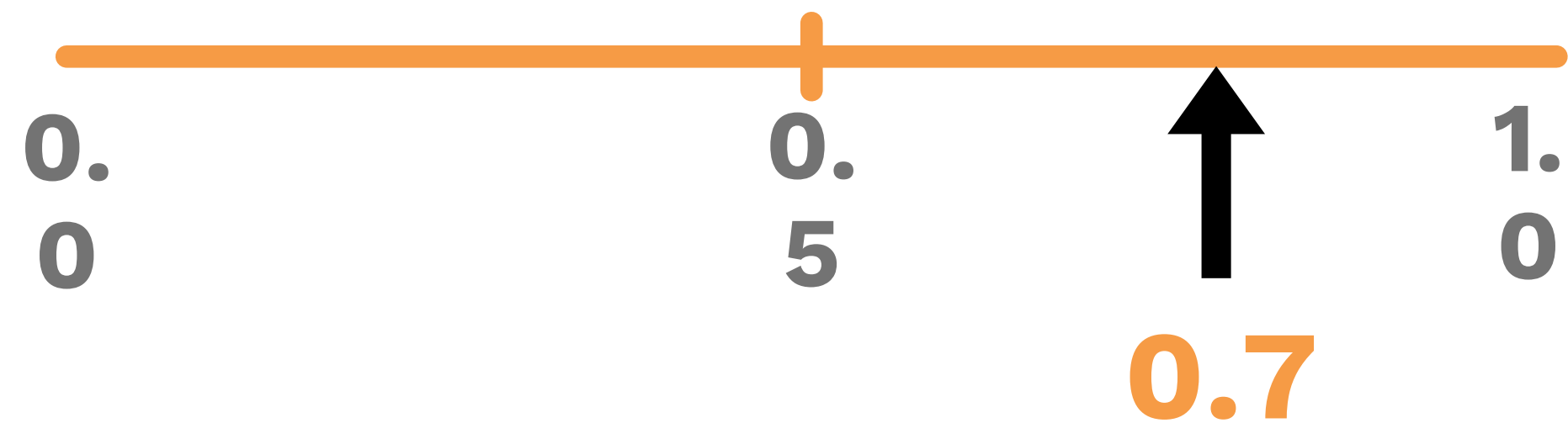
Level of Crunchiness (C)



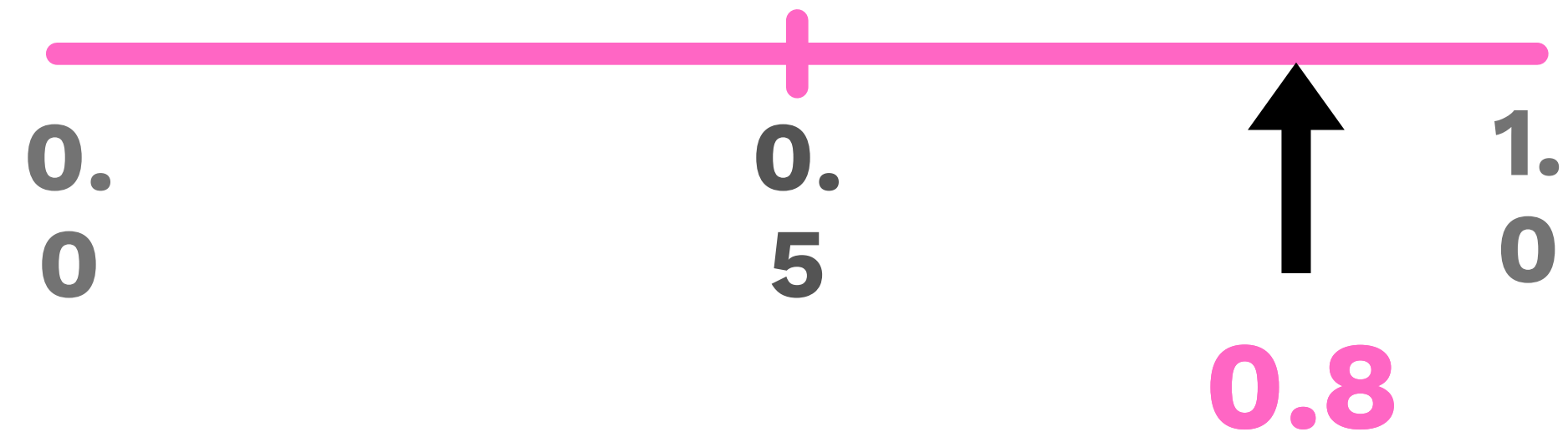
Level of Sweetness (S)



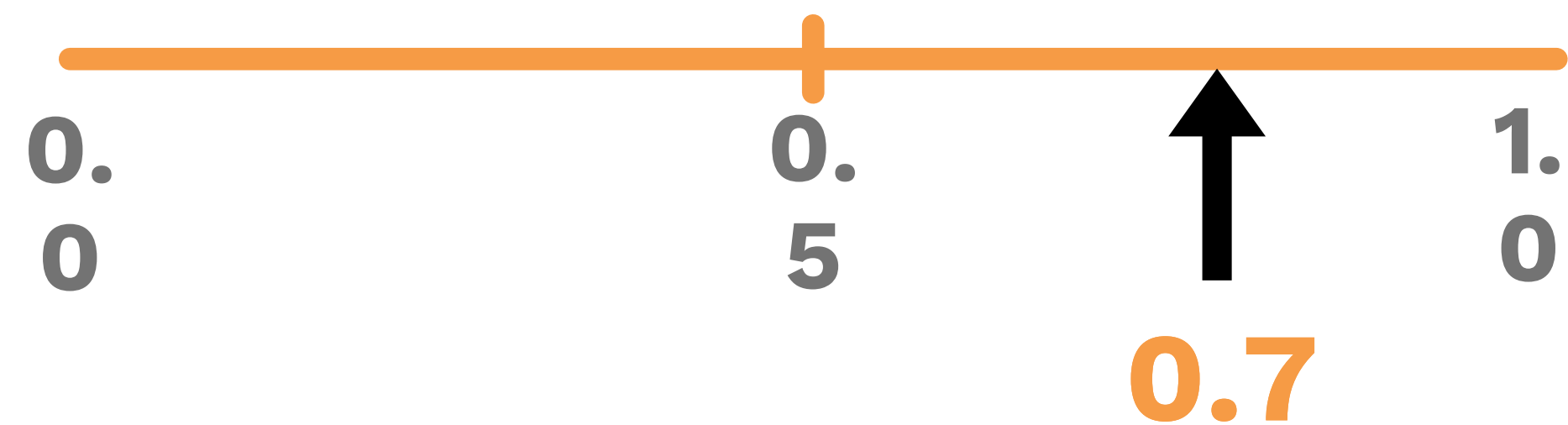
Level of Crunchiness (C)



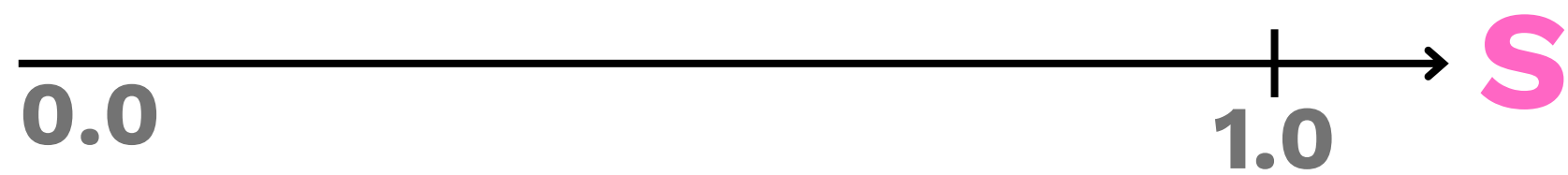
Level of Sweetness (S)



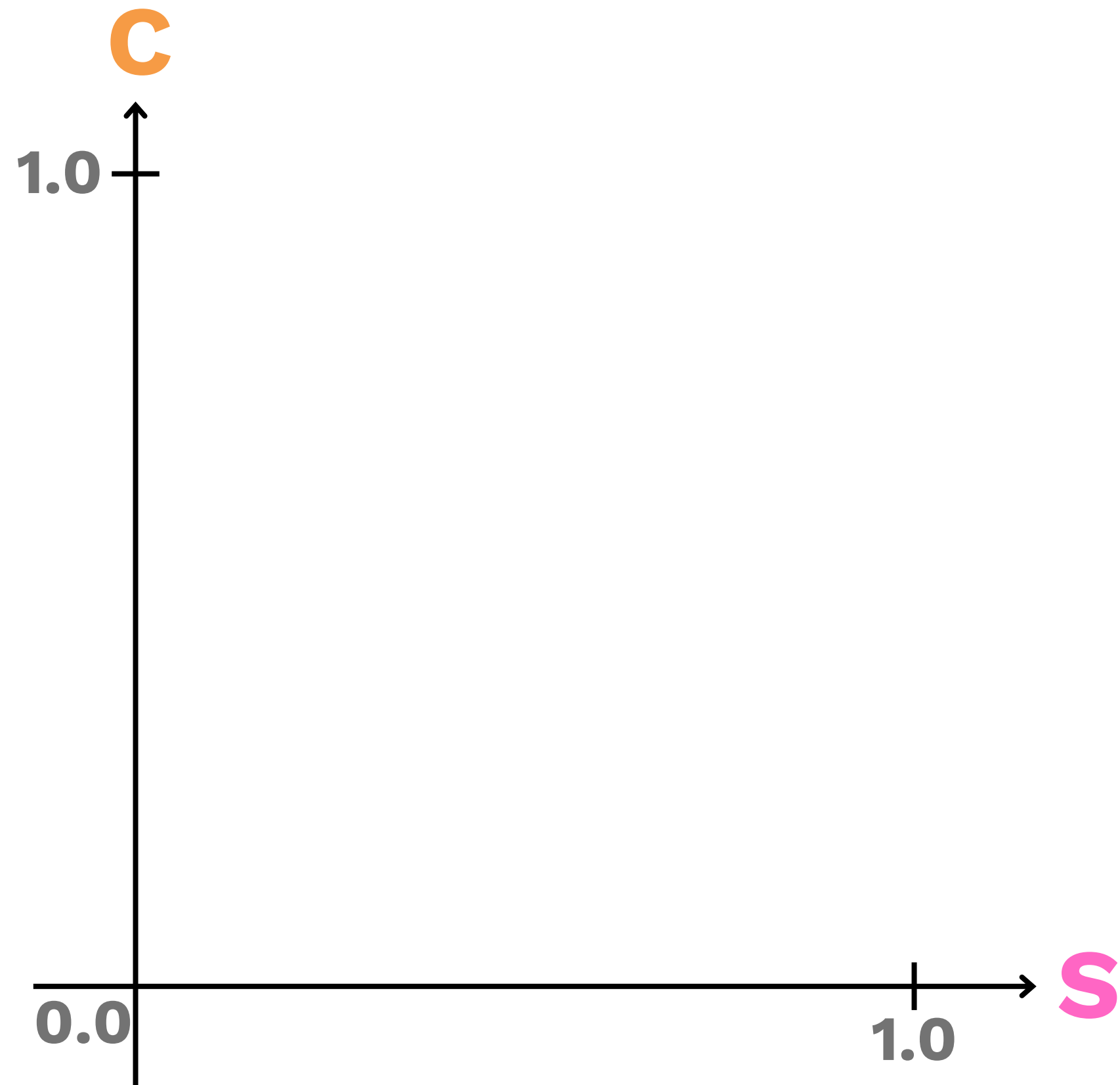
Level of Crunchiness (C)



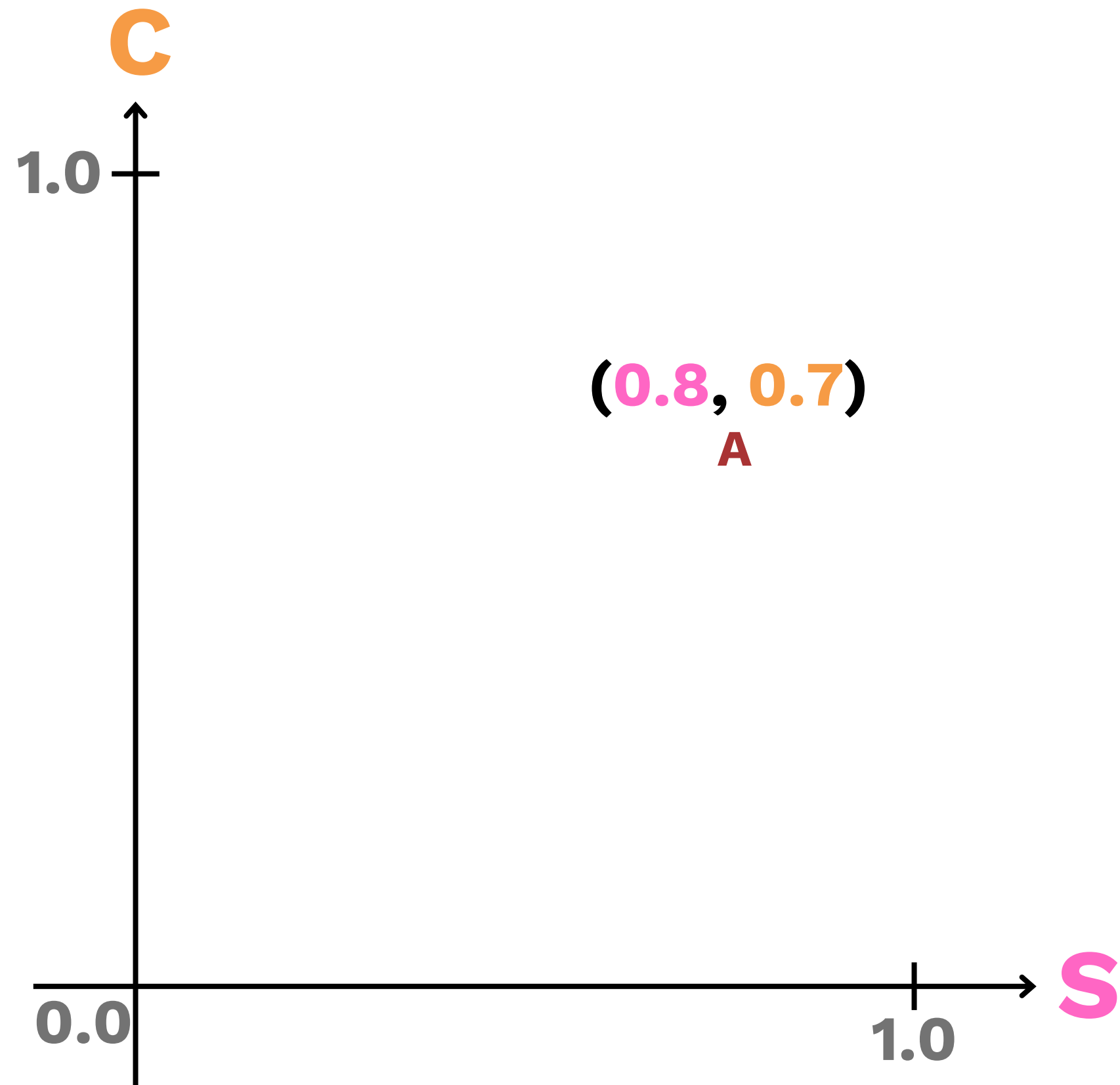
(,) = (,)



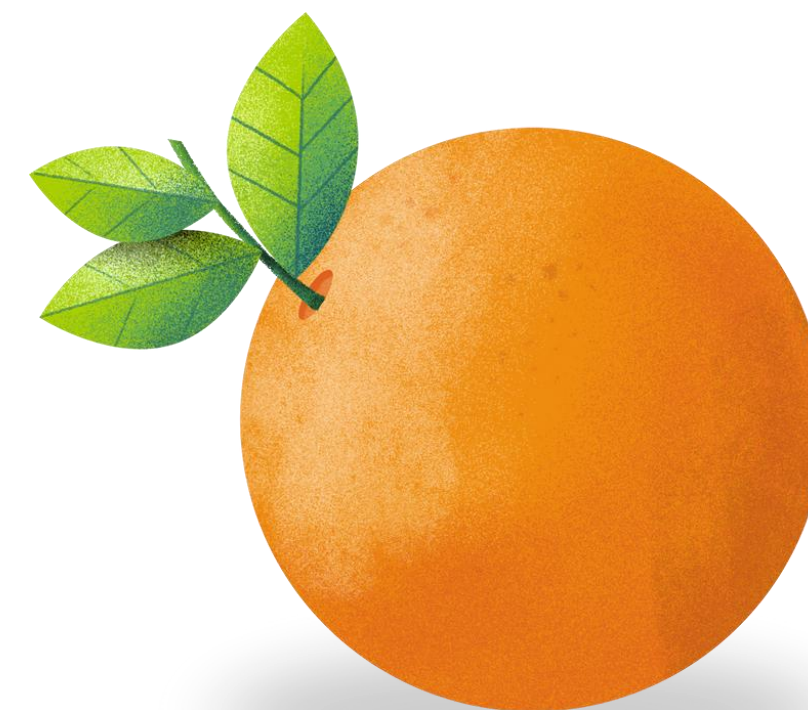
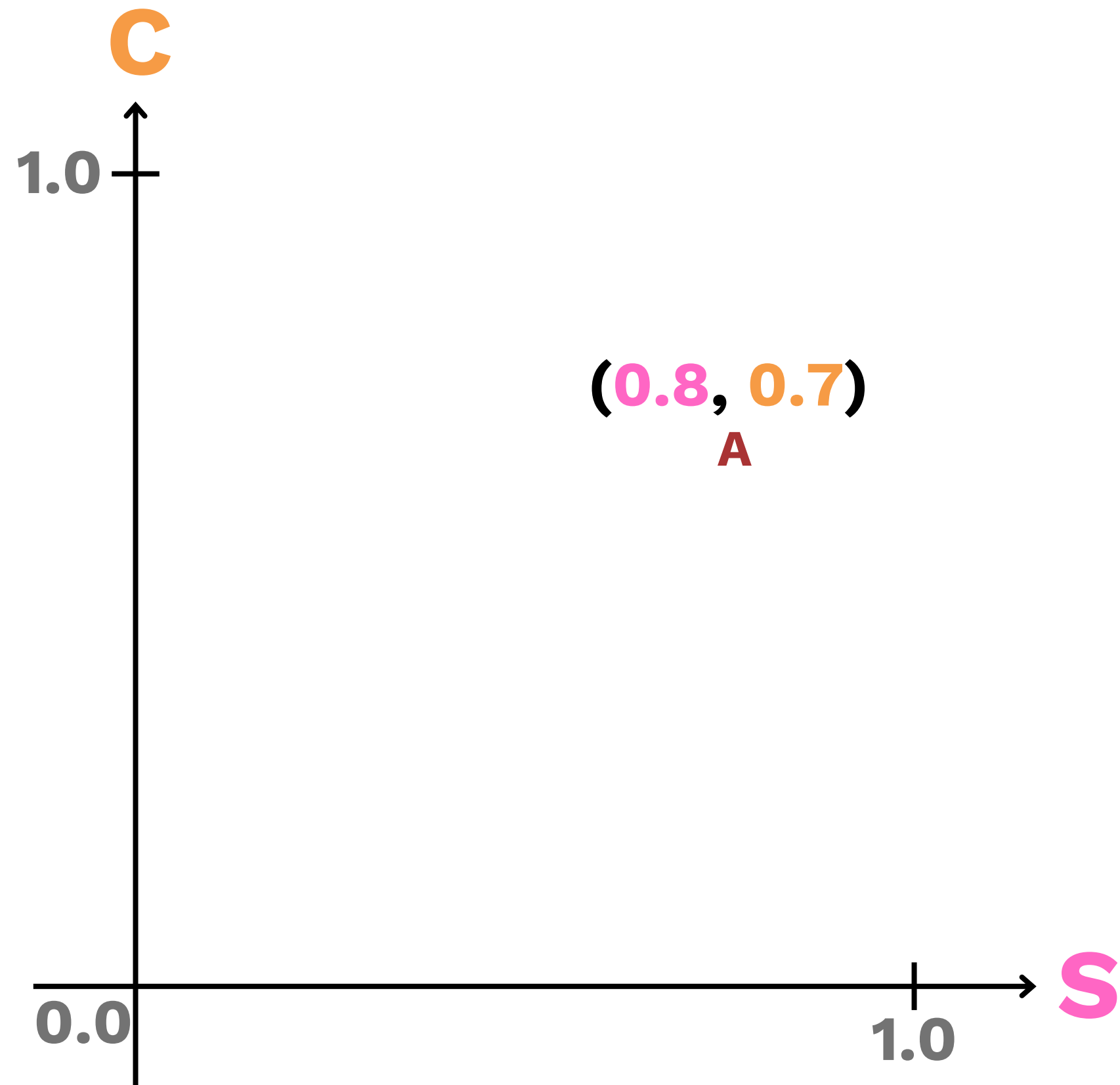
$$(S, C) = (0.8, 0.7)$$



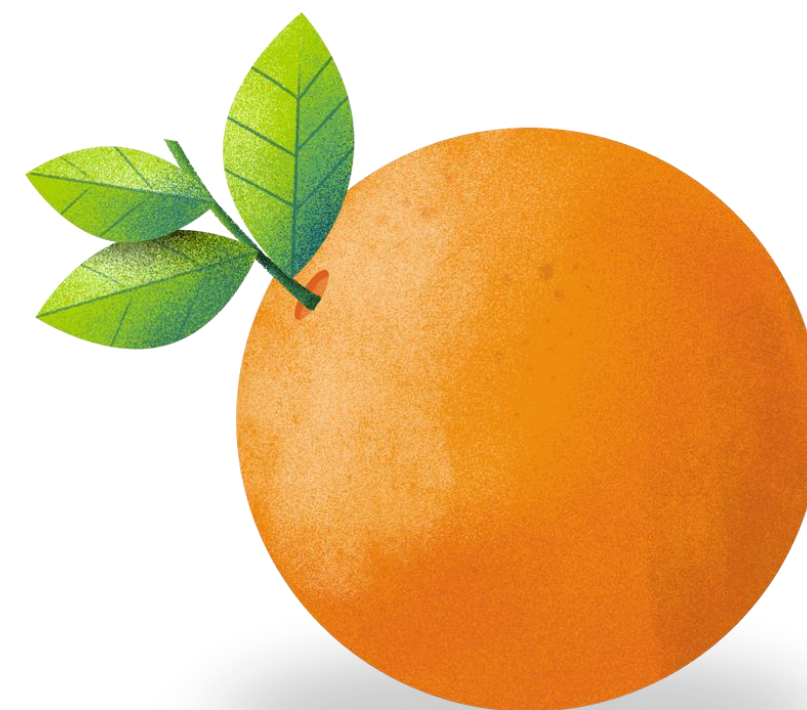
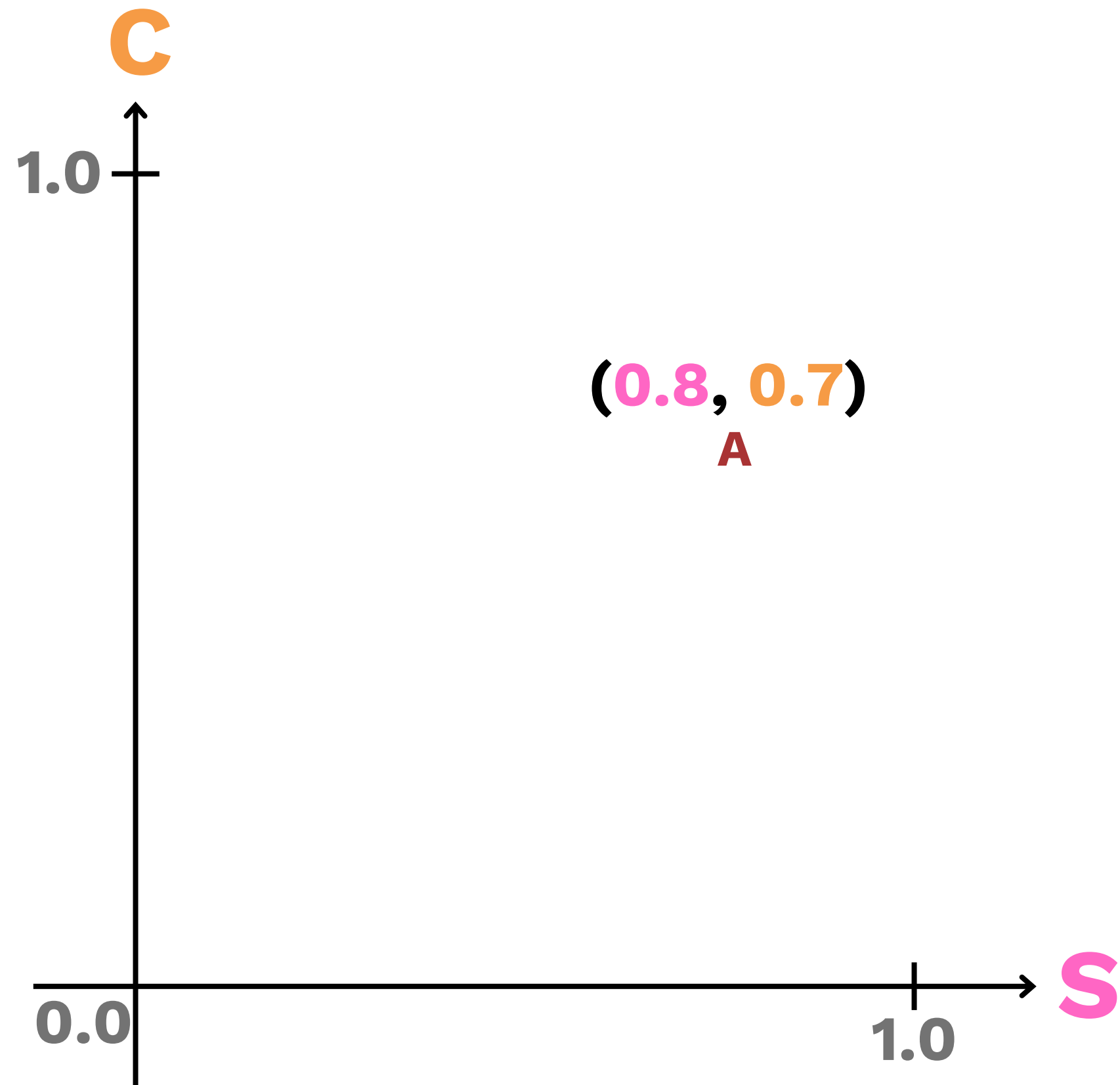
$$(\mathbf{S}, \mathbf{C}) = (0.8, 0.7)$$

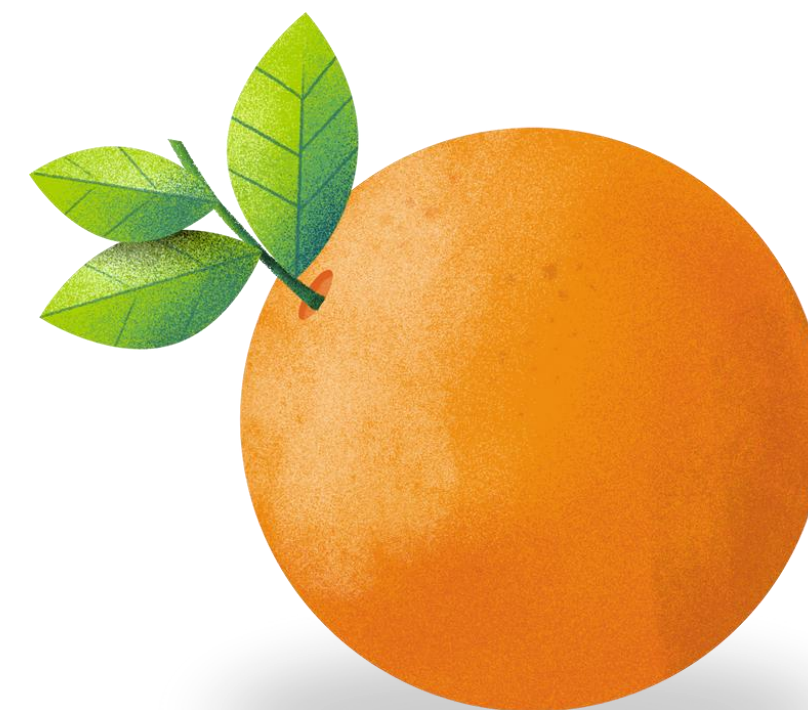
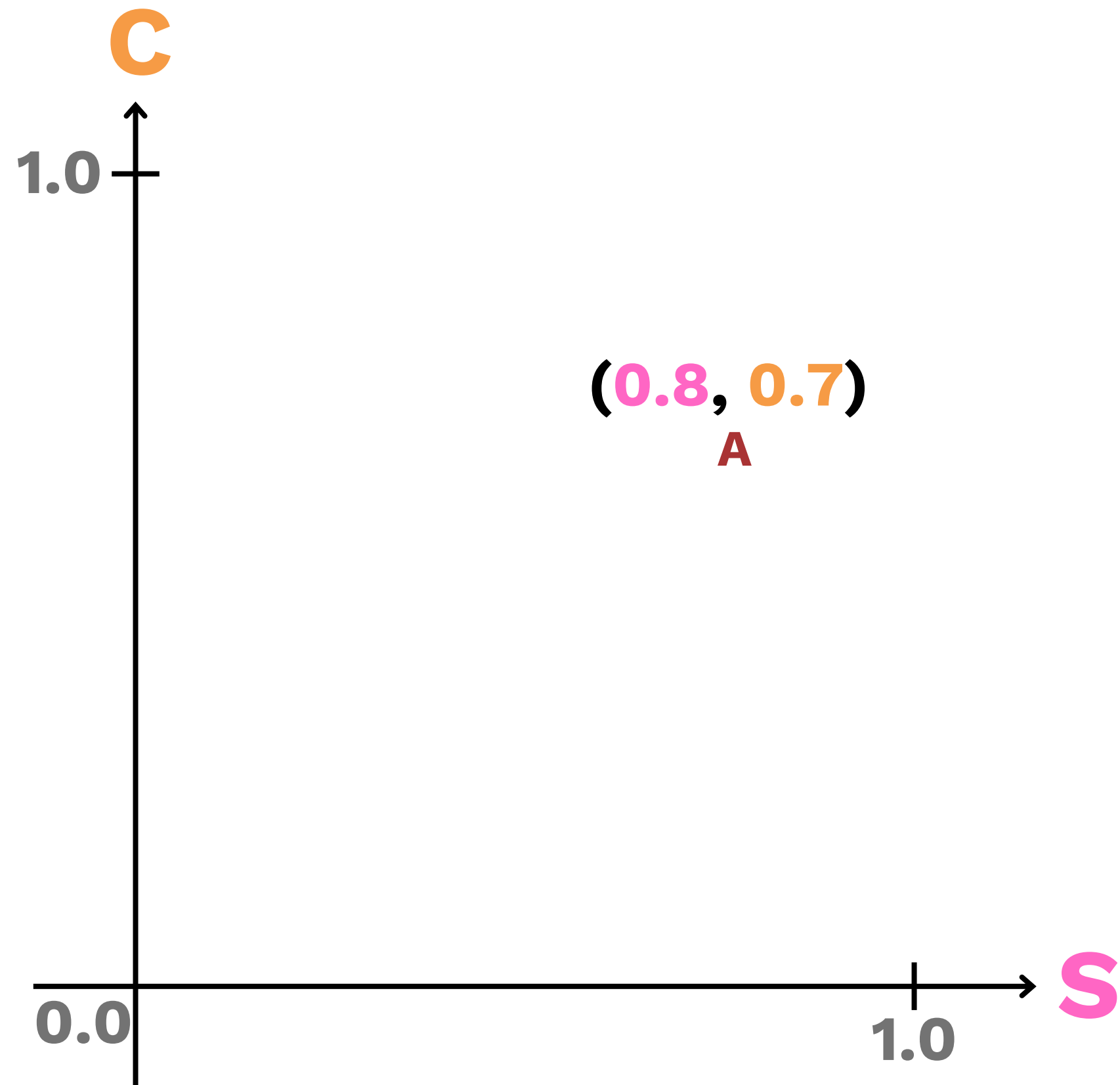


$$(\mathbf{S}, \mathbf{C}) = (\mathbf{0.8}, \mathbf{0.7})$$

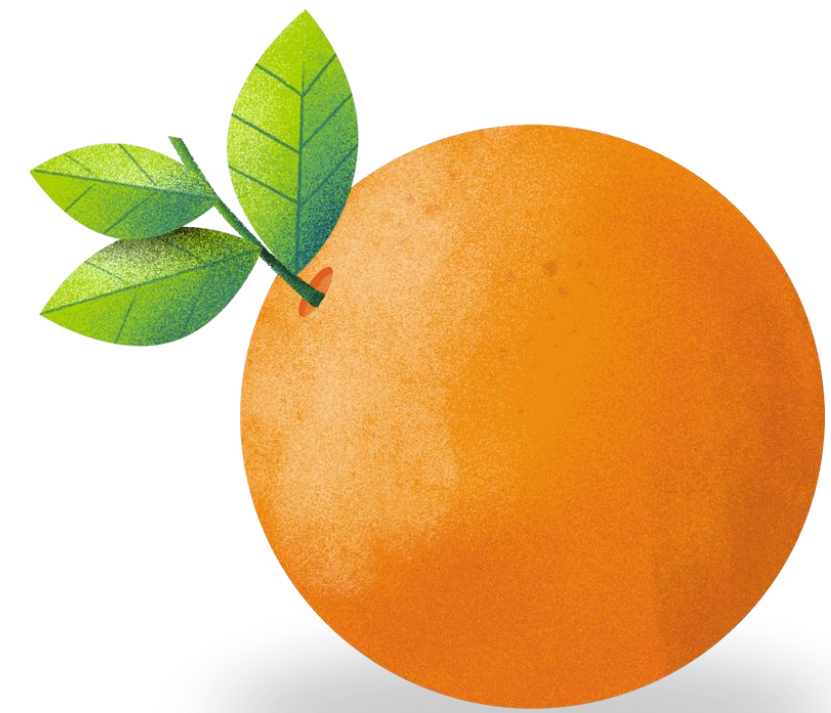
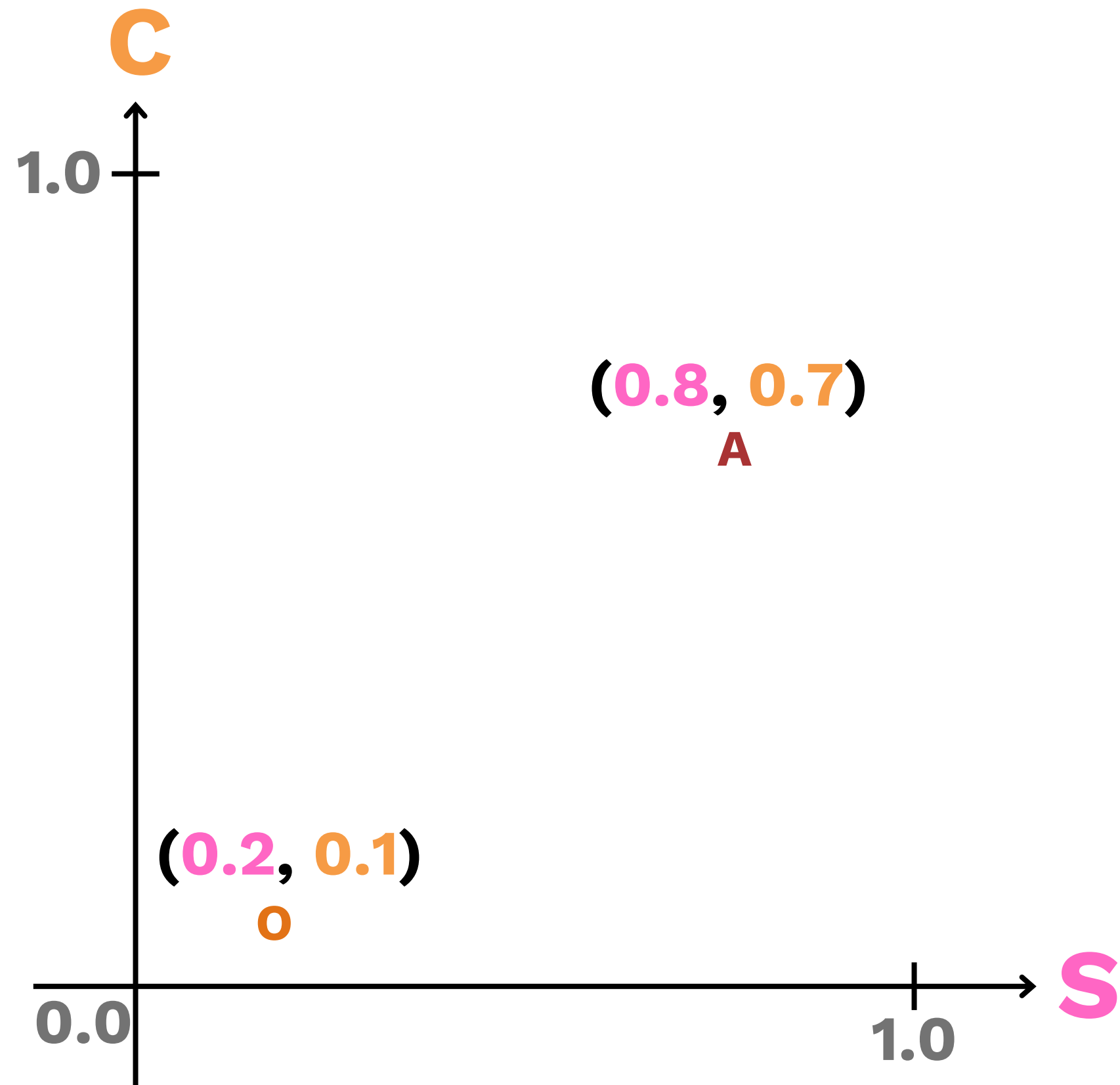


$$(\mathbf{S}, \mathbf{C}) = (\mathbf{0.8}, \mathbf{0.7})$$

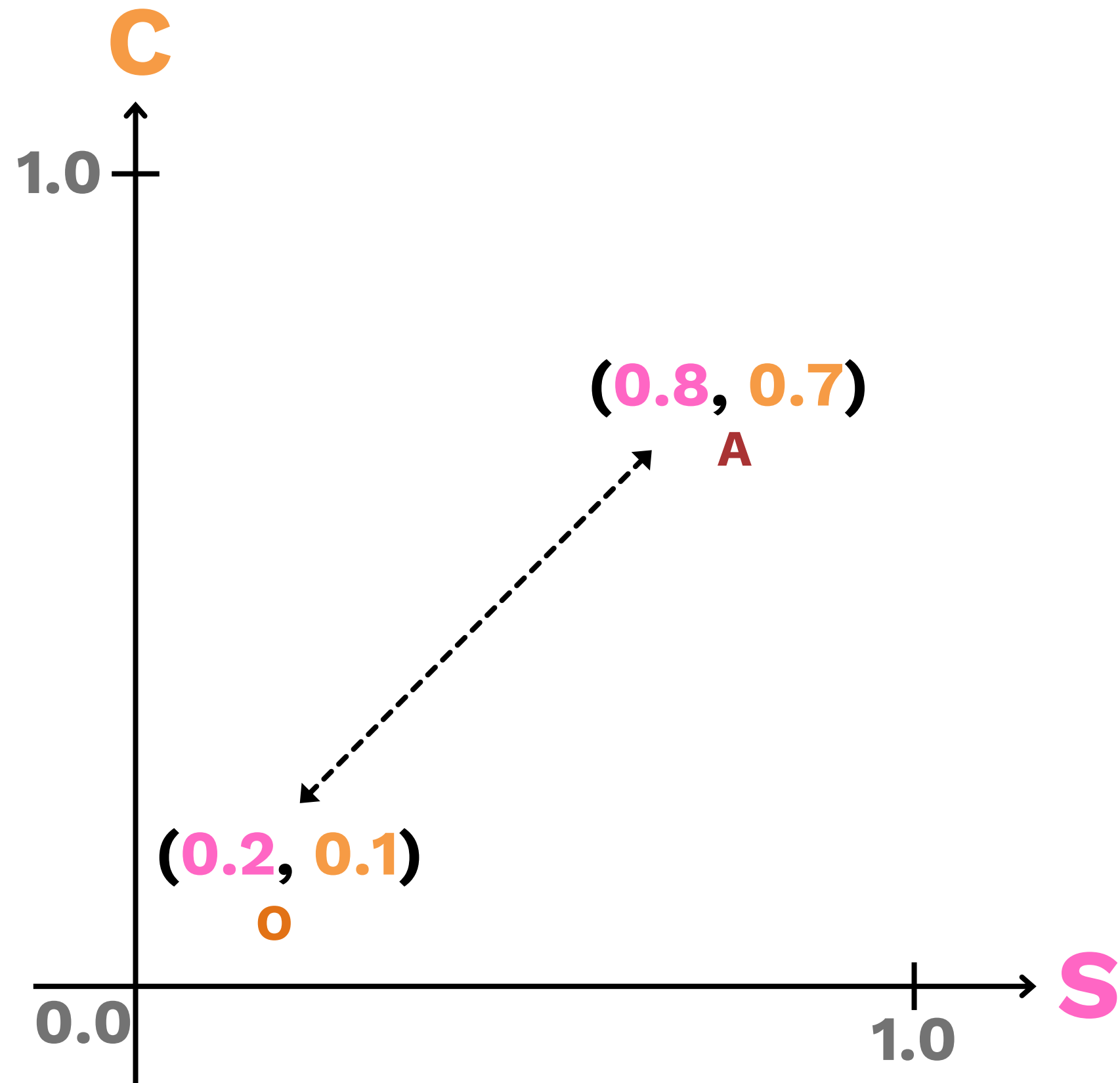




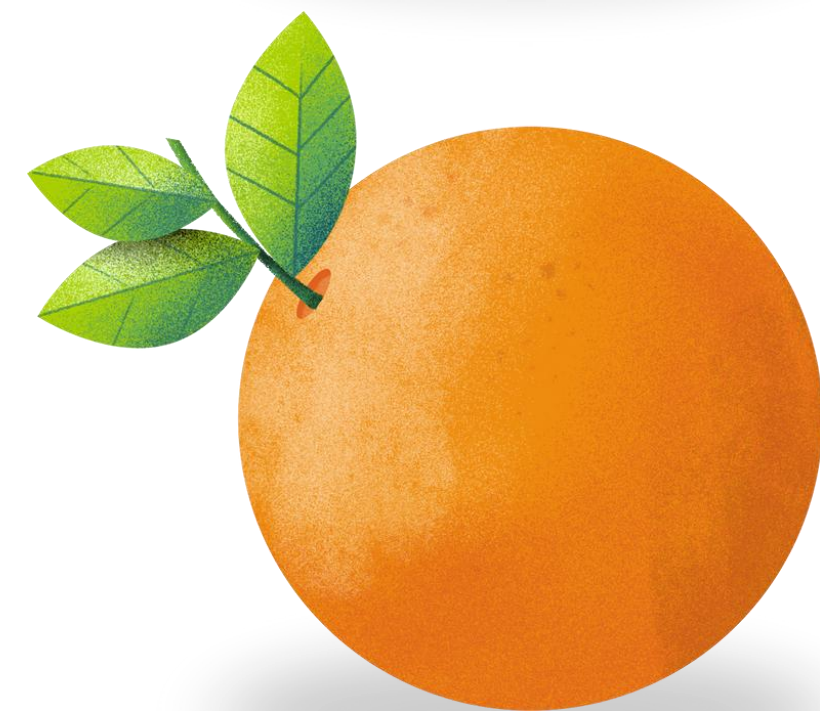
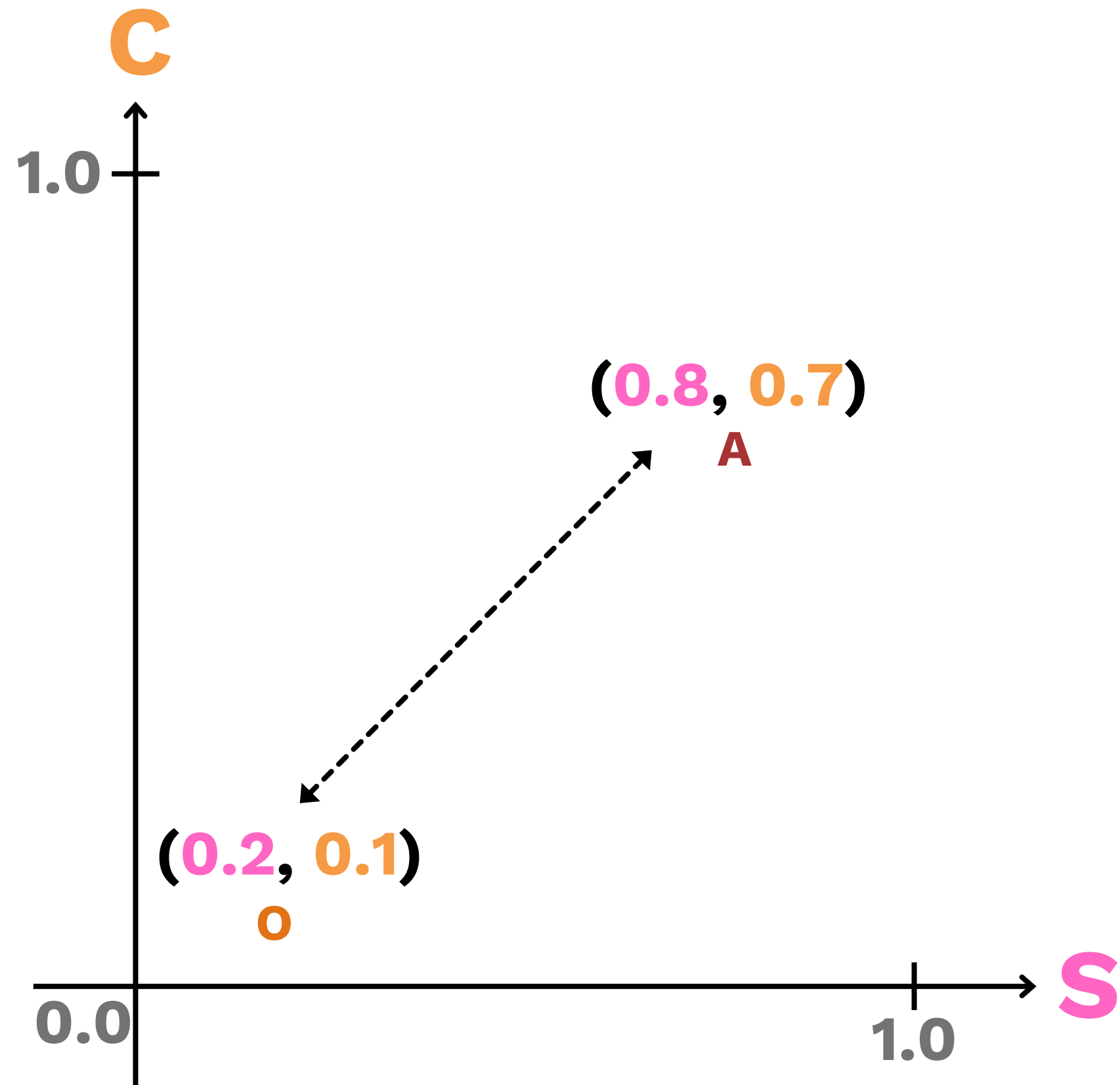
$$(\mathbf{s}, \mathbf{c}) = (0.2, 0.1)$$

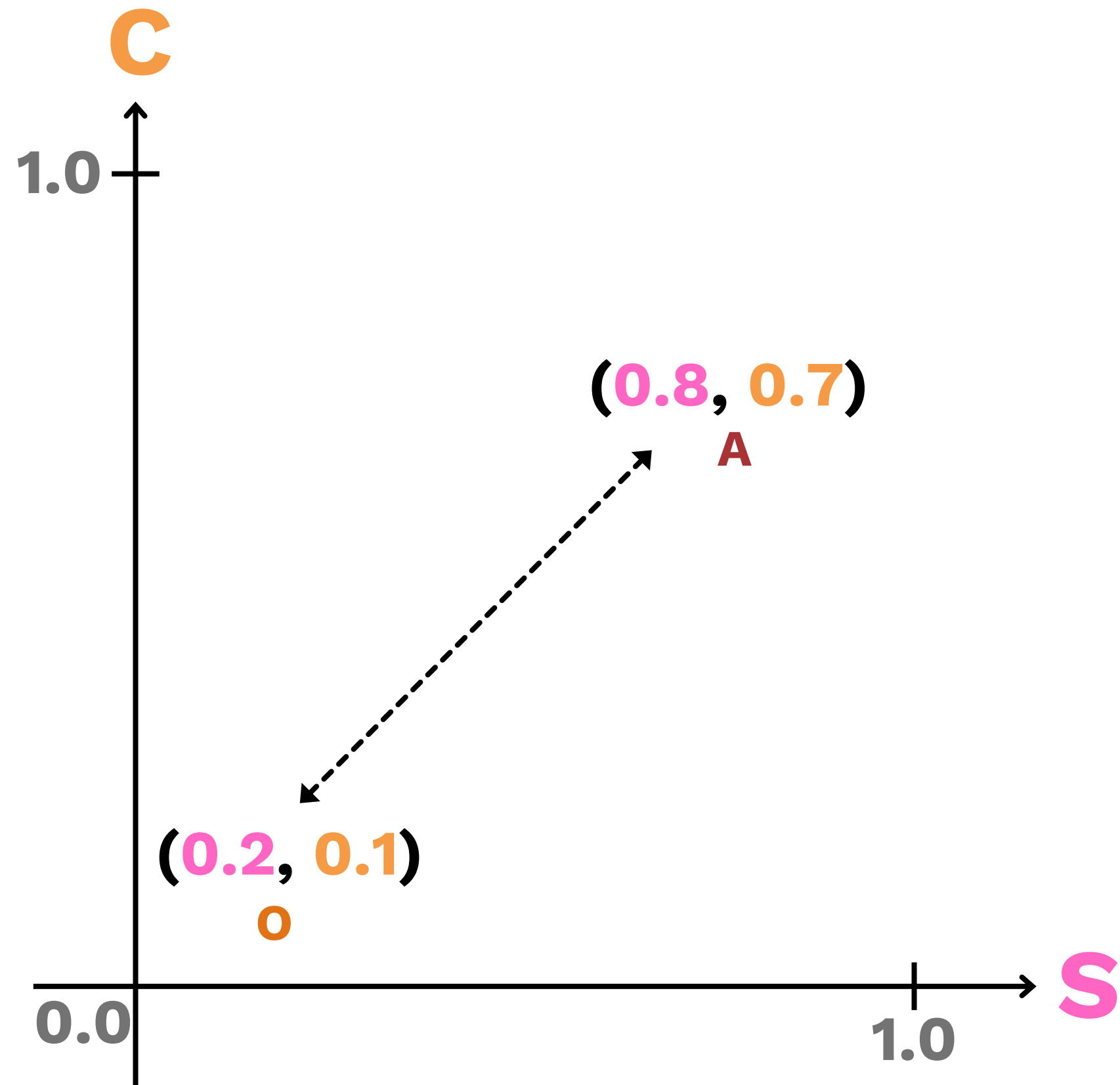


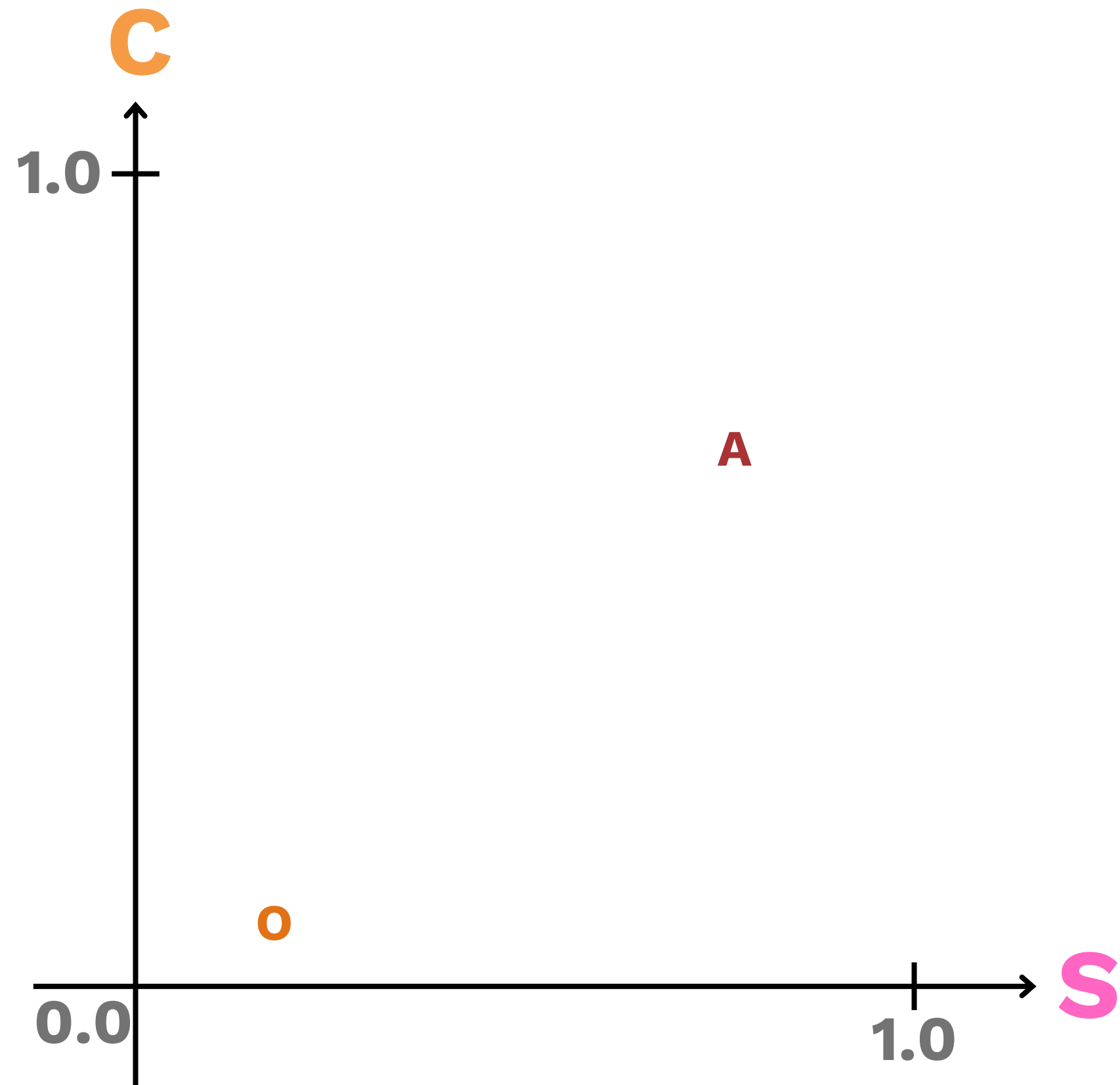
$$(S, C) = (0.2, 0.1)$$

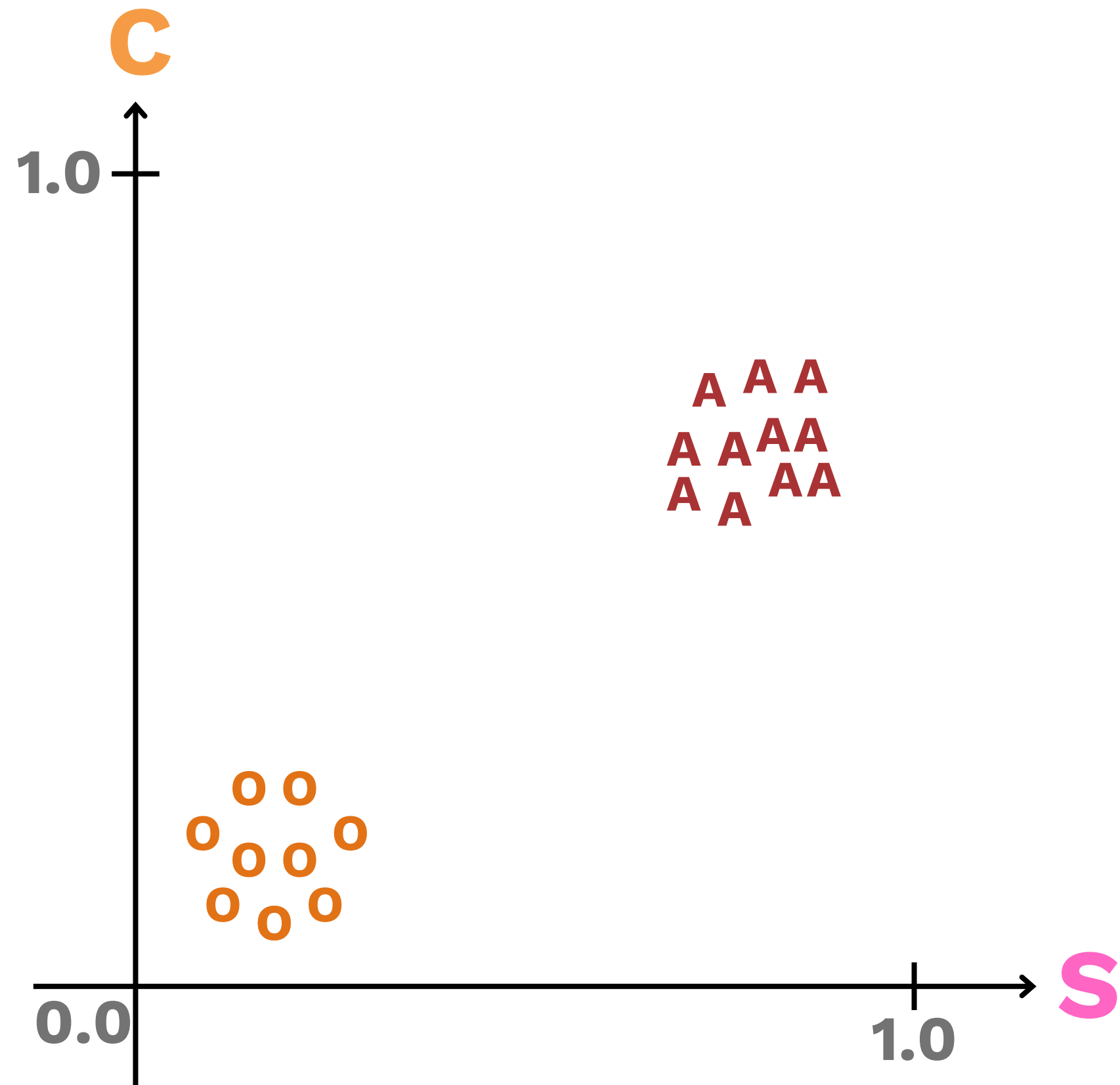


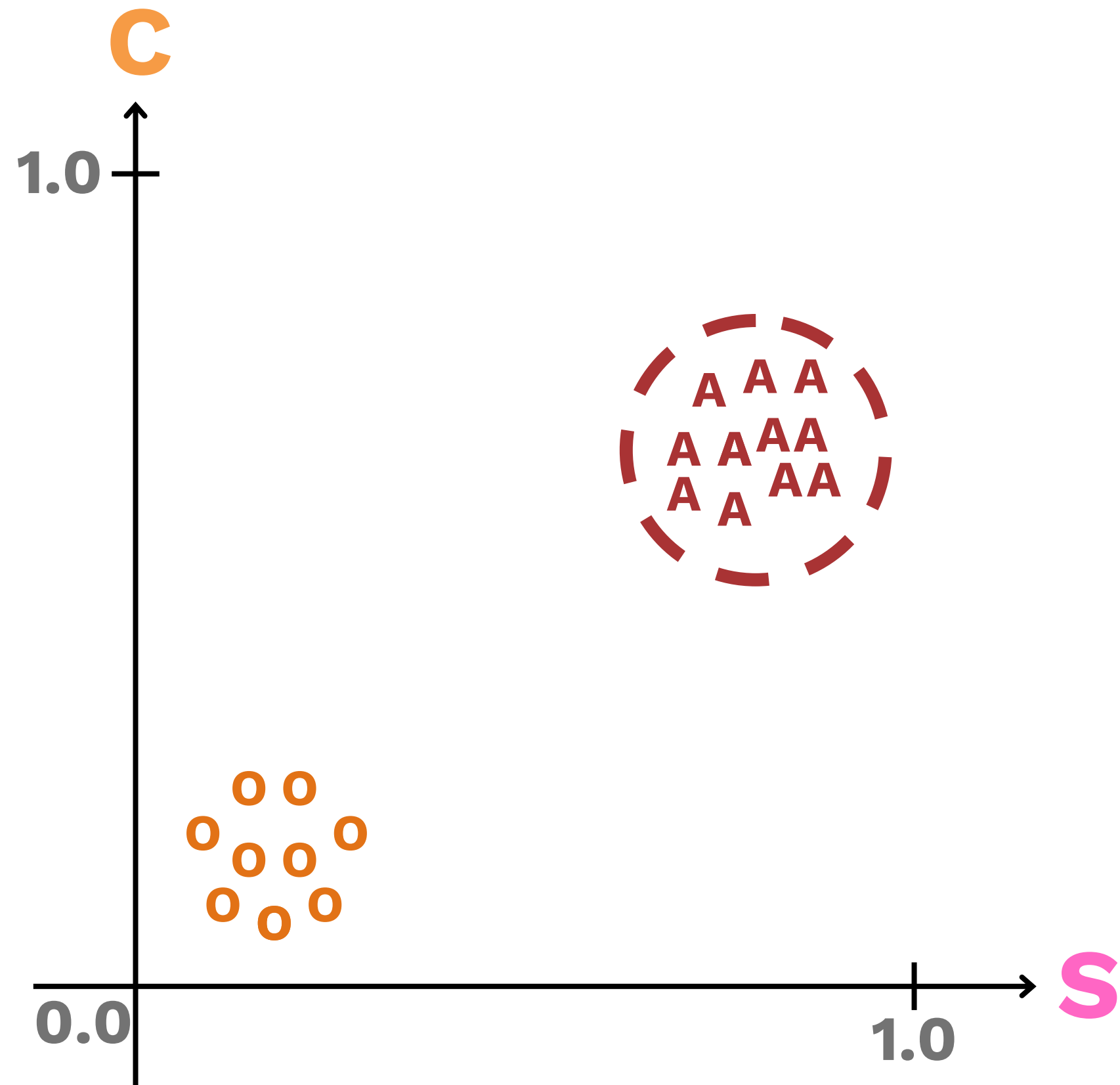
$$(S, C) = (0.2, 0.1)$$

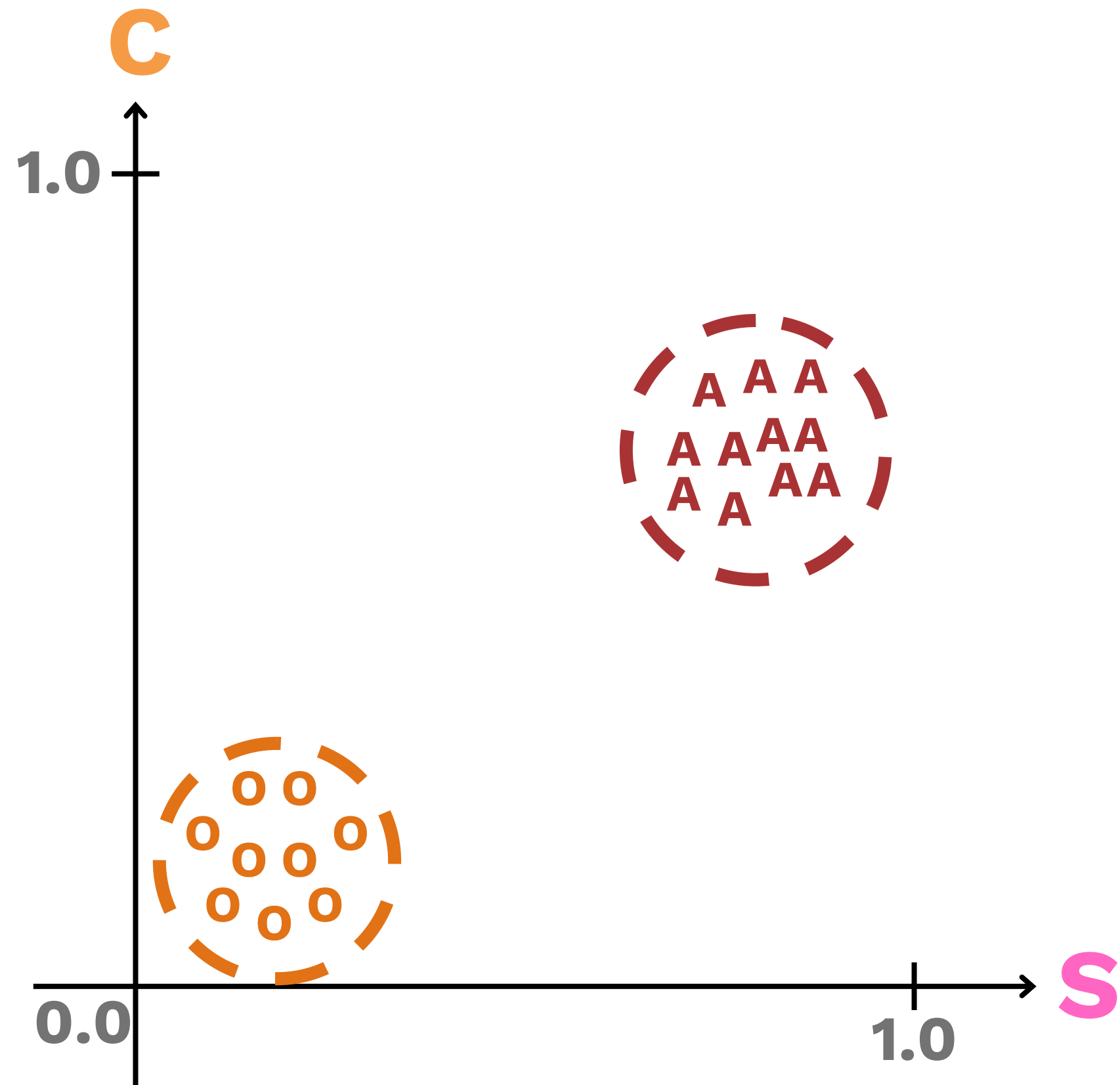


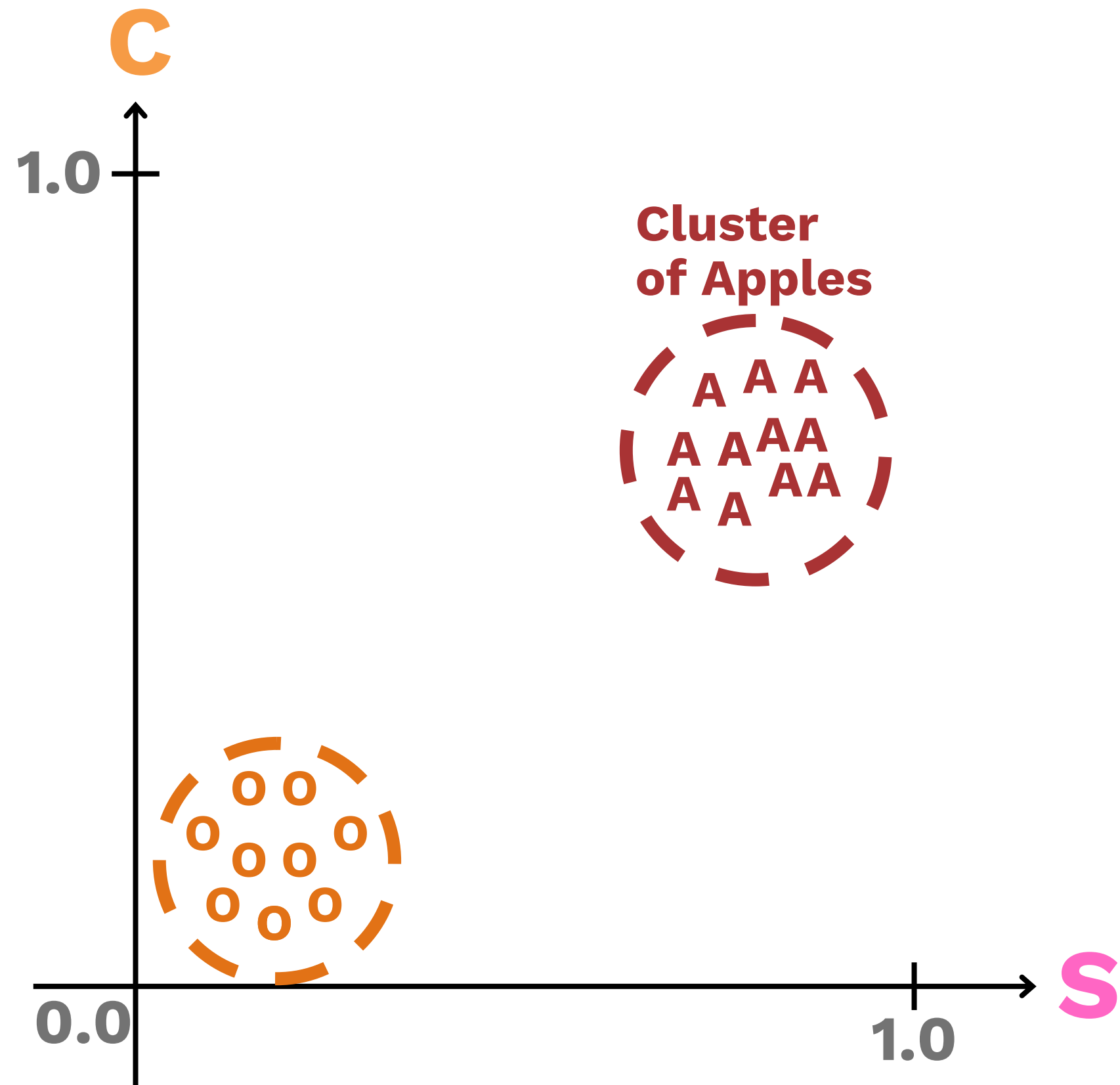


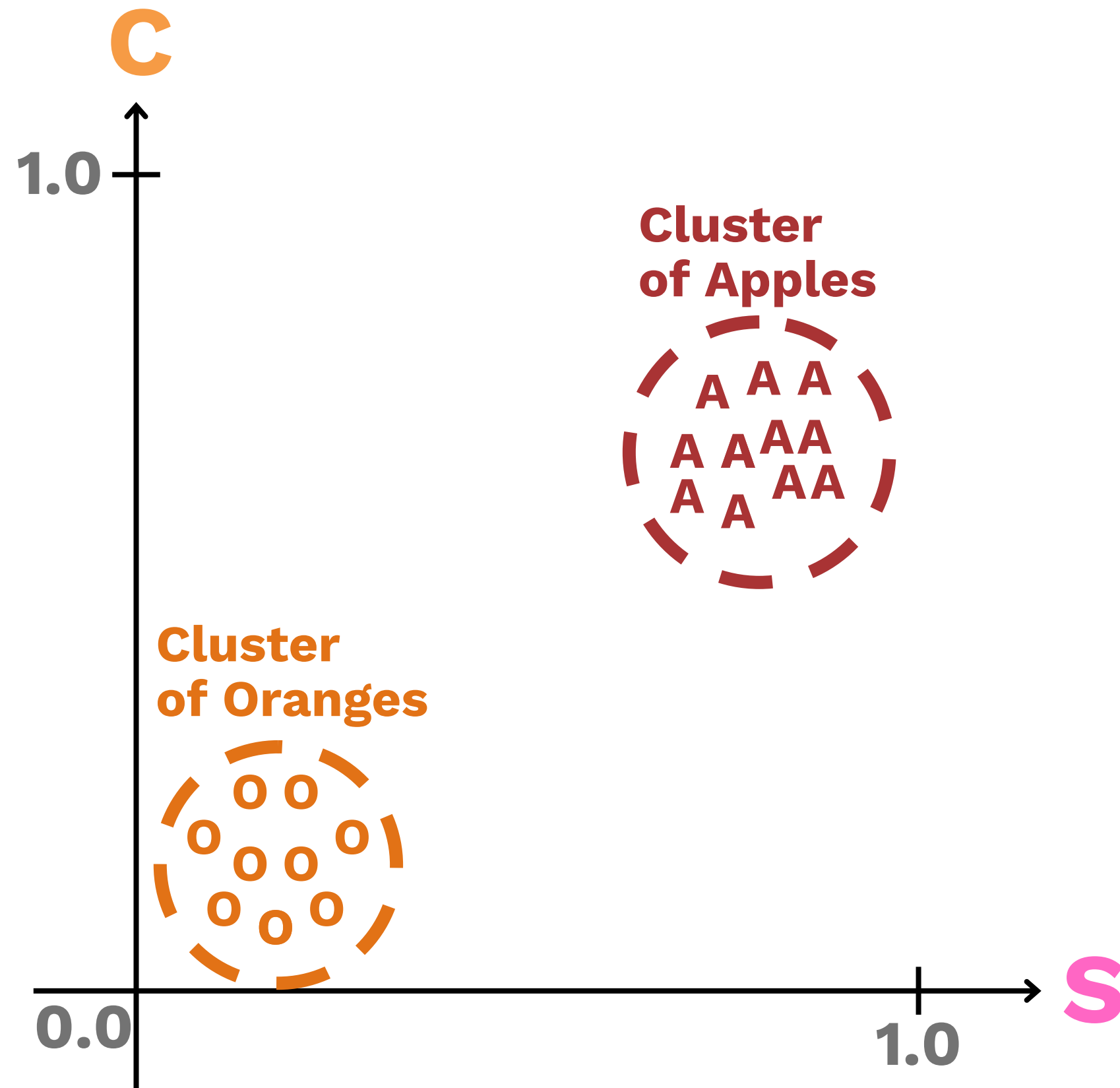


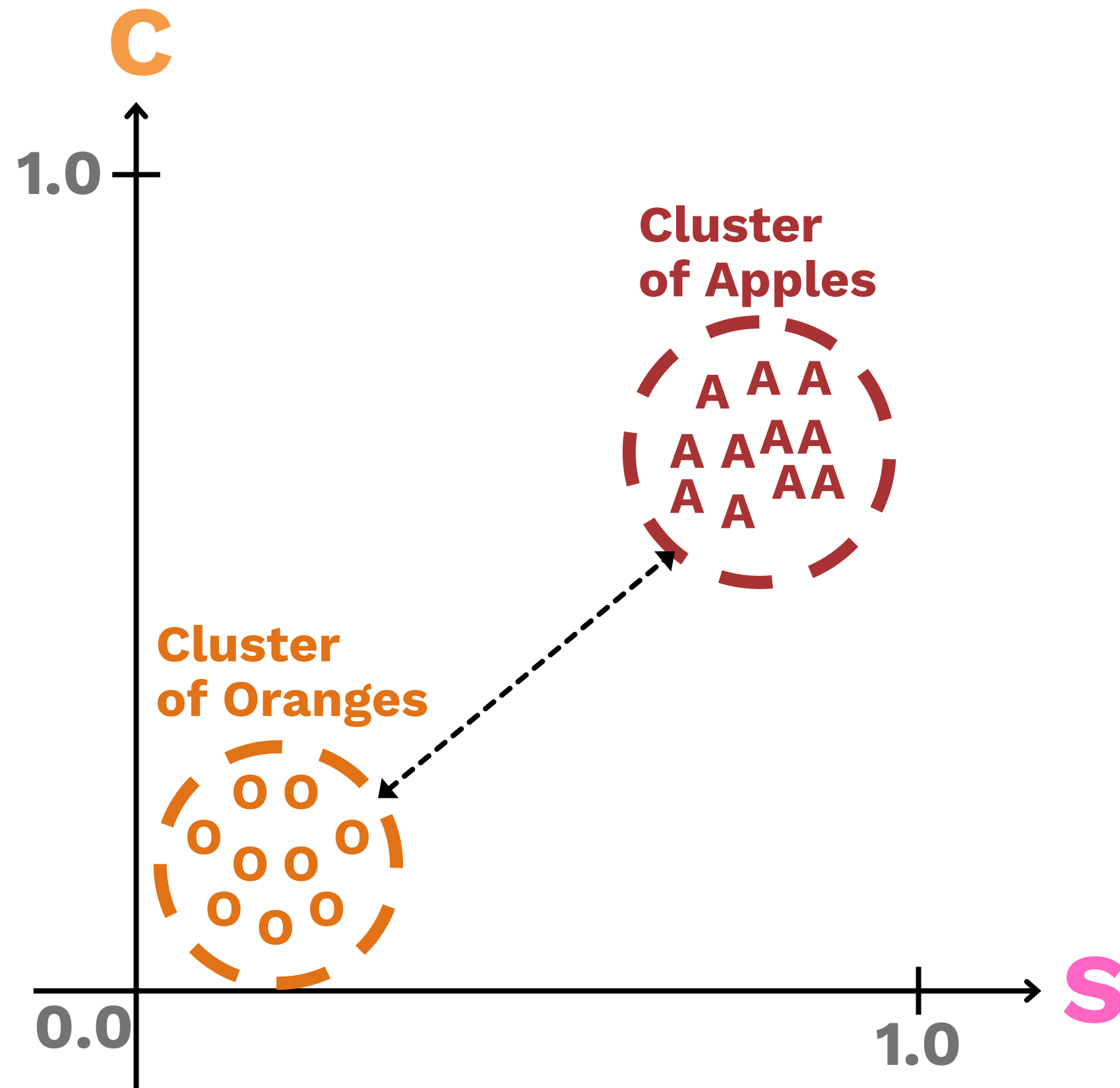


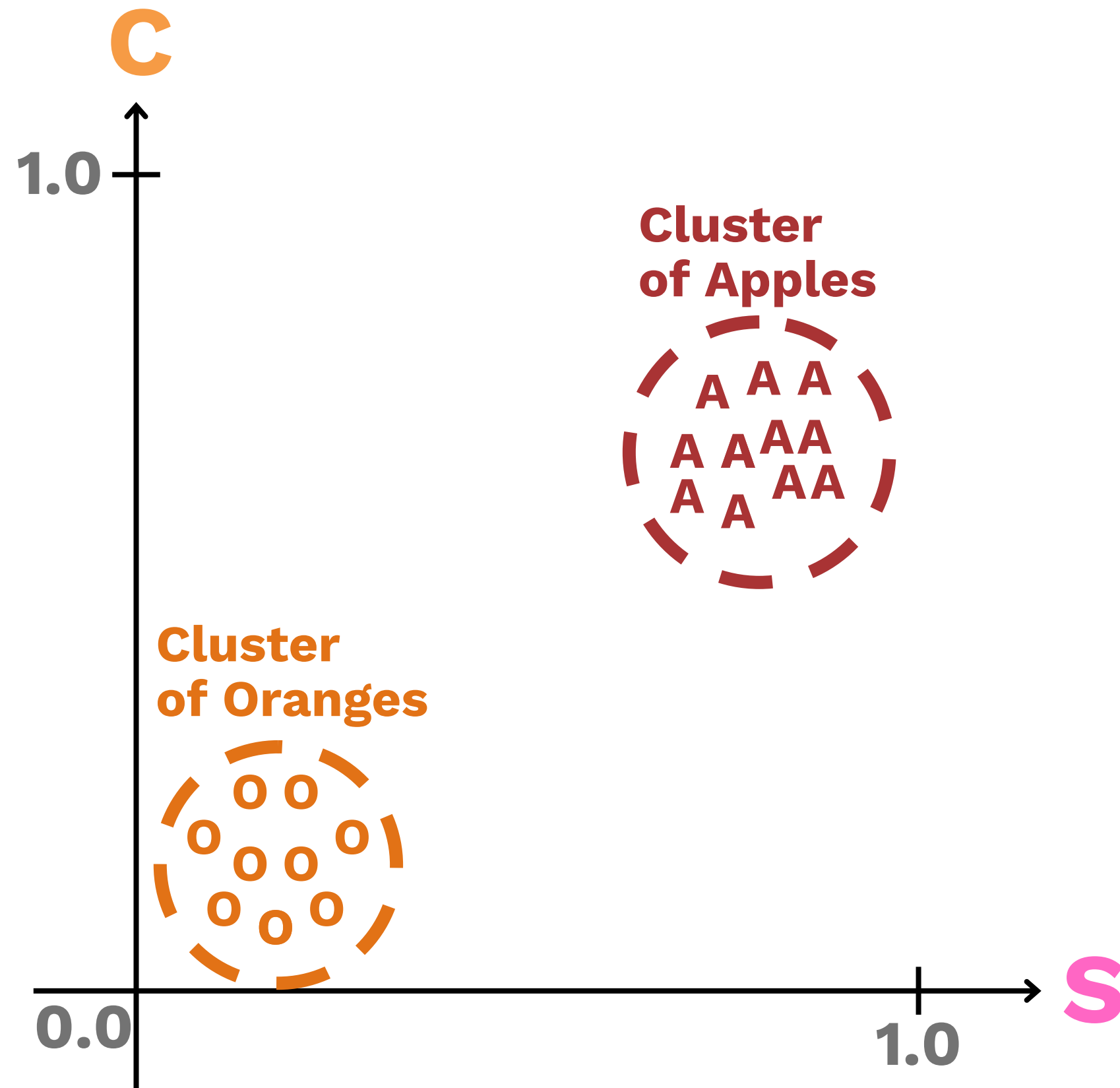


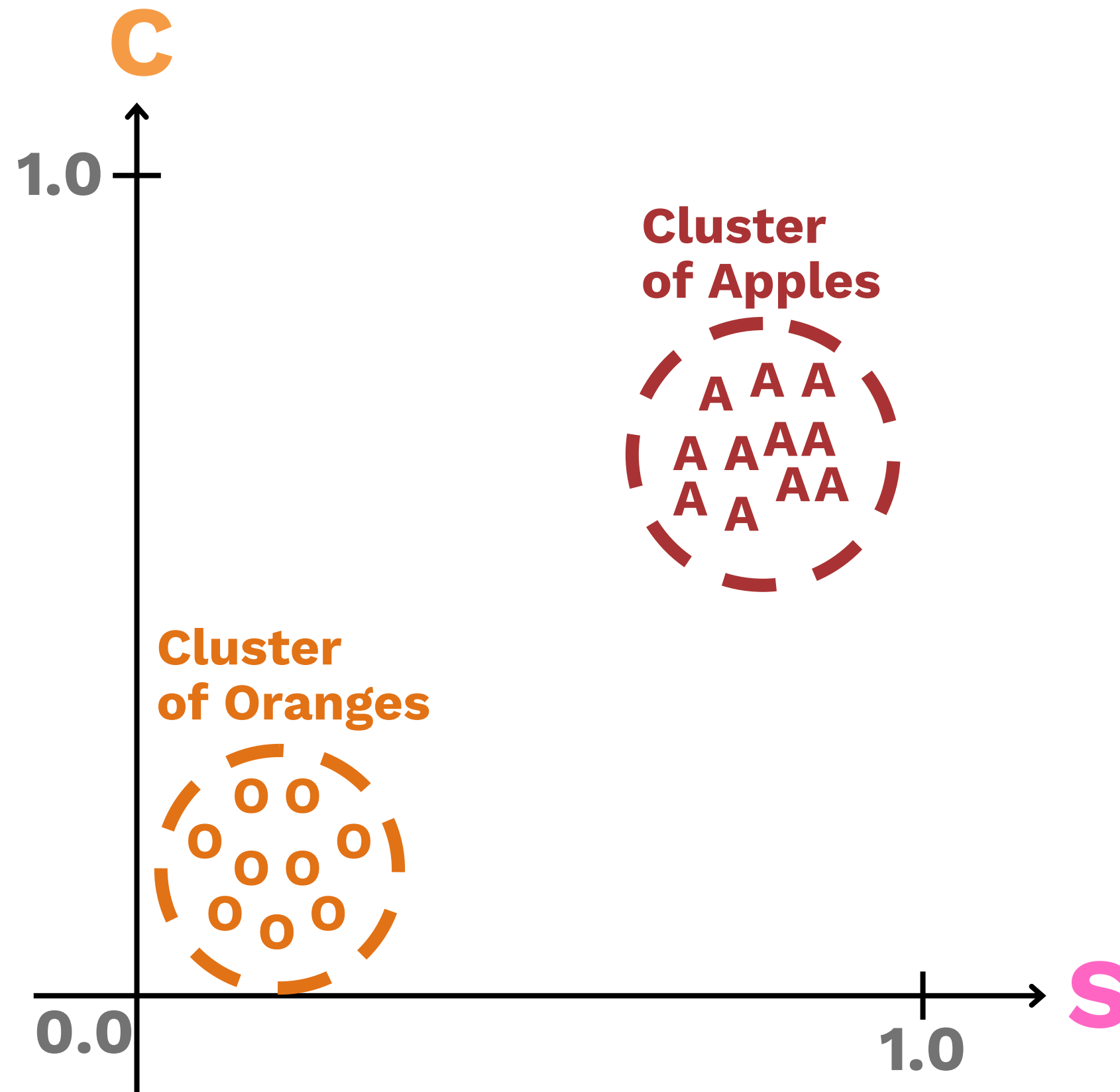




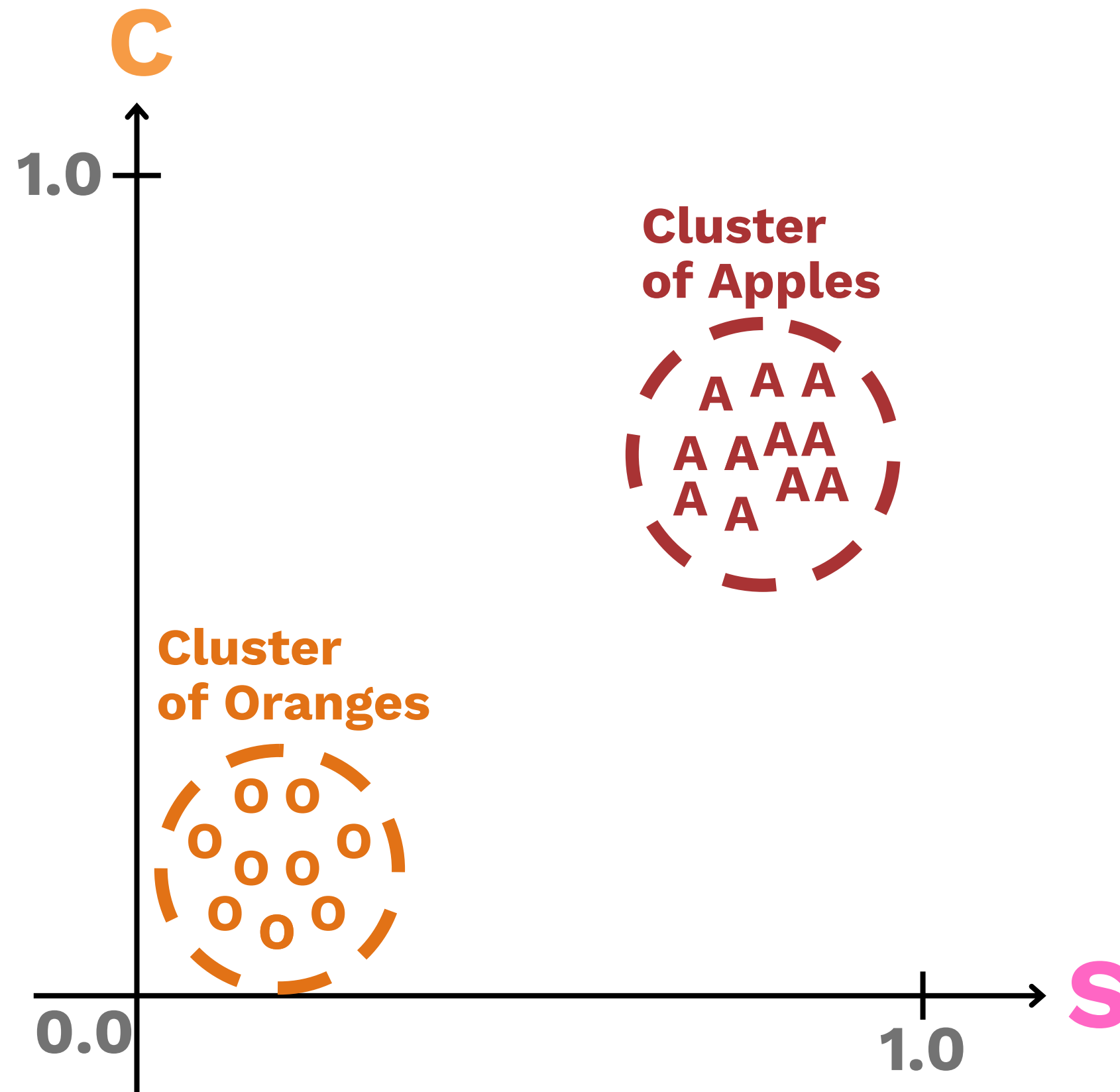




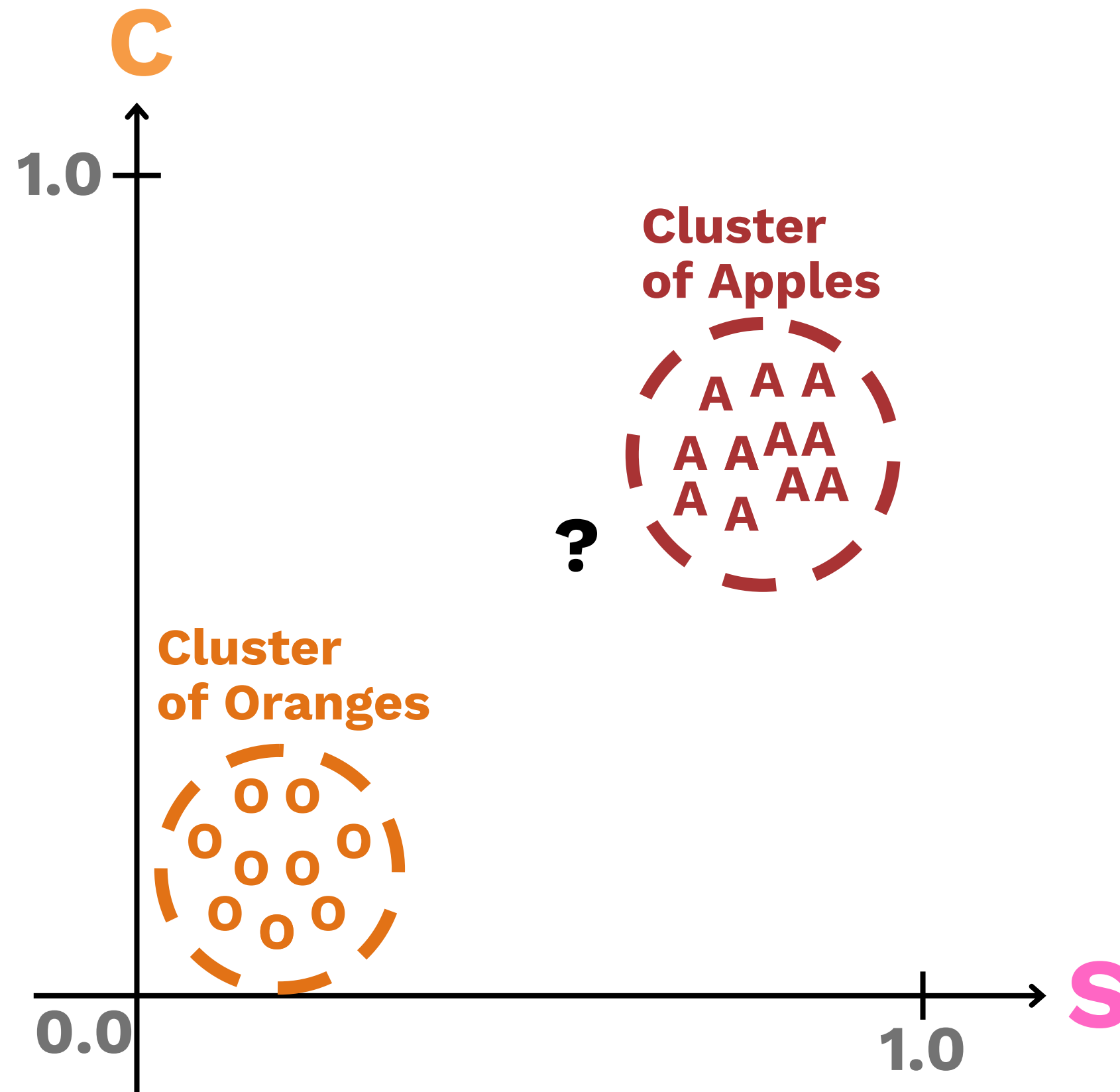




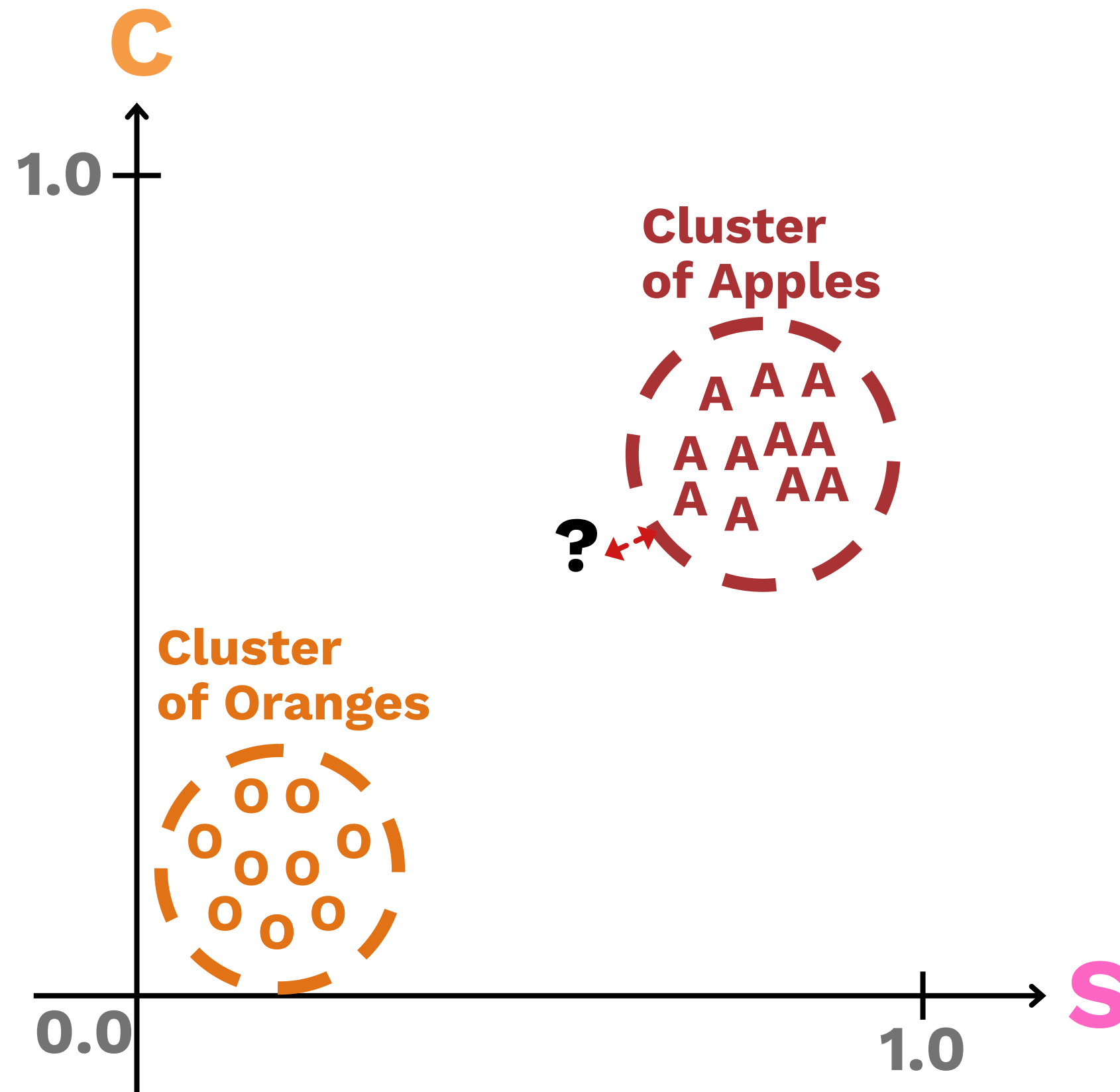
How can AI Recognise between Apples & Oranges?



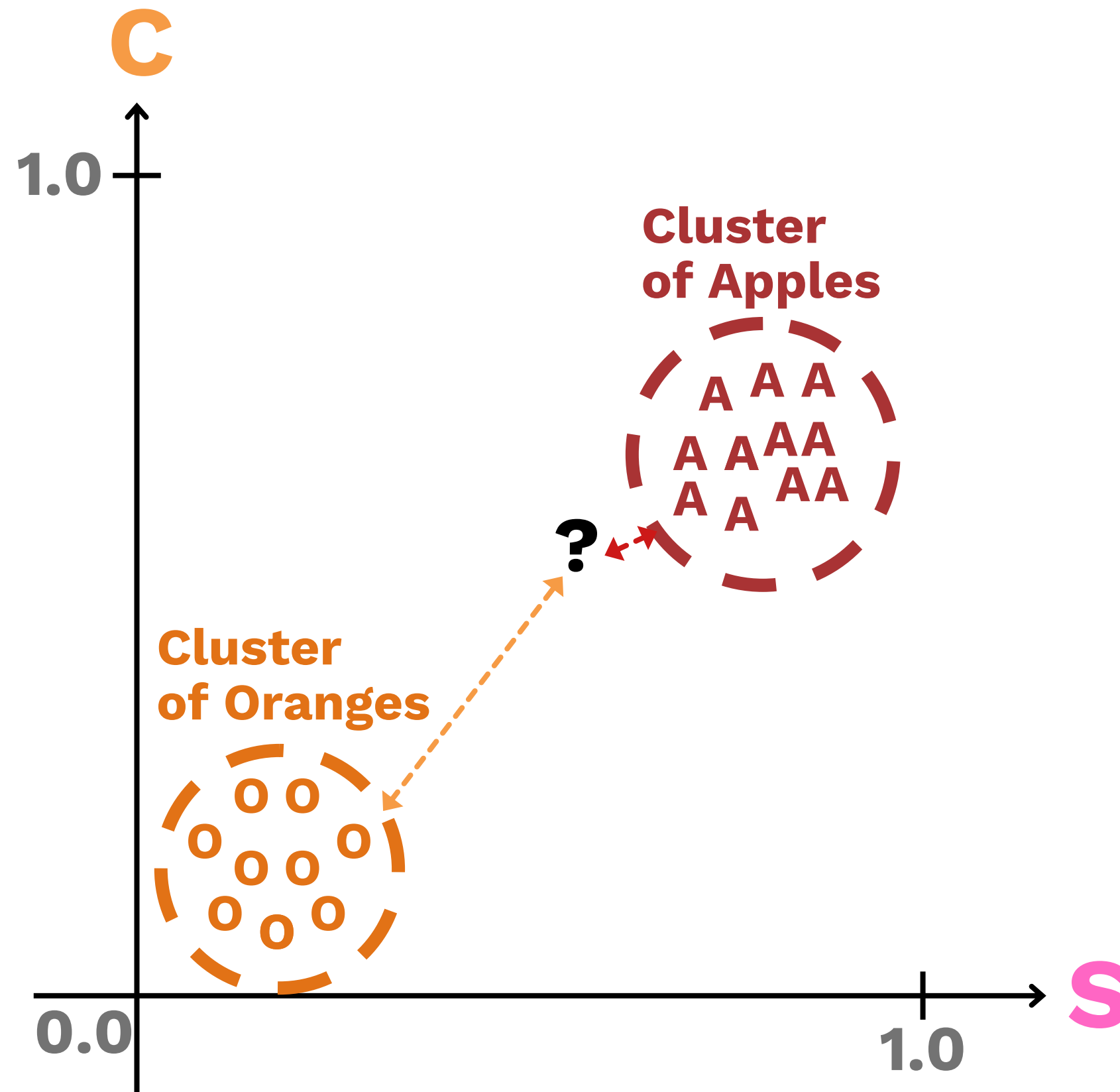
$$(S, C) = (0.6, 0.5)$$



$$(S, C) = (0.6, 0.5)$$

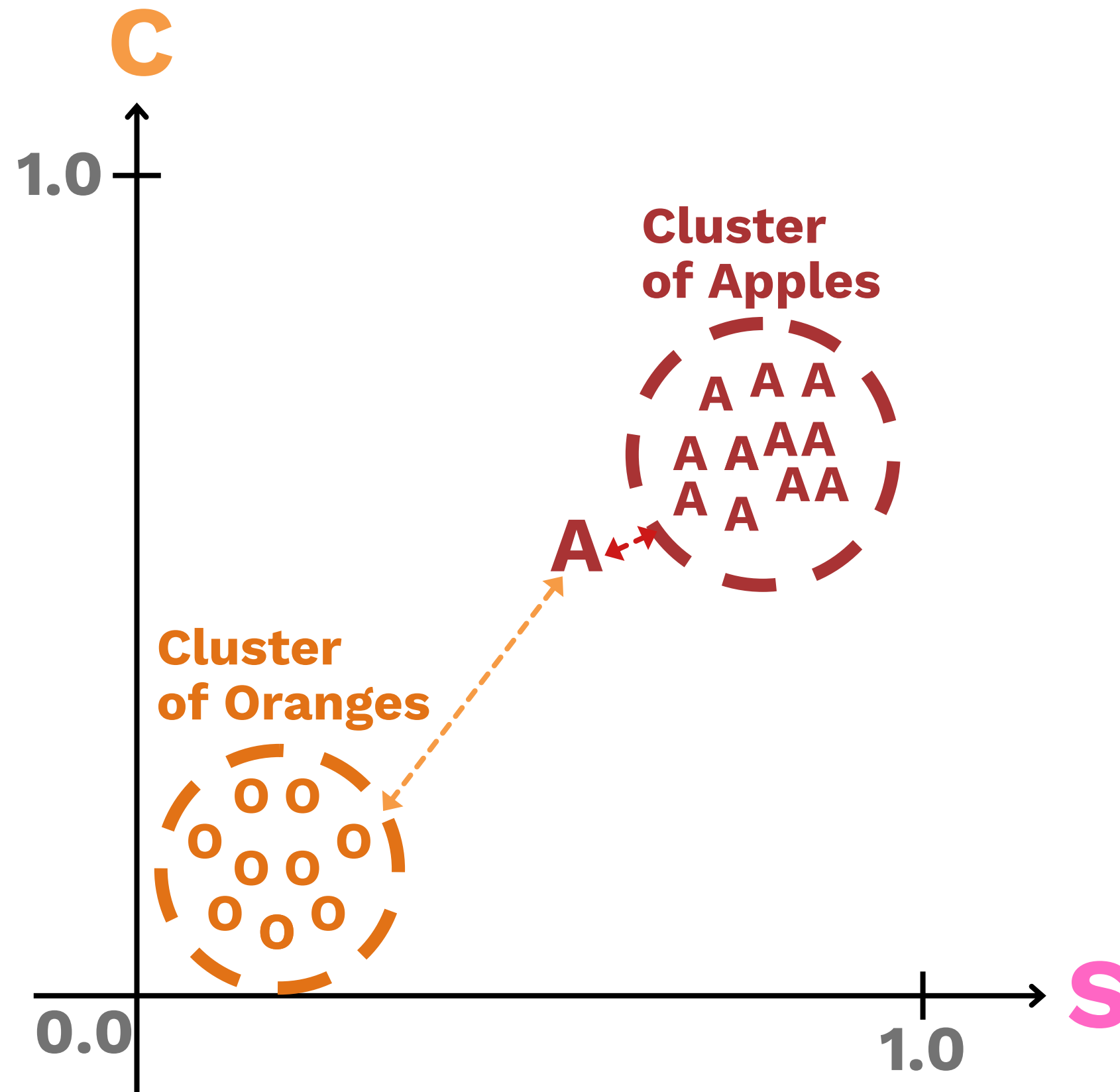


$$(S, C) = (0.6, 0.5)$$



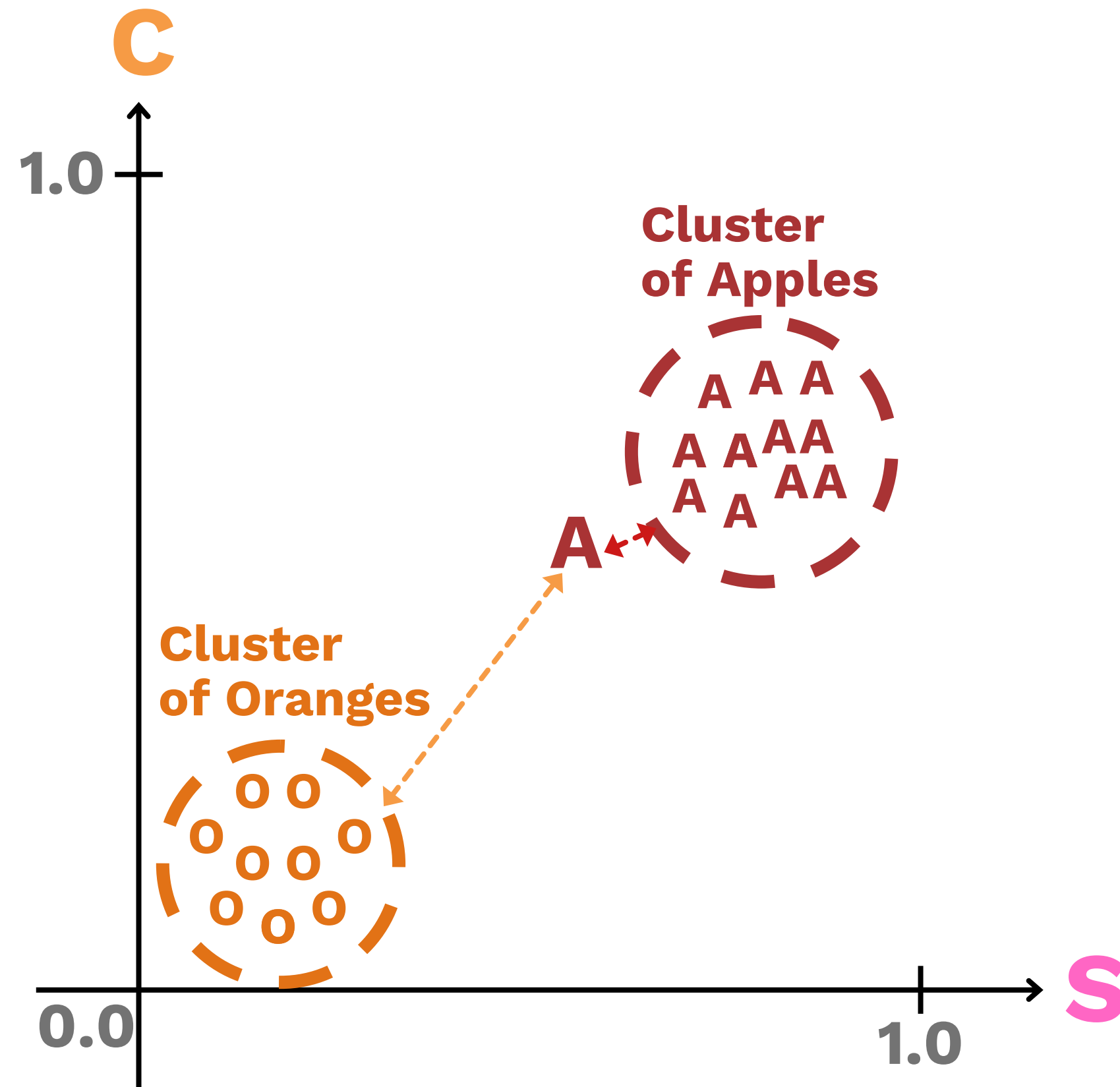
$$(S, C) = (0.6, 0.5)$$

How can AI Recognise between Apples & Oranges?

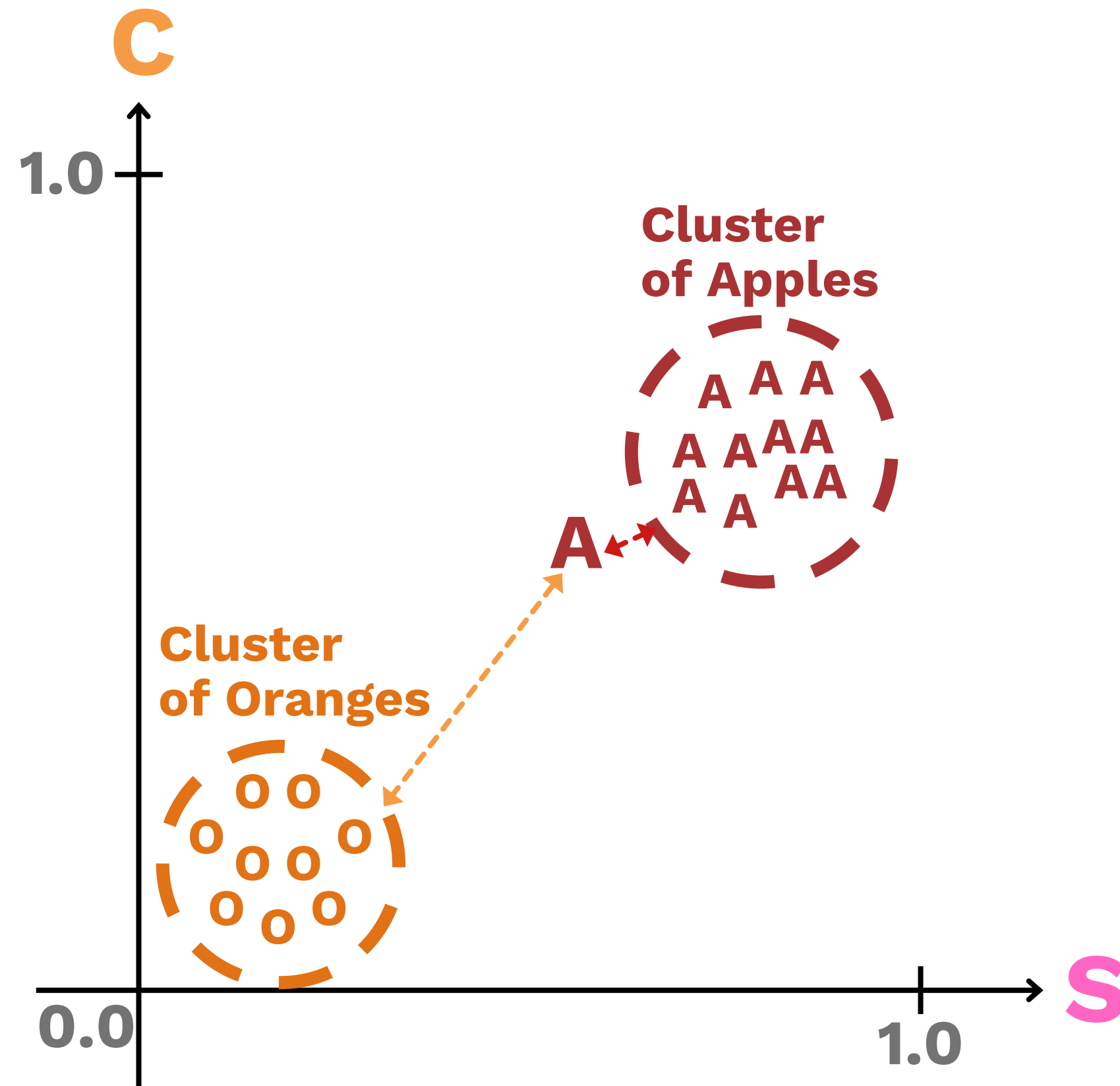


$$(S, C) = (0.6, 0.5)$$

How can AI Recognise between Apples & Oranges?

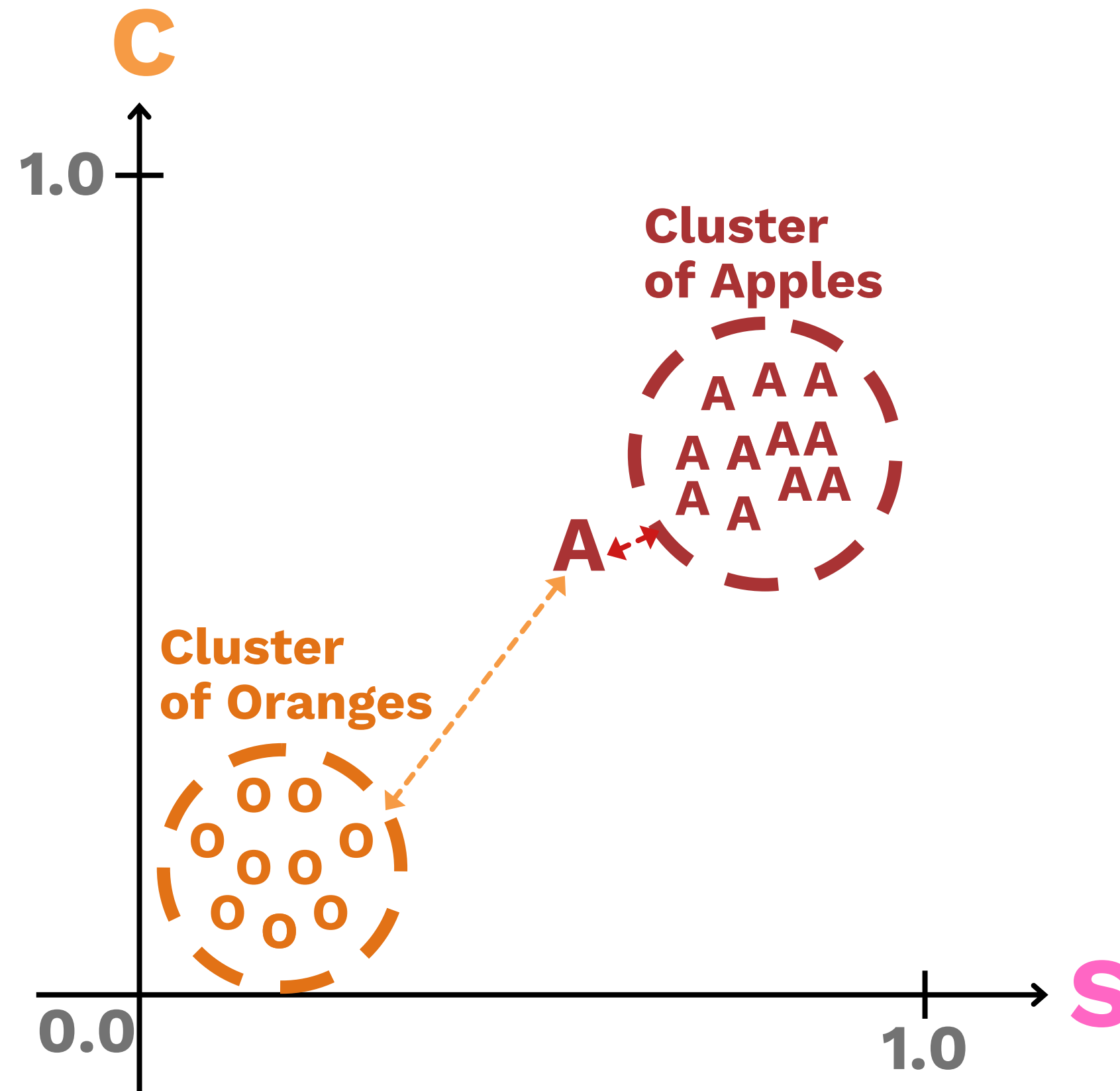


This is
Semantic Similarity



This is
Semantic Similarity

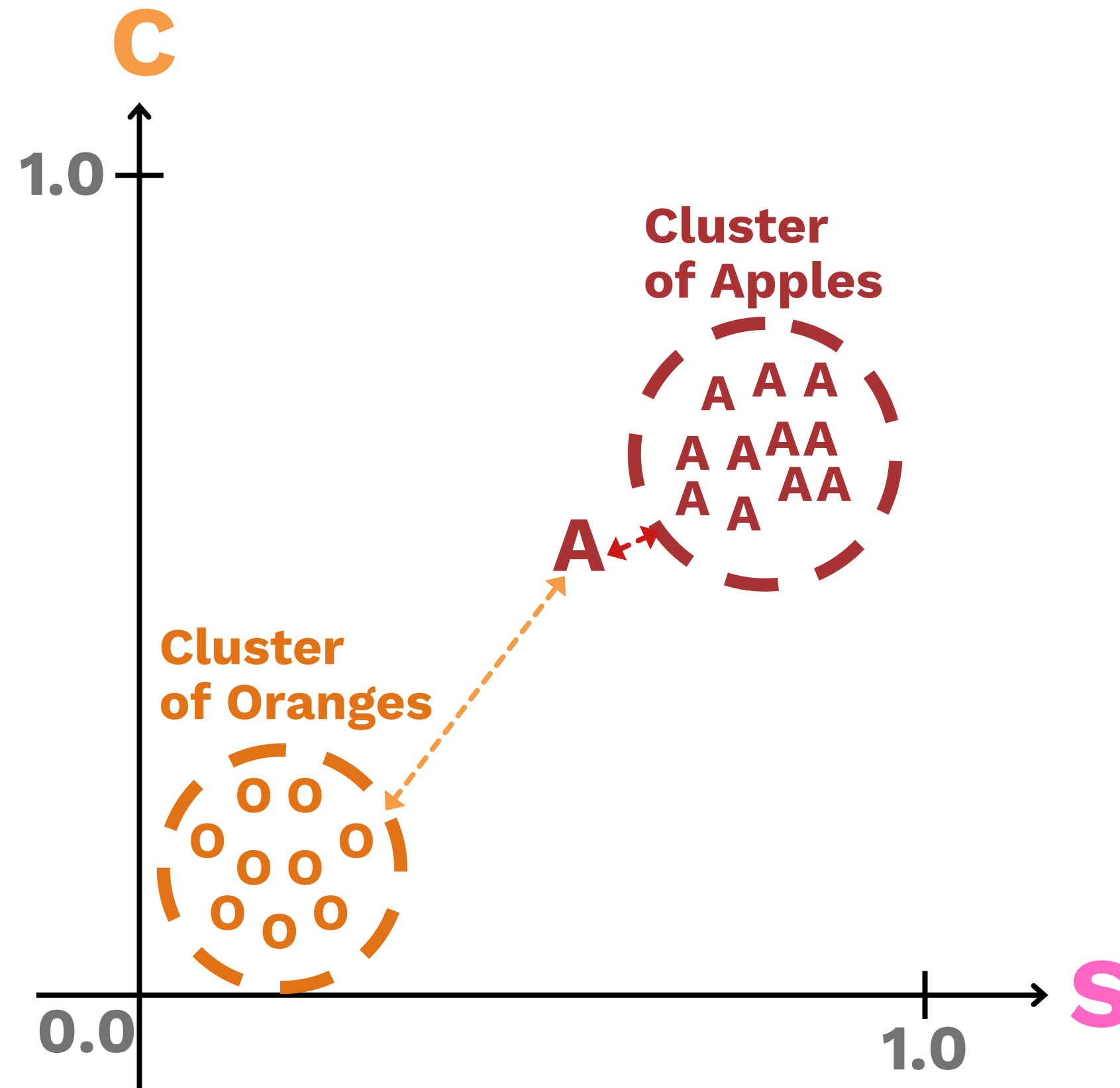
Grouping up ***similar*** items
based on its ***semantic***



This is *Semantic Similarity*

Grouping up ***similar*** items
based on its ***semantic***

Classifying unknown items
by ***similarity*** using its
semantic meaning

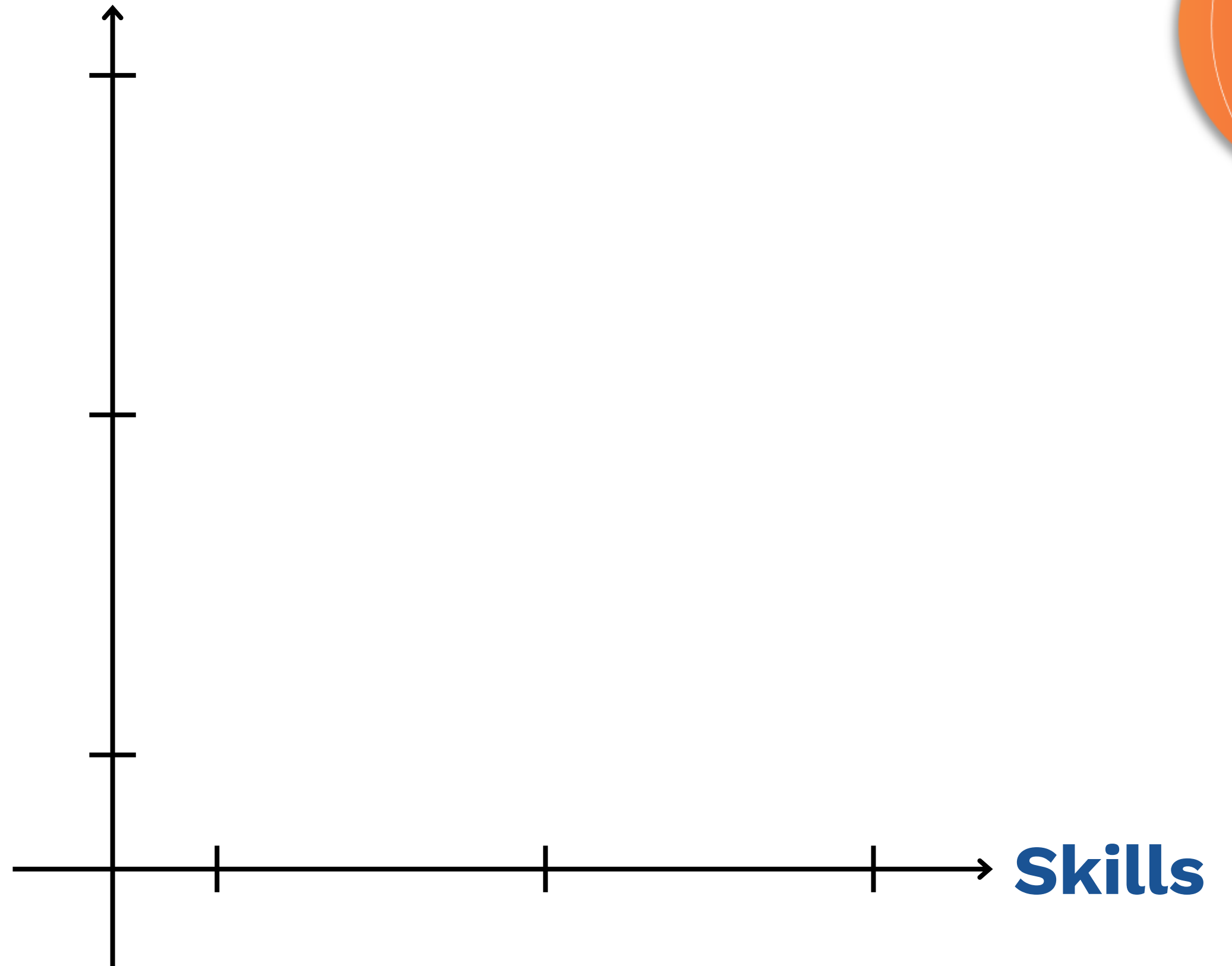


Can we apply
this technique
to advance
Skills Intelligence?

What if?

Find *Courses* by *Skills*?

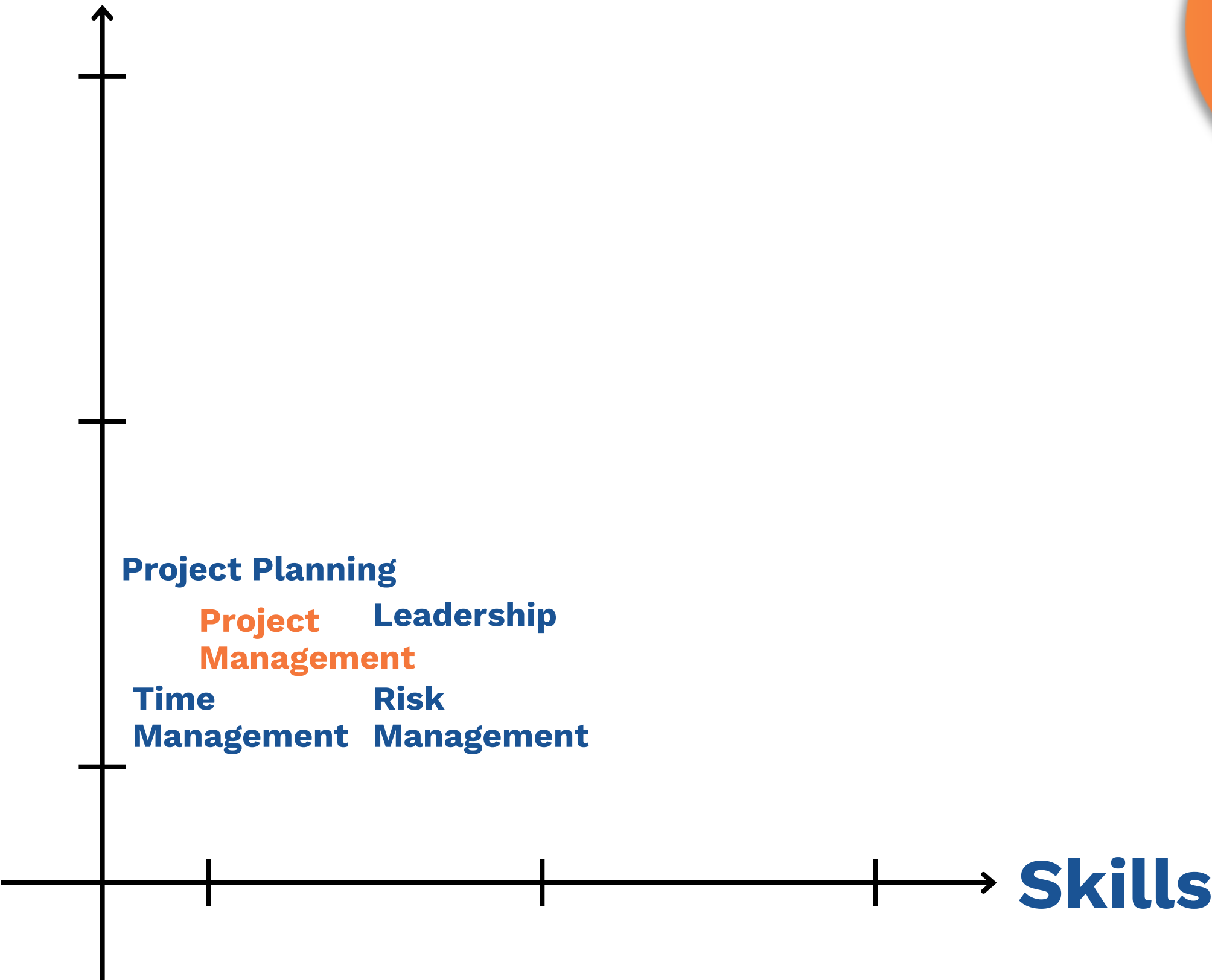
Courses



What if?

Find *Courses* by *Skills*?

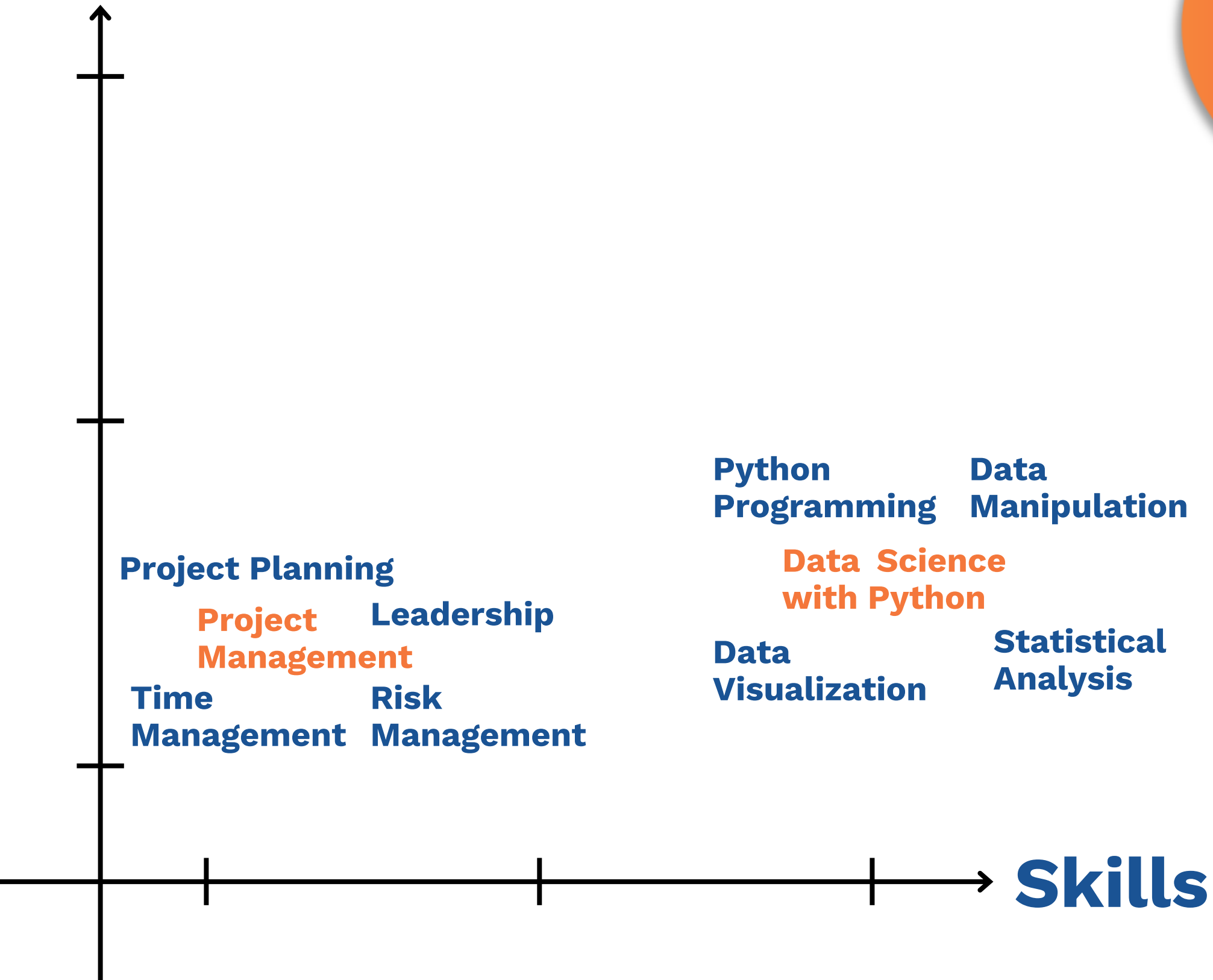
Courses



What if?

Find **Courses** by *Skills*?

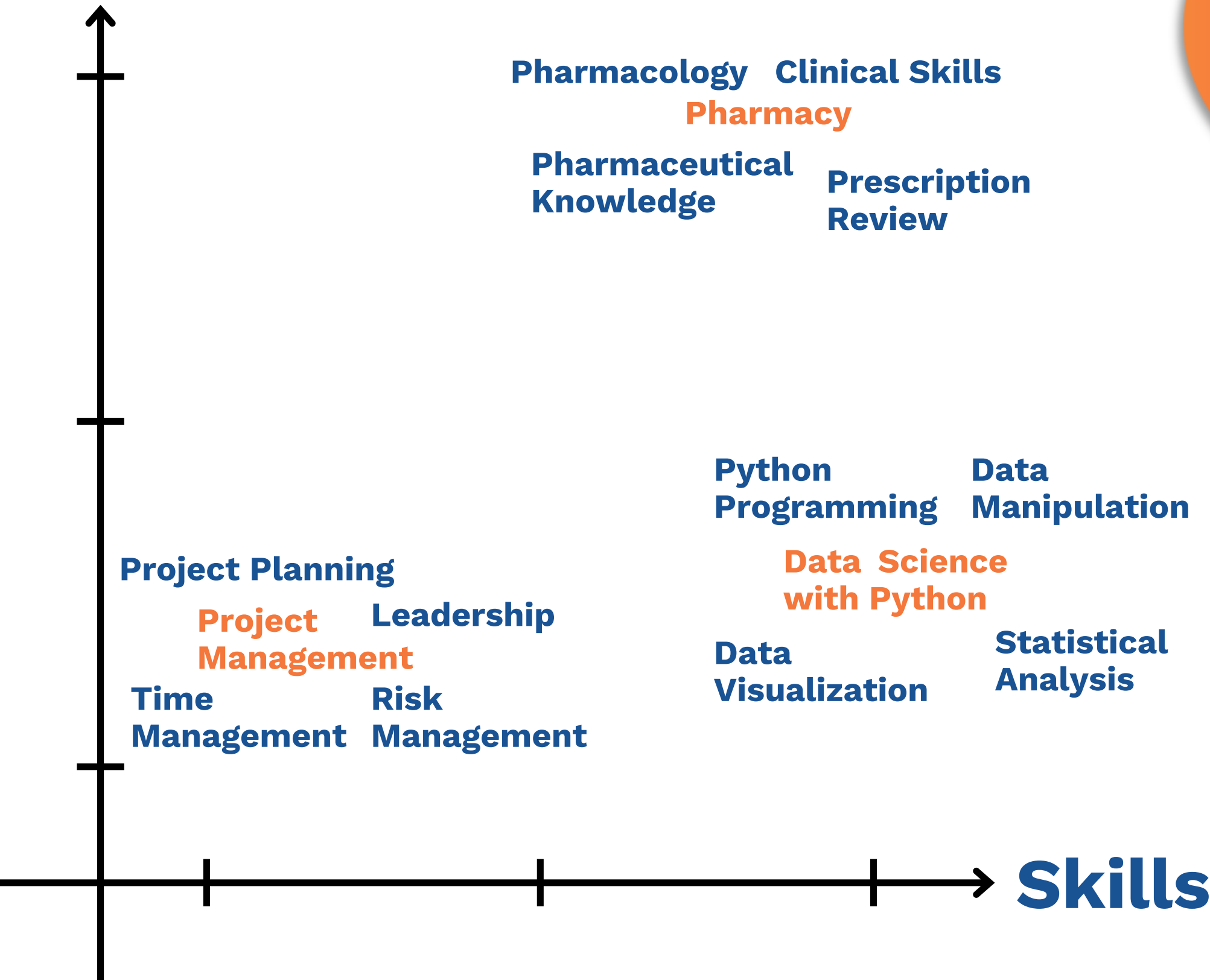
Courses



What if?

Find *Courses* by *Skills*?

Courses



What if?

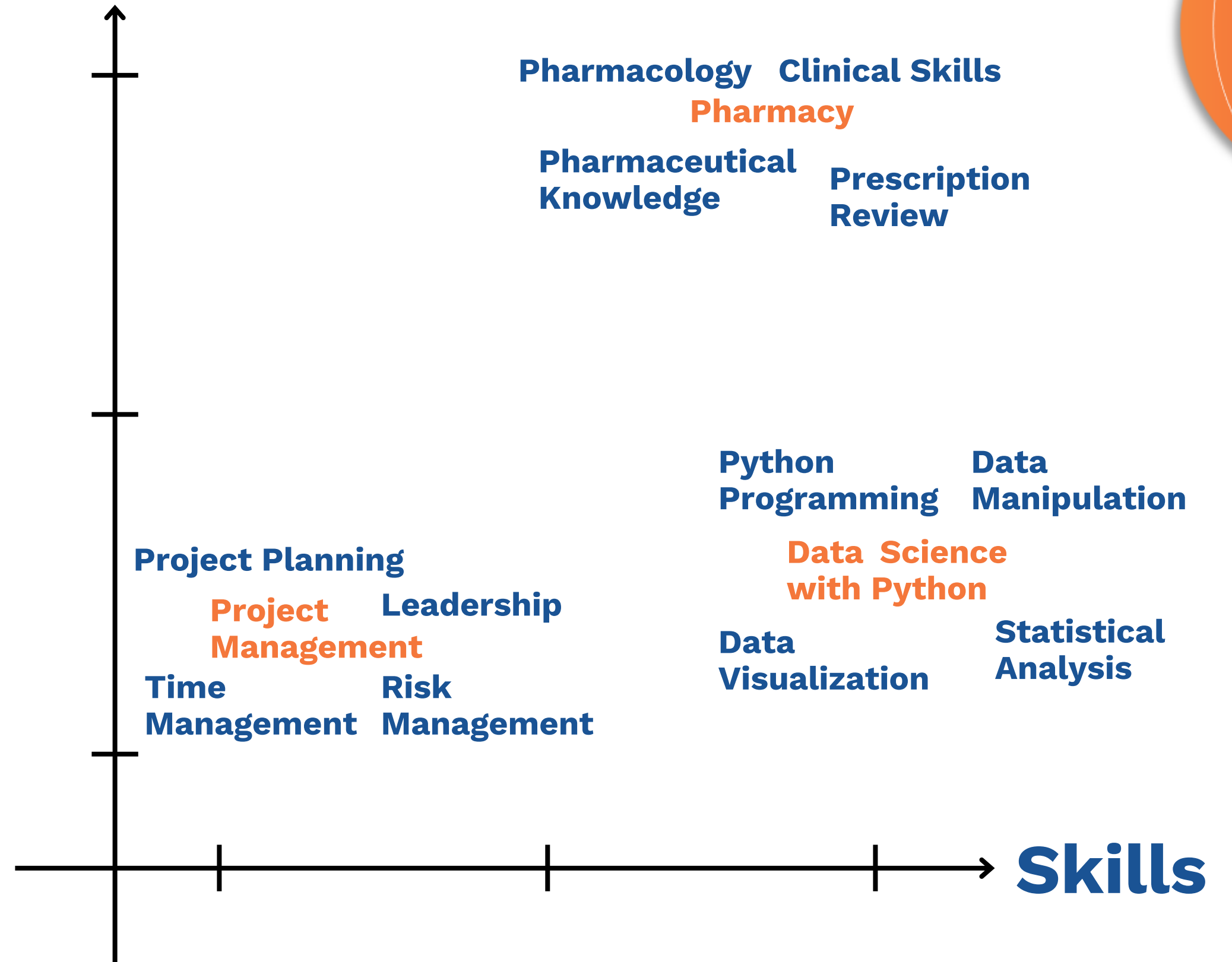
Find **Courses** by **Skills**?

Resource allocation (En)

Allocation des ressources (Fr)

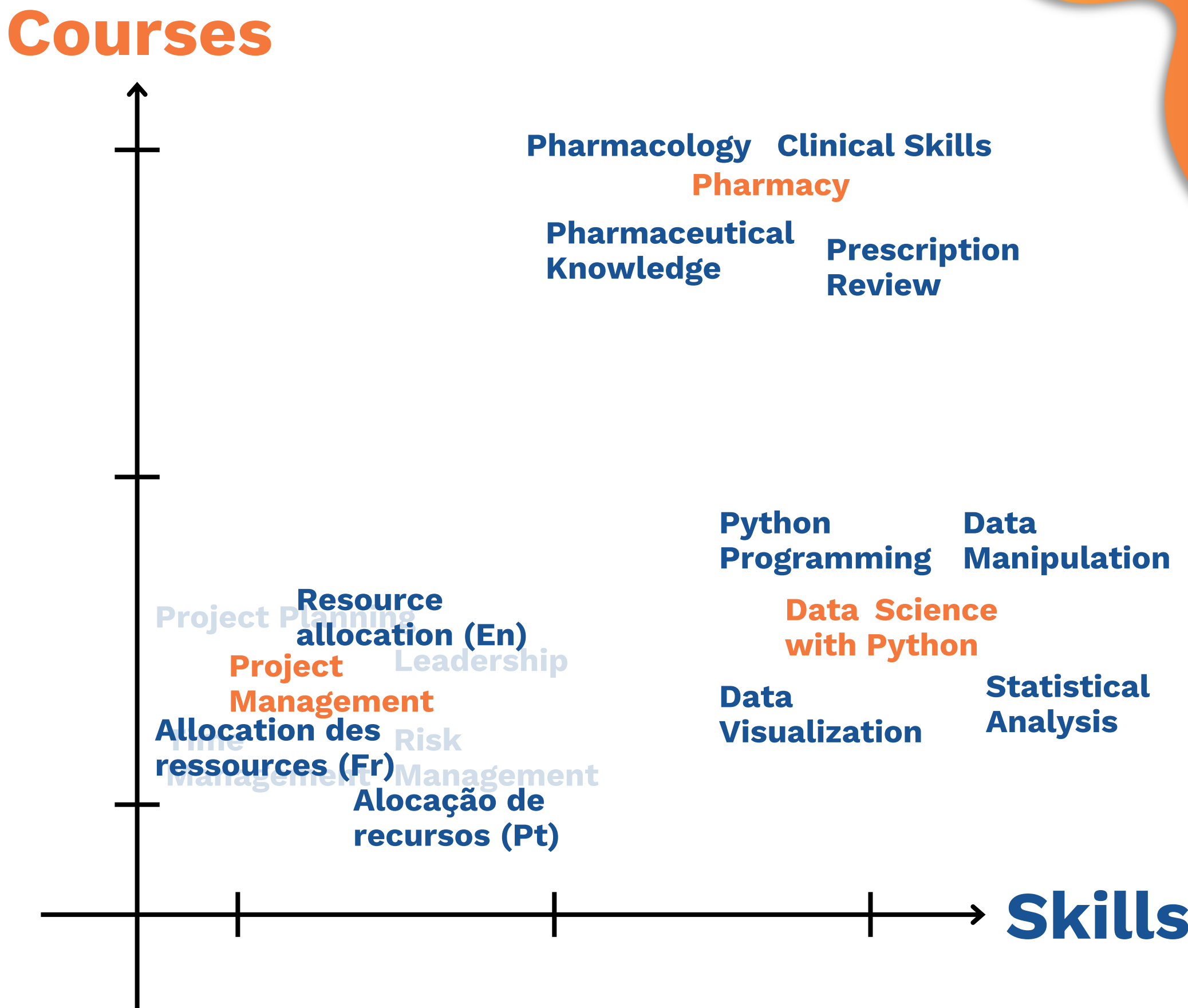
Alocação de recursos (Pt)

Courses



What if?

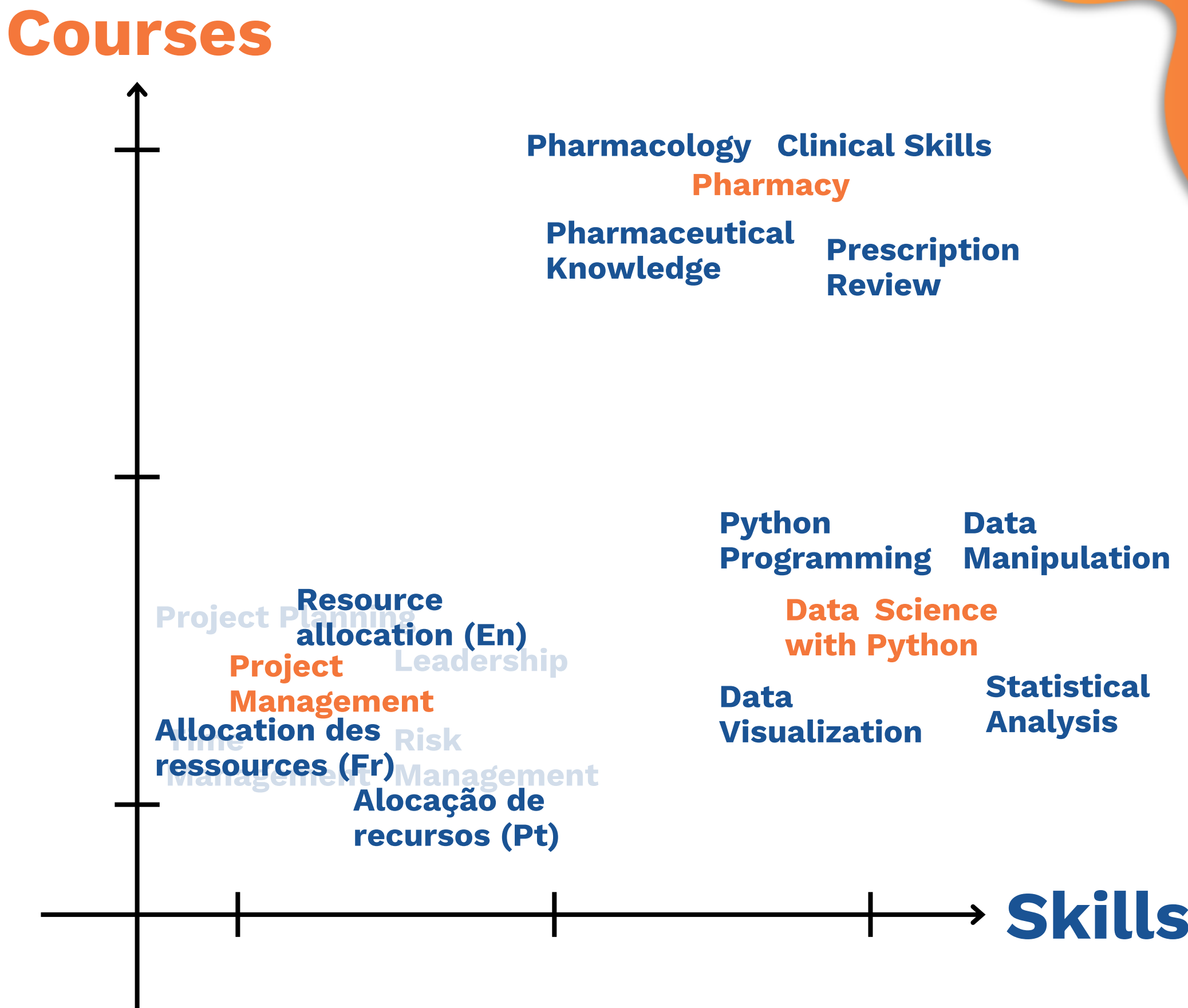
Find *Courses* by *Skills*?



What if?

Find **Courses** by **Skills**?

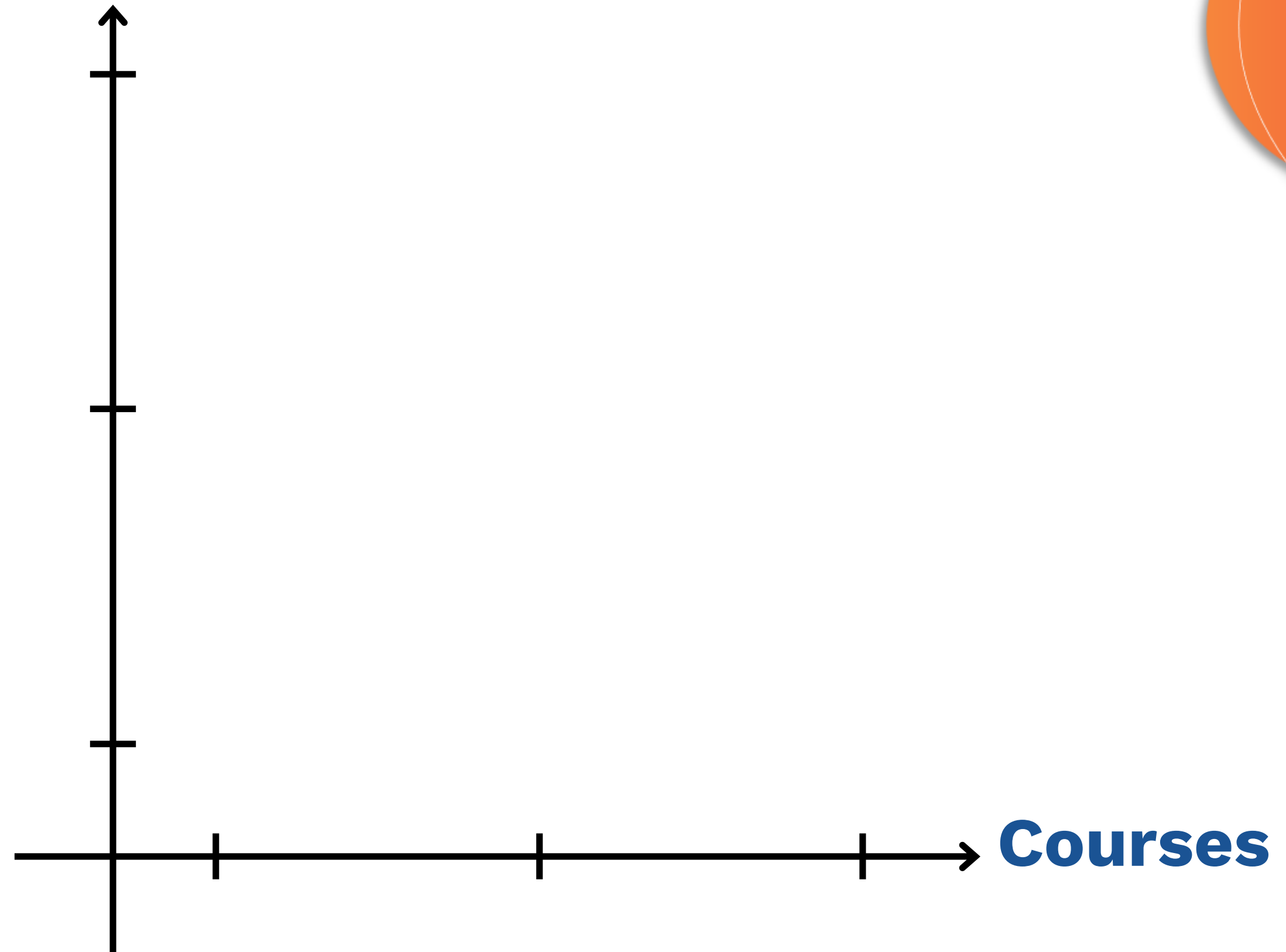
Suggested Course:
Project Management



What if?

Find *Occupations*
by *Courses*?

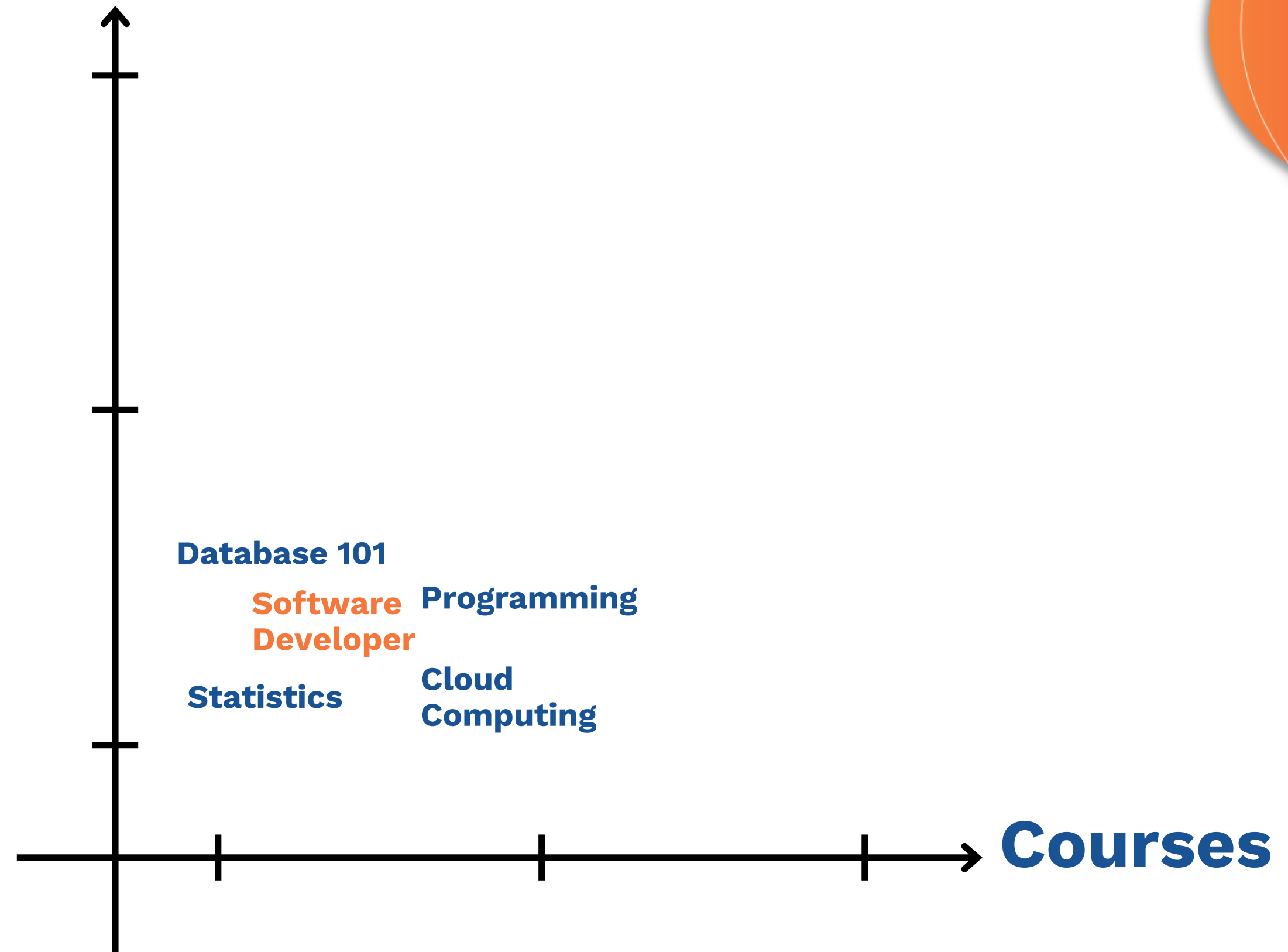
Occupations



What if?

Find *Occupations* by *Courses*?

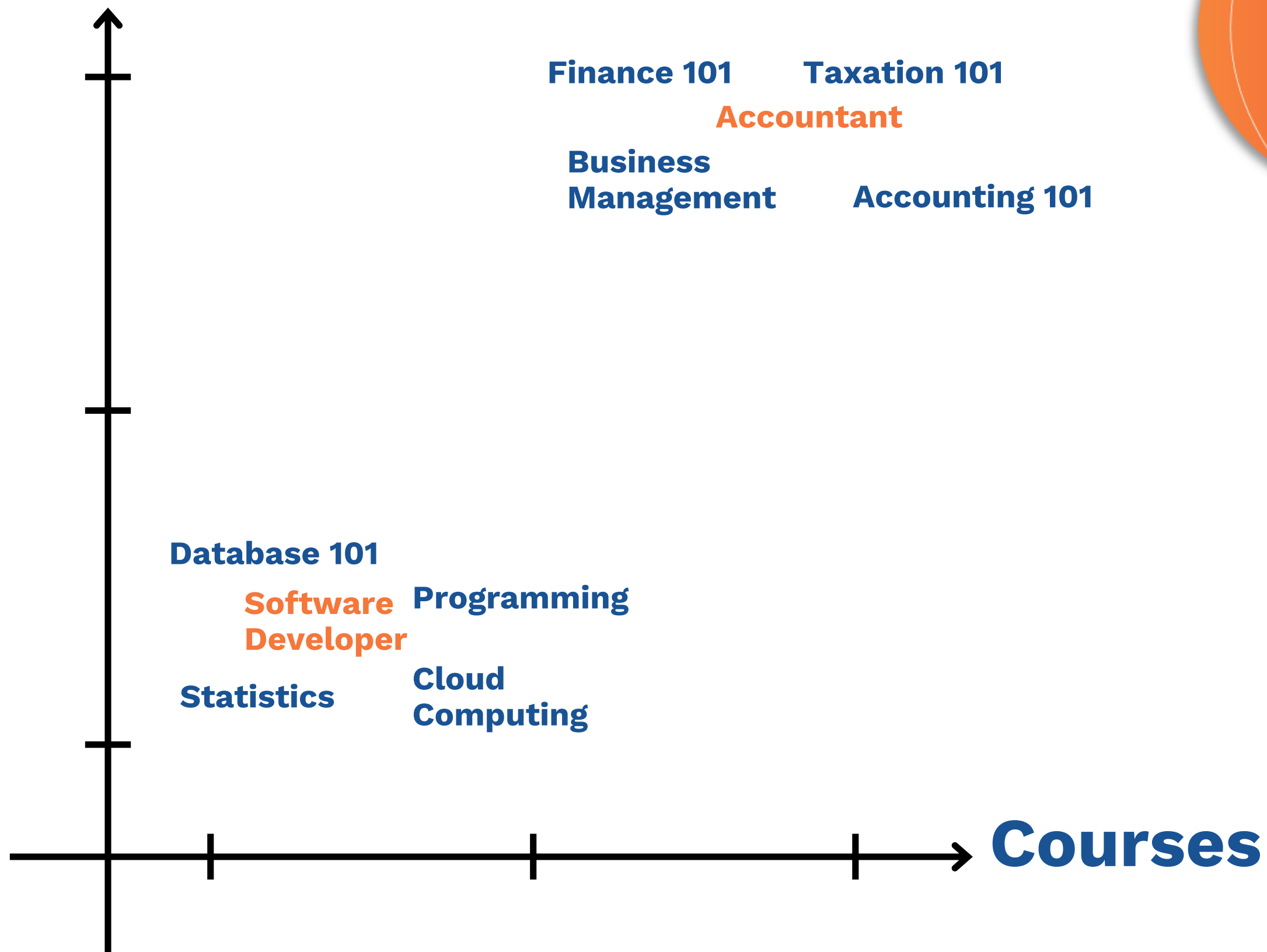
Occupations



What if?

Find *Occupations*
by *Courses*?

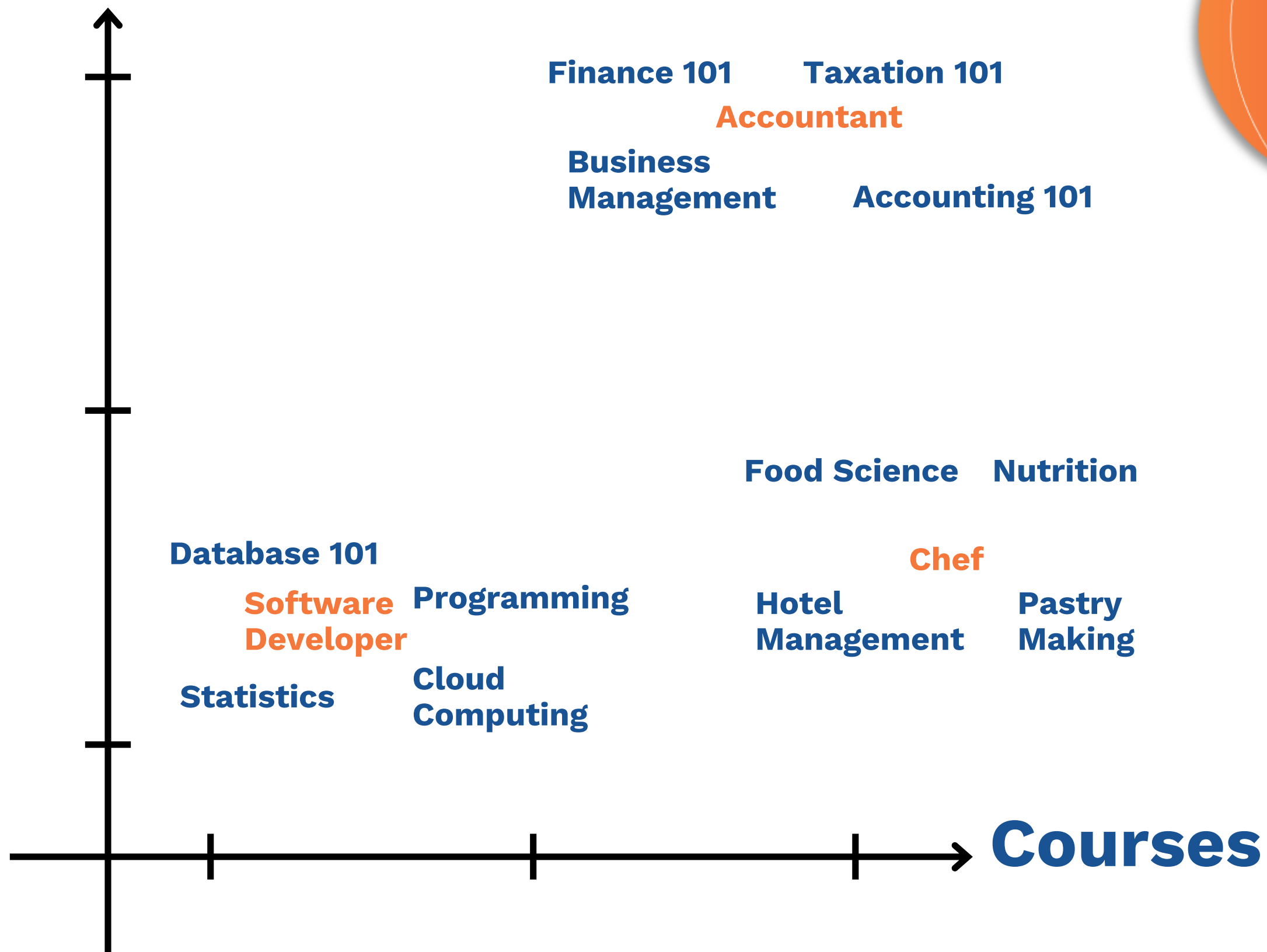
Occupations



What if?

Find *Occupations*
by *Courses*?

Occupations



What if?

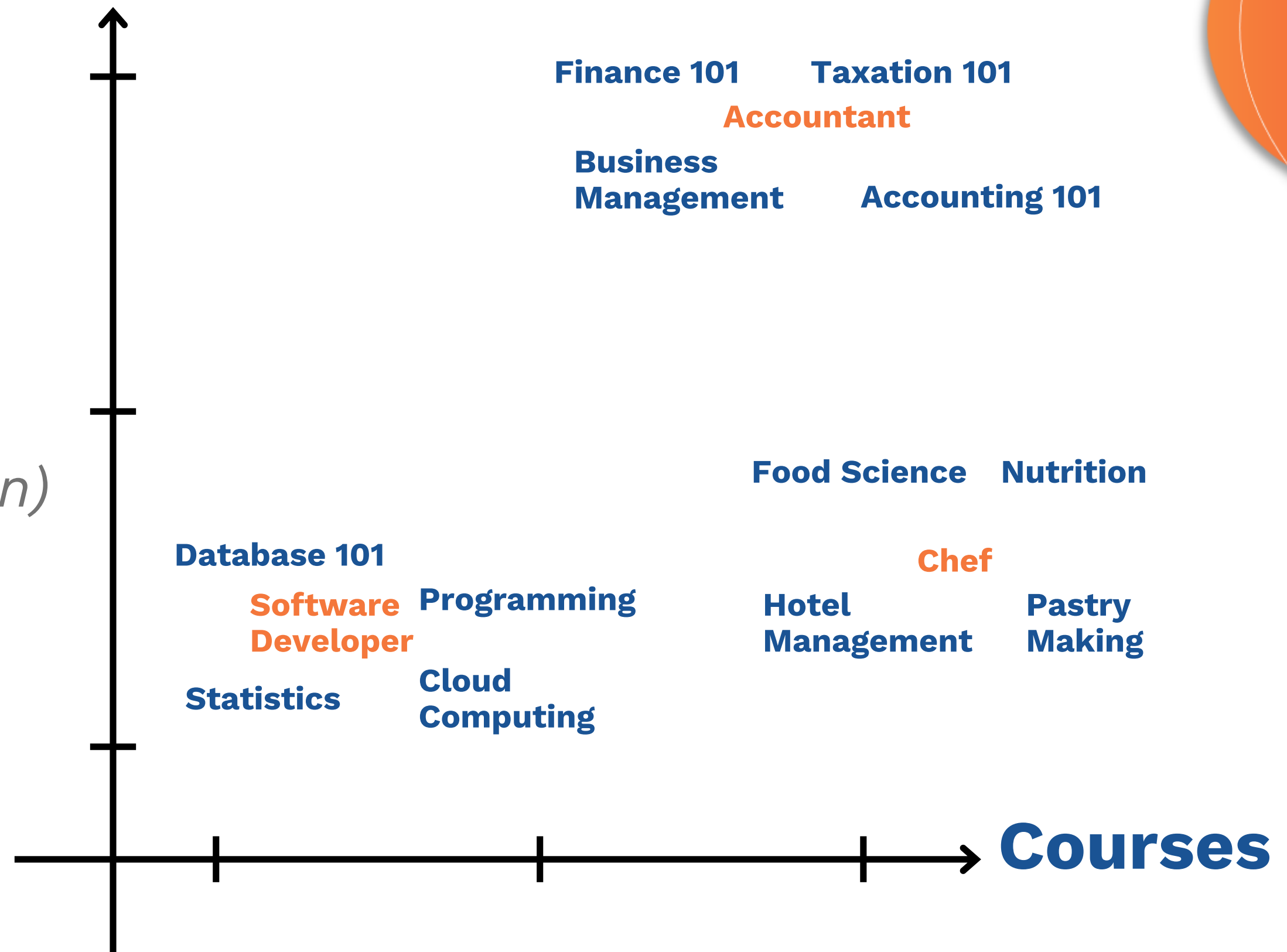
Find **Occupations** by **Courses**?

Bookkeeping Fundamentals (En)

*Principes fondamentaux de la
tenue de livres (Fr)*

*Fundamentos da
Contabilidade (Pt)*

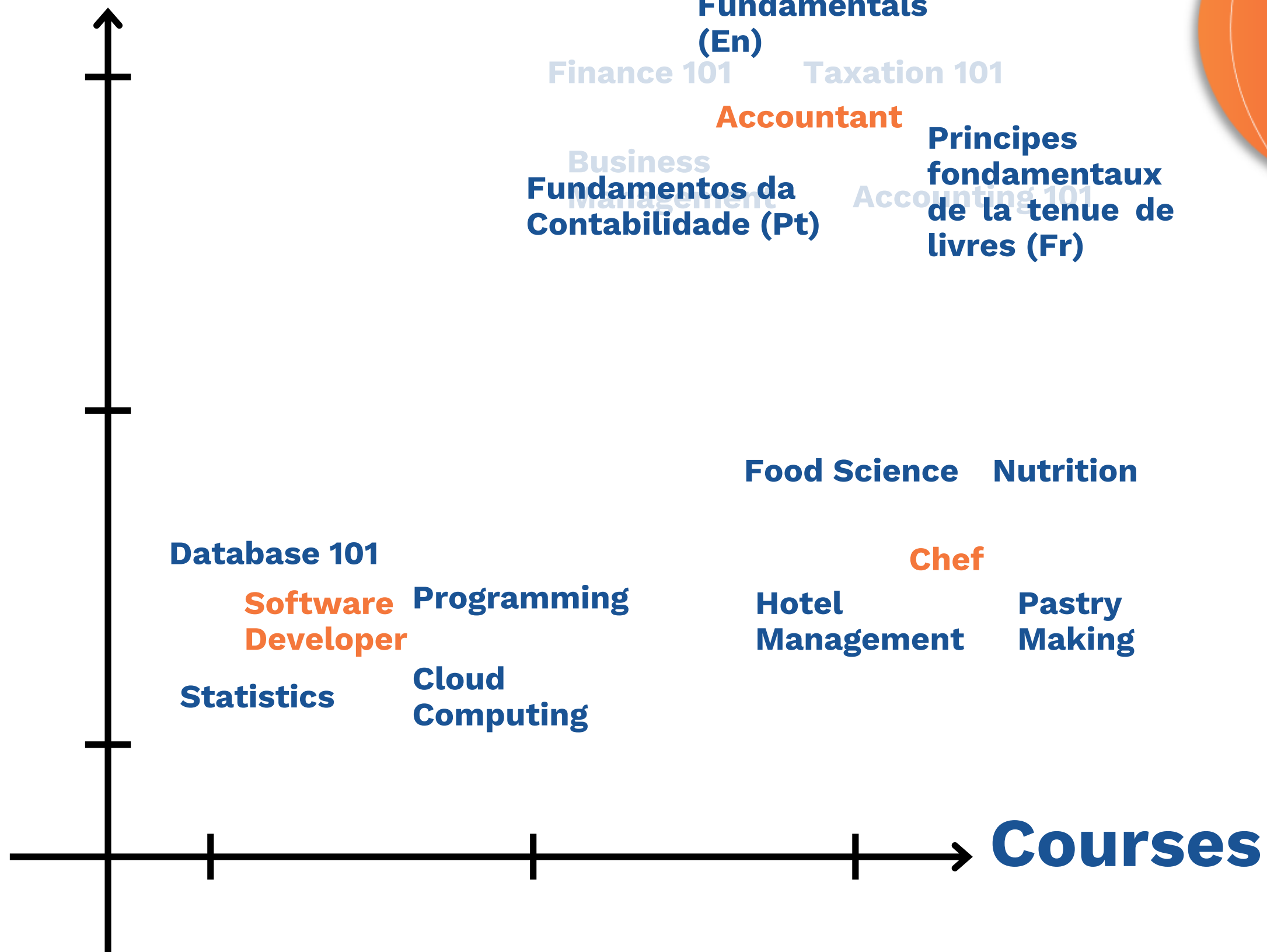
Occupations



What if?

Find **Occupations**
by **Courses**?

Occupations

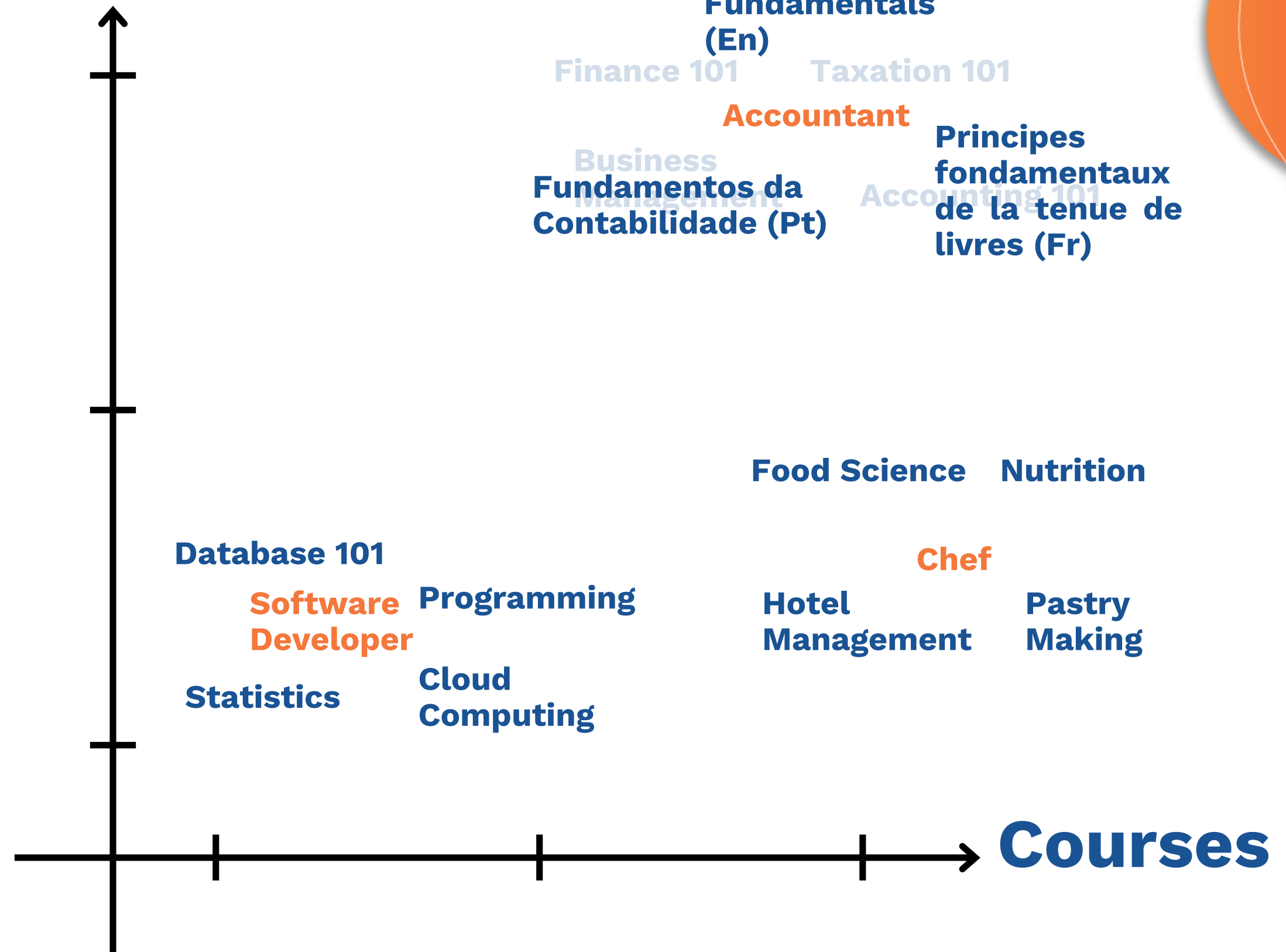


What if?

Find **Occupations** by **Courses**?

Suggested Occupation:
Accountant

Occupations





Knowledge
INNOVATION
Centre

Can we find the *skill gaps*
between a *candidate's abilities*
and the *skills* needed for their
desired jobs and suggest
relevant courses?

Skill Finder

Framework Builder

Skill Finder

Q Advanced manufacturing techniques

Q Search

English

Copy 0 selected

☐ Copy skill names

☐ Copy skill descriptions

☐ **Apply advanced manufacturing**
Improve production rates, efficiencies, yields, costs, and changeovers of products and processes using relevant advanced, innovative, and cutting...

☐ **Advanced materials**
Innovative materials with unique or enhanced properties relative to conventional materials. advanced materials are developed using...

☐ **Apparel manufacturing technology**
Traditional and advanced apparel manufacturing technologies. technologies including processes, machinery, etc. in order to compile and design...

☐ **Metal forming technologies**
The variety of technologies and techniques, such as forging, pressing, stamping, rolling and others, used for the forming processes of metal product...

☐ **Apply assembly techniques**
Apply correct and up-to-date assembly methods in the production development process.

☐ **Manufacture metal additive manufacturing parts**
Manufacture parts according to specifications and ensure compliance with quality requirements. this includes identifying issues and implementing...

☐ **Develop new welding techniques**
Design and optimise new techniques for welding together metal pieces; devise a solution to a welding problem after having performed research...

☐ **Lean manufacturing**
Lean manufacturing is a methodology that focuses on minimizing waste within manufacturing systems while simultaneously maximizing productivity.

☐ **Use moulding techniques**
Use moulding techniques, such as rotational moulding, injection moulding, blow moulding, compression moulding, extrusion moulding and...

☐ **Footwear manufacturing technology**
Footwear processes technology and machinery involved. the footwear manufacturing starts in the cutting/clicking room , cutting the uppers and...

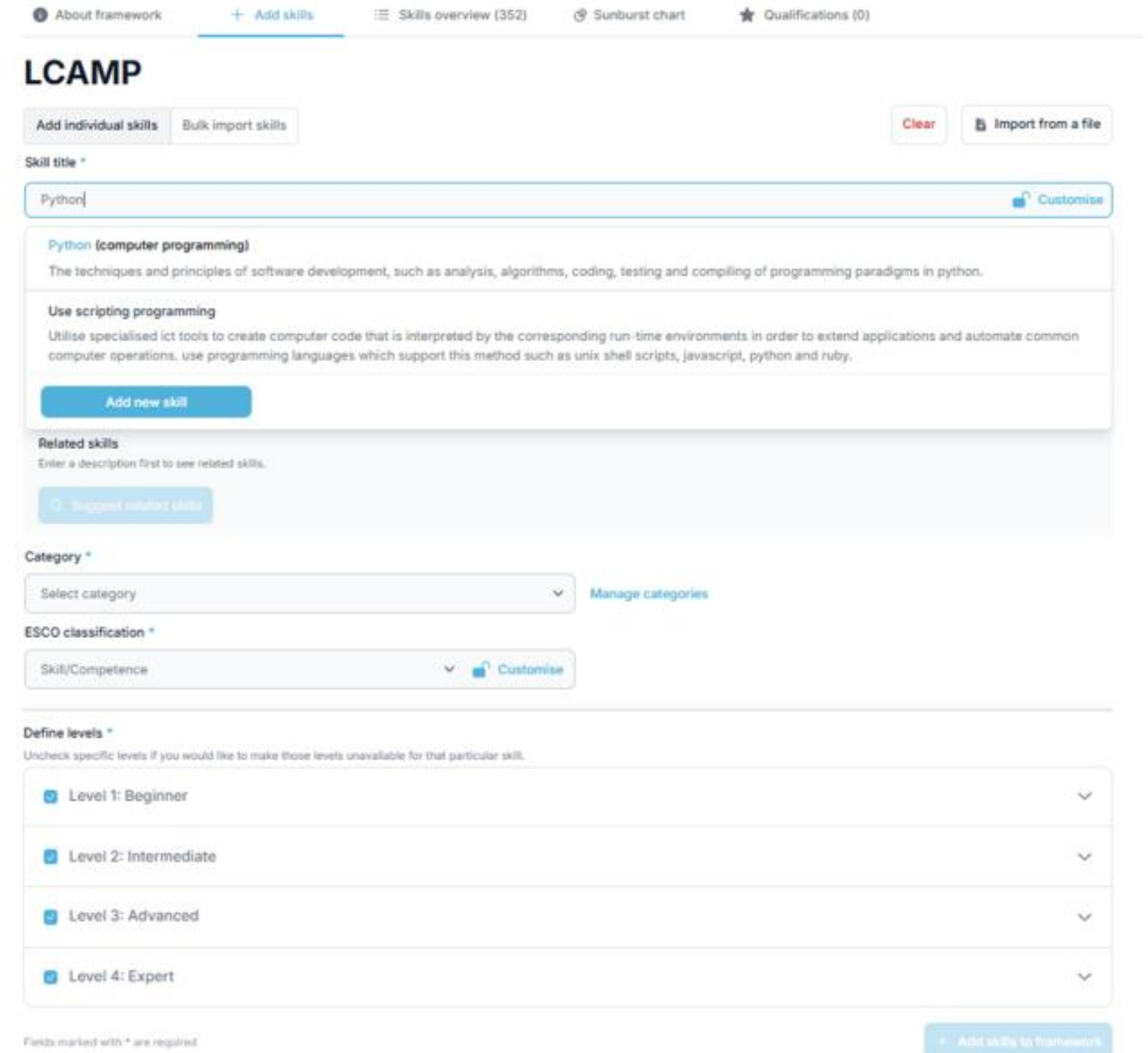
☐ **Chemical technologies in metal manufacture**
The chemical procedures and technologies used in basic metal production.

☐ **Metal joining technologies**
The various technologies used for the joining and assembling of fabricated metal workpieces.

Clear results

Organising skills in Custom Framework

- Search existing skills or add custom
- ESCO classification
- Define skill progression level (1 – 4)



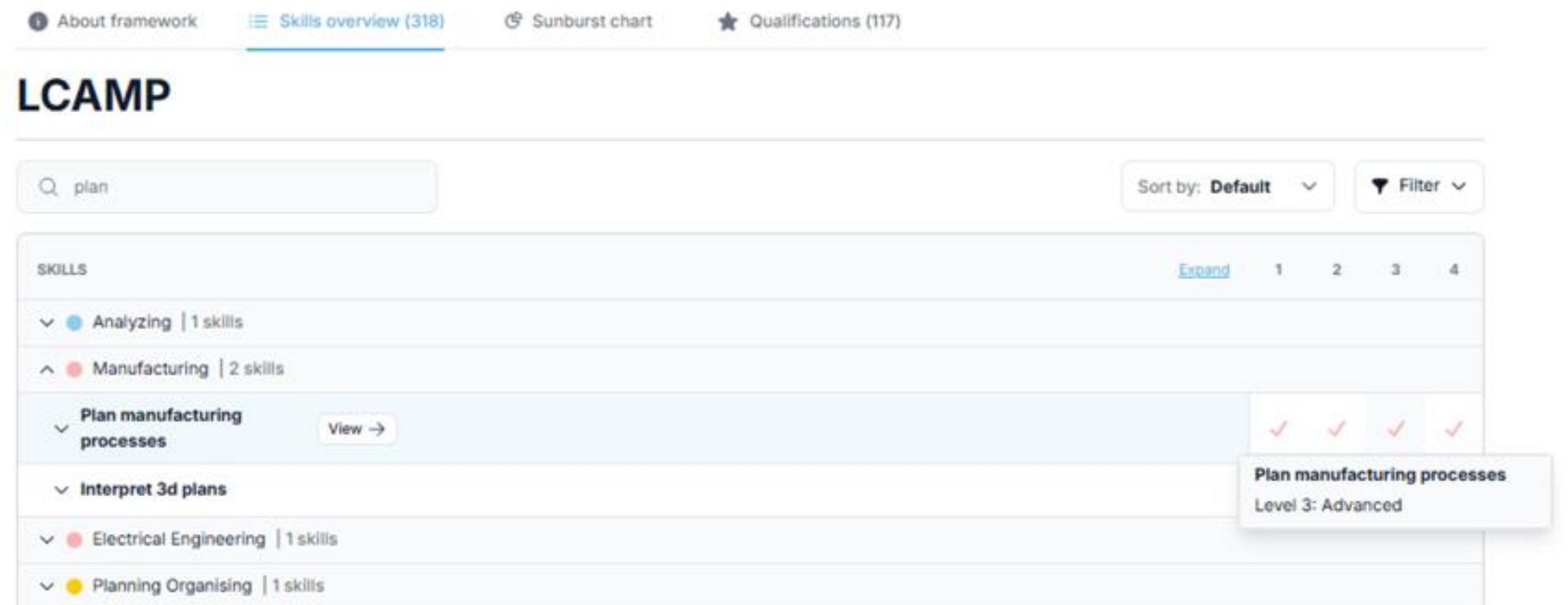
The screenshot displays the 'LCAMP' Custom Framework interface. At the top, there are navigation links: 'About framework', '+ Add skills' (active), 'Skills overview (352)', 'Sunburst chart', and 'Qualifications (0)'. Below the navigation bar, the title 'LCAMP' is followed by two buttons: 'Add individual skills' and 'Bulk import skills'. To the right of these are 'Clear' and 'Import from a file' buttons. The main form contains several sections:

- Skill title ***: A text input field with 'Python' entered and a 'Customise' button.
- Python (computer programming)**: A description box stating 'The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms in python.'
- Use scripting programming**: A description box stating 'Utilise specialised ict tools to create computer code that is interpreted by the corresponding run-time environments in order to extend applications and automate common computer operations. use programming languages which support this method such as unix shell scripts, javascript, python and ruby.'
- Add new skill**: A blue button.
- Related skills**: A section with the instruction 'Enter a description first to see related skills.' and a 'Suggest related skills' button.
- Category ***: A dropdown menu with 'Select category' and a 'Manage categories' link.
- ESCO classification ***: A dropdown menu with 'Skill/Competence' and a 'Customise' button.
- Define levels ***: A section with the instruction 'Uncheck specific levels if you would like to make those levels unavailable for that particular skill.' and a list of four levels, each with a checkbox and a dropdown arrow:
 - Level 1: Beginner
 - Level 2: Intermediate
 - Level 3: Advanced
 - Level 4: Expert

At the bottom right, there is a blue button labeled 'Add skills to framework'. A small note at the bottom left states 'Fields marked with * are required'.

Skill progression

- Define skill progression level from lowest (1) to highest (up to 10)
- Skill proficiency defined by workload required to obtain the skill (ECT)



The screenshot displays the 'LCAMP Skills overview (318)' interface. At the top, there are navigation links: 'About framework', 'Skills overview (318)', 'Sunburst chart', and 'Qualifications (117)'. Below the navigation bar, the title 'LCAMP' is prominently displayed. A search bar contains the text 'plan'. To the right of the search bar, there are controls for 'Sort by: Default' and a 'Filter' dropdown. The main content area is titled 'SKILLS' and features a table with columns 1, 2, 3, and 4. The table lists several skill categories: 'Analyzing | 1 skills', 'Manufacturing | 2 skills', 'Plan manufacturing processes' (highlighted in blue), 'Interpret 3d plans', 'Electrical Engineering | 1 skills', and 'Planning Organising | 1 skills'. Each category has a 'View ->' button. A tooltip for 'Plan manufacturing processes' shows 'Level 3: Advanced' with four red checkmarks in the table columns.

SKILLS	1	2	3	4
▼ Analyzing 1 skills				
^ Manufacturing 2 skills				
▼ Plan manufacturing processes View ->	✓	✓	✓	✓
▼ Interpret 3d plans				
▼ Electrical Engineering 1 skills				
▼ Planning Organising 1 skills				

Example of a custom Skills Framework

- Custom skill categories
- Qualifications mapped to skills
- Machine-readable export (Rich Skill Descriptor)

LCAMP

Search skills

Sort by: Default Filter

SKILLS	Expand	1	2	3	4
Valuing Sustainability 5 skills					
Critical Thinking 5 skills					
Data Literacy 3 skills					
Analyzing 12 skills					
Communication 11 skills					
Handling Production Principles 29 skills					
Competencies in STEM 19 skills					
Environmentally Suitable Practices 4 skills					
Environmental Health Safety 9 skills					
Design and Development 22 skills					
Manufacturing 42 skills					
ICT 7 skills					
Big Data 3 skills					
Problem Solving 7 skills					
Programming Coding 29 skills					
Cooperation Teamwork 5 skills					
Creativity Innovation 14 skills					
Electrical Engineering 42 skills					
Critical Thinking 11 skills					
Scientific Work 11 skills					
Planning Organising 5 skills					
Computer Skills 7 skills					
Newleadership 10 skills					
Responsibility 6 skills					

Example of a custom Skills Framework



← Return to category chart

Data Analysis

The ability to interpret data and derive actionable insights to support decisions.

Category

Technical Proficiency

Source ESCO classification

Custom Skill



Level 3: Expert

0 hours of practical experience

Builds predictive models and communicates insights to influence strategy.

Level 2: Proficient

0 hours of practical experience

Analyzes trends and patterns to identify opportunities and challenges.

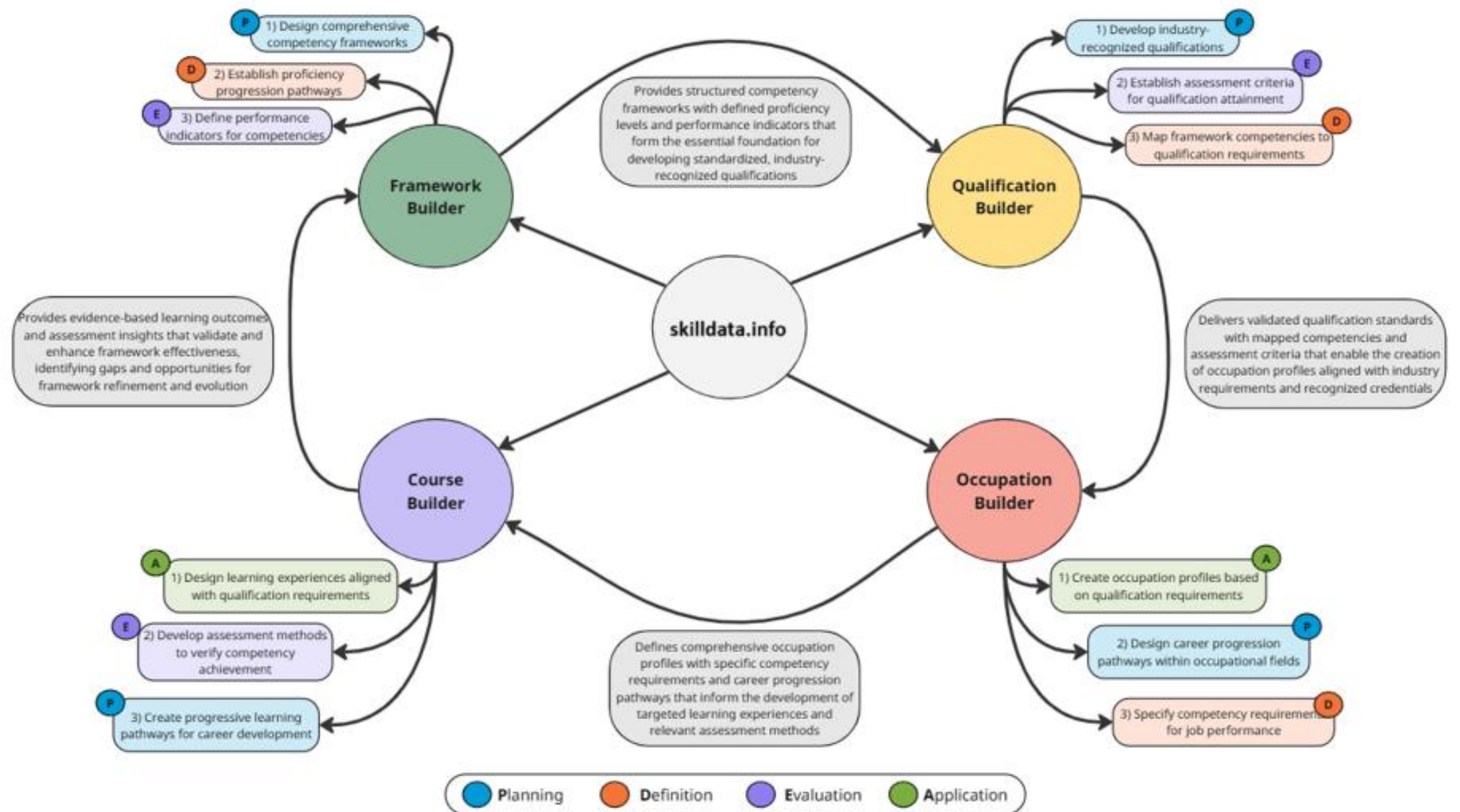
Level 1: Foundational

0 hours of practical experience

Sorts and visualizes data using basic tools and techniques.

What's next

- Job profile / occupation builder
- Course catalogue
- Skills gap analysis
 - import CV
 - self-assessment
- Career Recommendations





skilldata.info

Learn more about what we do

knowledgeinnovation.eu

or write to us

info@knowledgeinnovation.eu