Project Group Presentation

Summer Term 2025

Computer Science & Computer Engineering (Master)

Matthias Fischer

- Monday, February 3rd, 4:15 pm,

- Lecture hall: O1 (and O1.224)

Agenda

Single Session for all Students CS & CE (<u>**lecture hall: O1**</u>)

16:15   Why Project Groups?   Registration and Requirements

16:35   Mixed Project Groups (10)

18:15   CE Project Groups (1)

- Each advisor will present his project group in a short presentation (approx. 10 minutes).
- The presentations will take place immediately one after the other, questions are not allowed.

Discussion Sessions (multiple, all take place simultaneously)

approx. 18:25   (after ALL presentations)

- If you plan to take part in a group in Summer Term 2025, **please stay**!
- **Individual discussions** in groups with the students and the advisors.
- Build small groups for questions, discussion, declare personal interest.

Mixed Project Groups (2x10 ECTS, 2x9 ECTS)

accept both Computer Science and Computer Engineering students

CS Project Groups (2x10 ECTS)

accept Computer Science students

CE Project Groups (2x9 ECTS)

accept Computer Engineering students (and EE students, not the concern today)

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Mixed Project Groups (2x10 ECTS, 2x9 ECTS)

16:35   **AI Agents for Systems Engineering**
Advanced Systems Engineering

16:45   **How to Train Your Large Language Model**
Data Science

16:55   **Graph-Theoretic Approaches to Quantum States**
Quantum Information

17:05   **Classifying Graph Orbits under r-Local Complementation**
Quantum Information

17:15   **Towards more intelligent client-server architecture for SPARQL query processing**
Data Science

17:25   **Explainable Graph Query Answering**
Data Science Junior Research Group

17:35   **Intelligent AI Assistants for adessoGPT based on OpenAI on Azure**
Machine Learning and Optimisation

17:45   **Adaptive Virtual Tutor for Chemistry Study Preparation 2**
Theory of Distributed Systems

17:55   **Representing Contrastive Explanations for Knowledge Graphs**
Data Science

18:05   **Adaptive Retrieval Augmented Generation**
Data Science

CE Project Groups (2x9 ECTS)

18:15   **Machine Learning and Signal Processing Using EEG and Smartwatch Data**
Signal and System Theory

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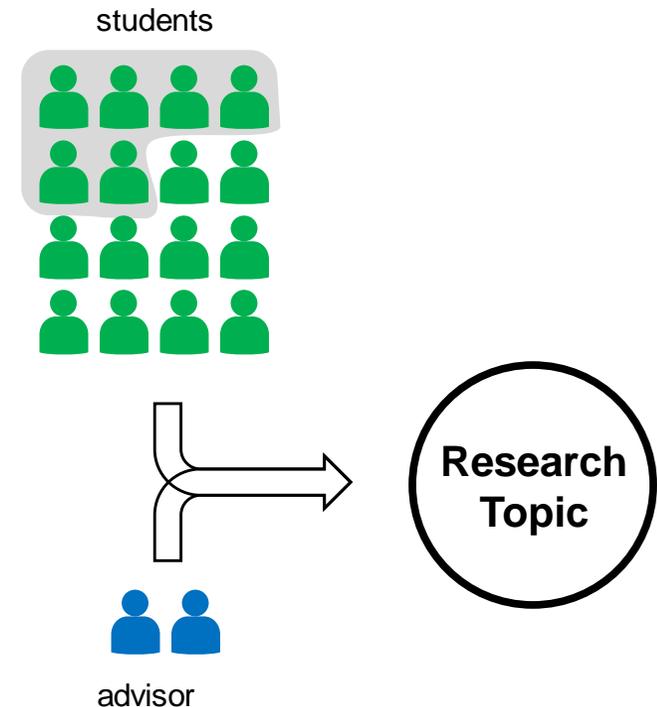
Definition
Project Group

Group of about 8 – 16 students
working together on a <u>research-related project</u>

- Upper limit 16 holds for all groups!

- Lower limit 6 in particular situations!

Research topics
from the advisor's field of interest

Duration: **one year** (two terms)

students

advisor

Research Topic

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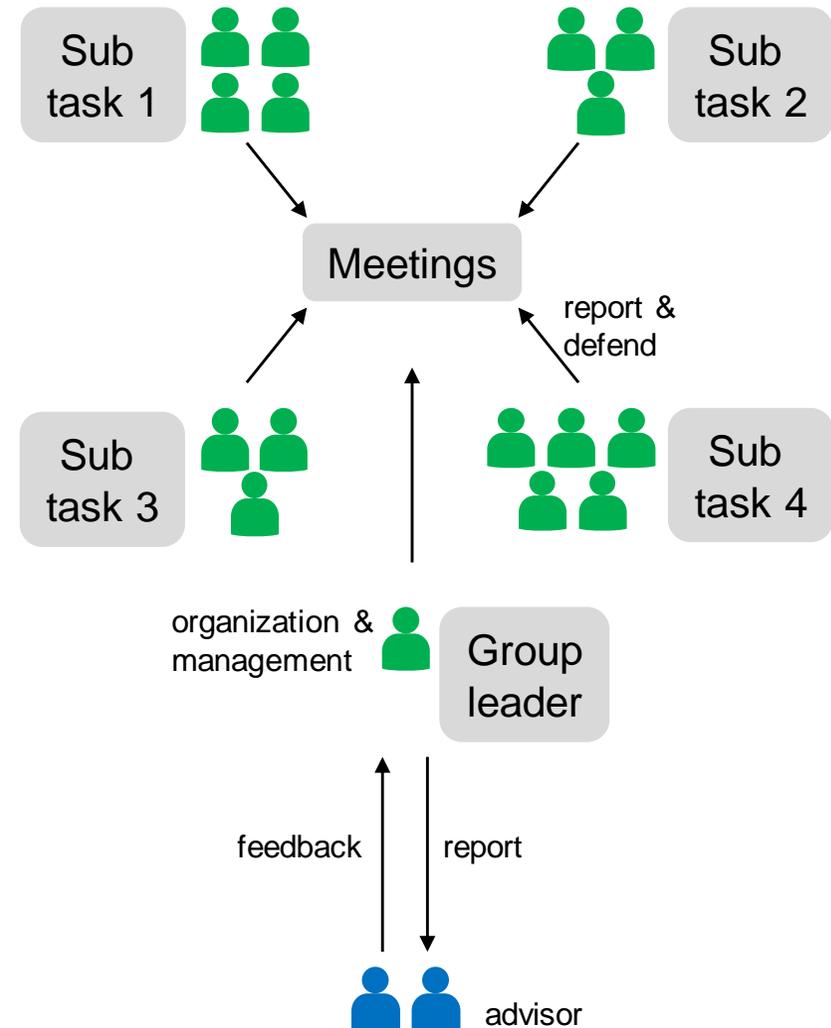
Aims: Improvement of character building (1/2)
Project Group

Practical experience in
teamwork and **organization** of a project

- Build your own **personnel structure**, similarly to an industrial team

- **Delegation** of sub tasks and responsibilities to subgroups

Division of tasks involves

- the necessity to **report** at regular intervals
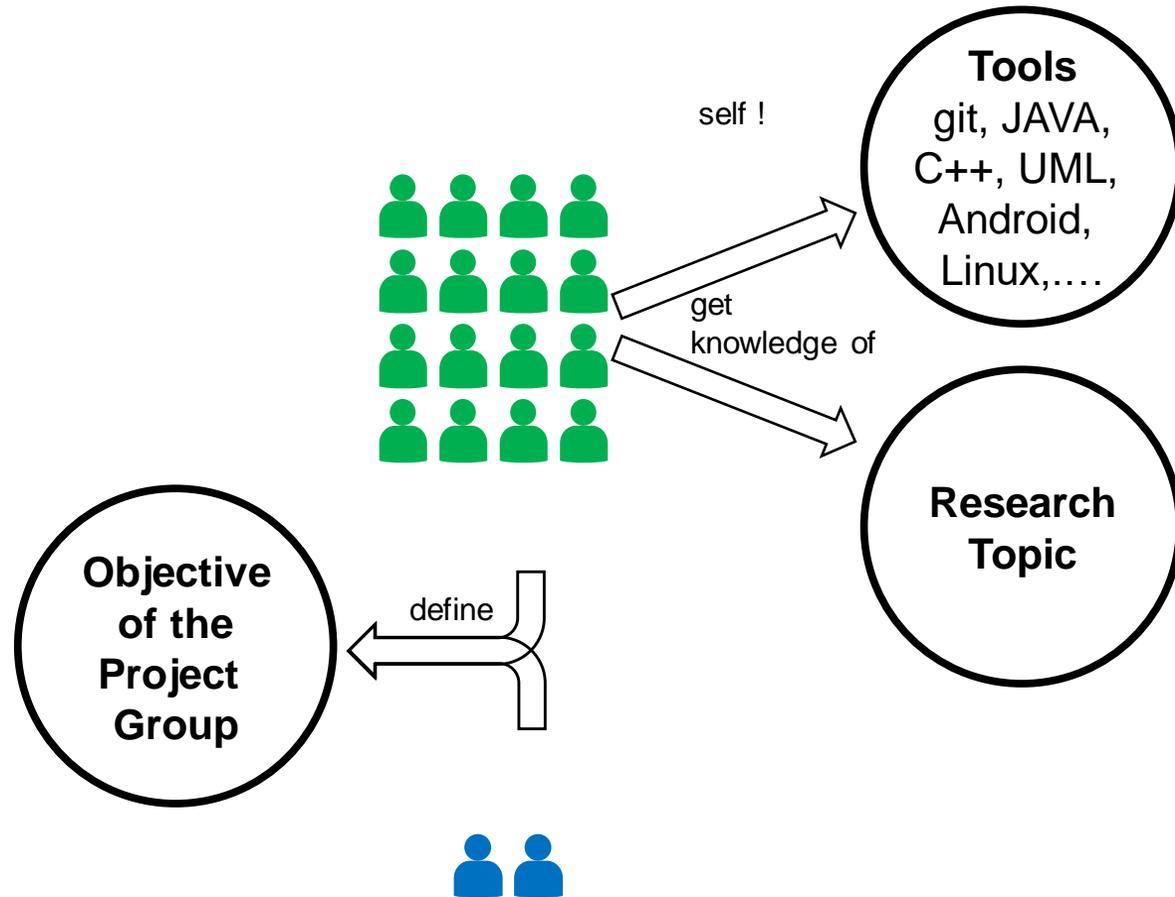
- and to **defend** the own work

Sub task 1

Sub task 2

Meetings

report & defend

Sub task 3

Sub task 4

organization & management

Group leader

feedback   report

advisor

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Aims: Improvement of character building (2/2)
Project Group

Self-organization

- **Define the aims** on your own together with the advisors

- **Self training** with necessary tools, methods and approaches

self !

Tools
git, JAVA, C++, UML, Android, Linux,....

get knowledge of

Research Topic

Objective of the Project Group

define

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Outcome
Project Group

Your our outcome

You learn

- systematic and methodic working

- comprehensive development processes (including final report and documentation)

You

- will be intensively prepared for industrial practice

- approach current research topics

   (often students write their **master's theses** in the same field and research topic)

Advisor's outcome

- Project groups are a means for research

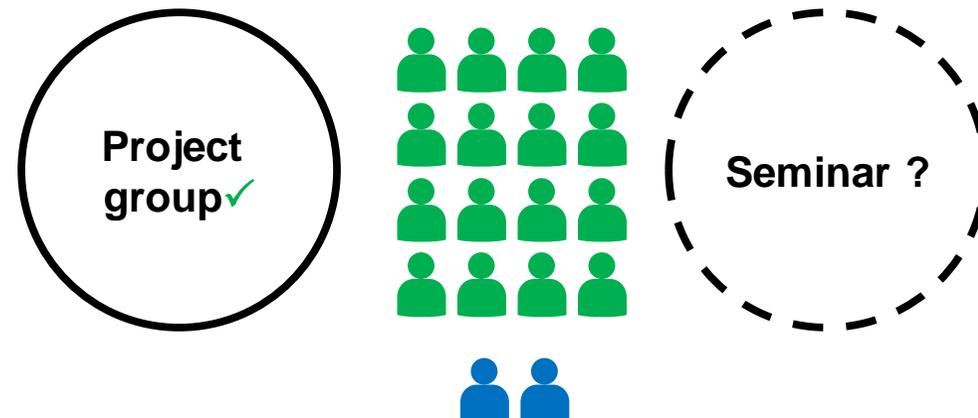- Implementation and execution of research

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Seminar
Project Group

Seminar as parallel course

■ the organizer can provide a seminar parallel to the project group

■ the seminar is a <u>separate course</u>

■ the organizer determines whether participation is <u>mandatory or optional</u>

■ the organizer decides whether such a seminar is <u>available or not</u>

Please note the announcements of the organizer

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Requirements for Participation
Project Group

Project group can only be started
→ when the **bachelor's degree** has been successfully **completed**

Bachelor's degree is successfully **completed**, when

- all examinations have been passed and

- the thesis' 4.0 confirmation is handed over to the examination secretariat (Lessmann, Guhlich,…)

  - by 31 March (PGs starting summer term) and

  - by 30 September (PGs starting winter term)

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Requirements for Participation
Project Group

Project group can only be started
→ when the **enrollment in the master's program** has been **completed**

Students of the bachelor's program,

- who reach the 4.0 confirmation or examinations only on 31st of March, or on 30th of September,

- must therefore <u>enroll for the Master's program</u>
  in the relevant period of the change of studies (by March 21, see uni webpage!)
  https://www.upb.de/zv/3-3/formalitaeten/studiengangwechsel/uebergang-bachelormaster

- you can submit proof of successful completion of your studies (Bachelor's certificate and deed or a corresponding certificate from the office responsible for issuing the deed)
  by April 23, see uni webpage!
  https://www.upb.de/zv/3-3/formalitaeten/studiengangwechsel/uebergang-bachelormaster

Bachelor Students who cannot apply electronically via PAUL due to <u>missing master status</u> register as follows in the period of **Phase 1**:

Send e-mail to:	To: paul@upb.de CC: mafi@upb.de
Subject:	"Anmeldung All Project Groups Summer Term 2025"
E-mail body:	Hallo, ich möchte mich zu diesem Kurs anmelden: "L.079.07099 All Project Groups Summer Term 2025" Name: ??? Matrikelnummer: ??? Uni-E-Mail: ??? IMT-Benutzername: ??? Studiengang (CS/CE): ???

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How to Get a Project Group
Method to Match Students to Project Groups

Method consist of 4 phases:

- **Phase 1:** PAUL registration
  February 17 - February 23 (timely registration)
  February 24 - March 23 (late registration)

- **Phase 2:** Assignments & Preferences
  February 25 - March 16

- **Phase 3:** Stable Marriage
  March 24

- **Phase 4:** Result's Notification & Decision
  March 28 (PAUL registration by administration & email notification)

- Advisor final grading: March 18 - 23
  Autograding: March 17

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How to Get a Project Group
PAUL registration

Phase 1 – PAUL registration

- You register only for one <u>course</u>:
  "**L.079.07099 All Project Groups Summer Term 2025**"

- The course captures the registration for <u>all project groups</u>,
  here you <u>cannot</u> choose your preferred group!

- You can see all project groups in the Course Catalogue,
  but you can't register for them

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How to Get a Project Group
PAUL registration

"**Phase 1: PAUL Registration**" consists of two registration periods
directly following each other.

Timely registration
- You will receive a project group/seminar in any case
- You can start Phase 2 on time

Late registration
- You will receive a project group/seminar in any case
- the registration in PAUL is only synchronized once a week with the access to Jupyter
- If you register in PAUL during Phase 2 (Assignments & Preferences)
  - you can complete all assignments and preferences
  - late access to Jupyter may cause you to miss interview appointments that were scheduled in Phase 2 (applies only to organizers who are conducting interviews)
- If you register in PAUL after Phase 2
  - you will not be able to do any assignments and
    you will be graded to the lowest rank in the grading of all organizers
  - but you can still set your preferences in any case,
    this will go until the beginning of Phase 3 (Stable Marriage)

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How to Get a Project Group
PAUL registration

Registration in PAUL is only possible

- if the re-registration (renewal of matriculation) for the summer semester has been completed <u>before</u> then!
- The re-registration is done by paying the enrollment fee https://www.upb.de/zv/3-3/formalitaeten/rueckmeldung

Please note!

- Bank transfer takes a few days
- The university's administration also takes a few days to book the money
- Registration for project groups is only possible once both have been completed

We therefore highly recommend that you re-register and renew your matriculation, i.e. pay the enrollment fee **NOW !**

(**CE students**: The one-week registration phase is only valid for PGs of ET organizers participating in this procedure. This does not apply to others PGs of ET organizers!)

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How to Get a Project Group
Assignments & Preferences

Phase 2 – Assignments & Preferences

Consist of 2 steps:

Step 1

- Students state the <u>preferences</u> for <u>all</u> project groups

- All means all and not just 1 or 2 or just the one you like!

Do students have to participate in a project group they do not like?
→ No! See below

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How to Get a Project Group
Assignments & Preferences

Phase 2 – Assignments & Preferences

Consist of 2 steps:

Step 2

■ Project group advisors provides an "assignment"

■ Used to test student's suitability for a given project group

■ Students fill in these assignments for the project group they are interested in

Assignment can be

■ Empty (e.g., if the organizers do not require a precondition for participation)

■ Programming assignments

■ Free-text answers

■ Placeholder for a personal interview

■   … or whatever the organizer needs

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How to Get a Project Group
Assignments & Preferences

Phase 2 – Assignments & Preferences

Consist of 2 steps:

Both Steps

- Where? → Tool chain by Jupyter and nbgrader extension

- You can log in starting on February 25
  Jupyter Server: https://pg.cs.upb.de
  here you can find the assignments

What if I decide not to participate in any PG while the assignment phase is running?

→ Deregister in PAUL L.079.07099 All Project Groups Summer Term 2025 !

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How to Get a Project Group
Assignments & Preferences

For how many project groups should I take the assignments?

- Recommendation: Minimum: 3 Better: 4 - 5

- More than five? → May be waste of time, but you can do

What if I only do the assignment for one project group?

- Only for students who are better than all others in the desired project group

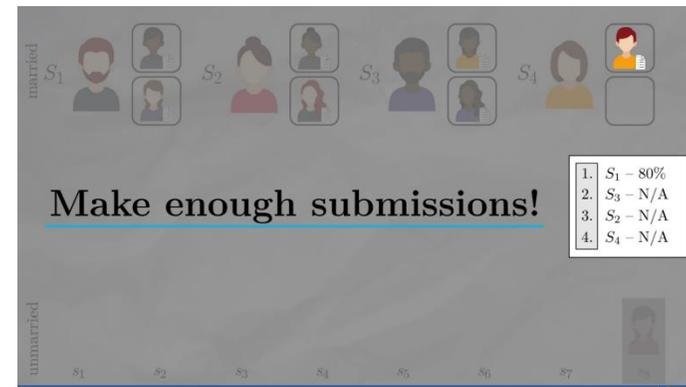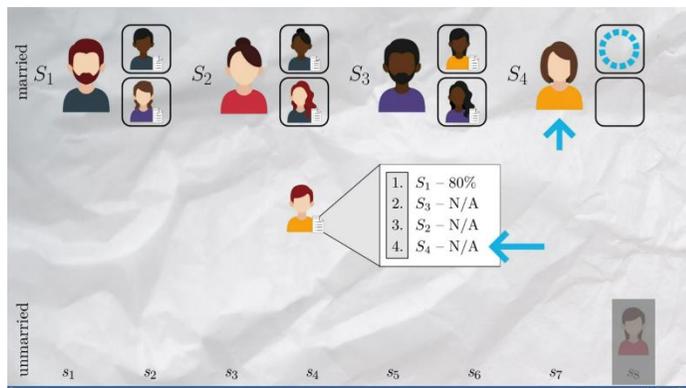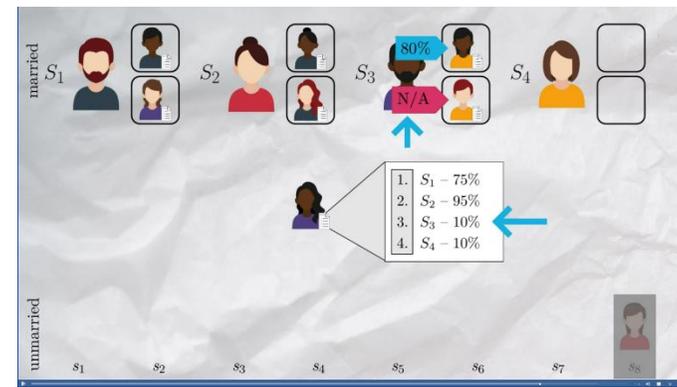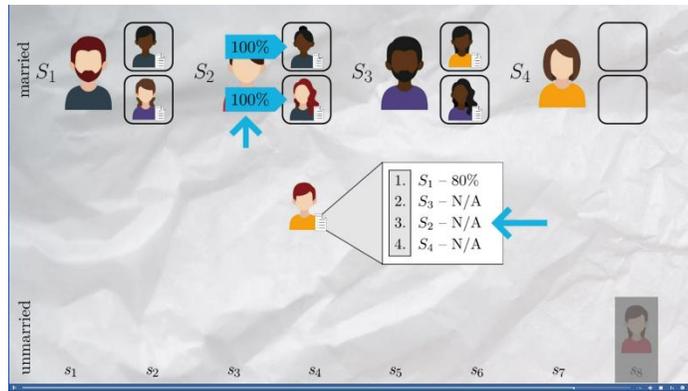- In general, very bad idea, not recommended

Example: last term allocation of seminars

- One student submitted only <u>one assignment</u> for one seminar

- The algorithm did not give him the seminar with <u>preference 1</u> because 15 students had better scores than him

- Because he had no other assignments, he was passed down to his lowest preference and received, a seminar with <u>preference 11</u>

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How to Get a Project Group
Assignments & Preferences

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On our website www.upb.de/cs/pg you will find a nice video

- that explains the algorithm

- and it shows what happens when you fill out too few assignments

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How to Get a Project Group
Stable Marriage

Phase 3: Stable Marriage

- The project group advisors <u>score</u> the <u>assignments of the students</u> with points

- The more points a student gets from the advisor,
  the greater the chance of a project group seat

Now we apply the Stable Marriage algorithm

- <u>Scores rank students</u> from project groups <u>advisor's perspective</u>

- <u>Preferences</u> of the students rank the <u>project group</u> from <u>student perspective</u>

- Based on both, we compute a stable marriage
- The <u>Stable Marriage</u> algorithm matches students to project groups
- Each student gets a project group!

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How to Get a Project Group
Stable Marriage

Stable Marriage - Wikipedia

" A matching is a mapping from the elements of one set to the elements of the other set.
A matching is not stable if:

1. There is an element A of the first matched set which prefers some given element B of the second matched set over the element to which A is already matched, and

2. B also prefers A over the element to which B is already matched.

In other words, a matching is stable

when there does not exist any match (A, B)
by which both A and B would be individually better
off than they are with the element to which they are currently matched. "

Stable Marriage Algorithm is a deterministic algorithm !

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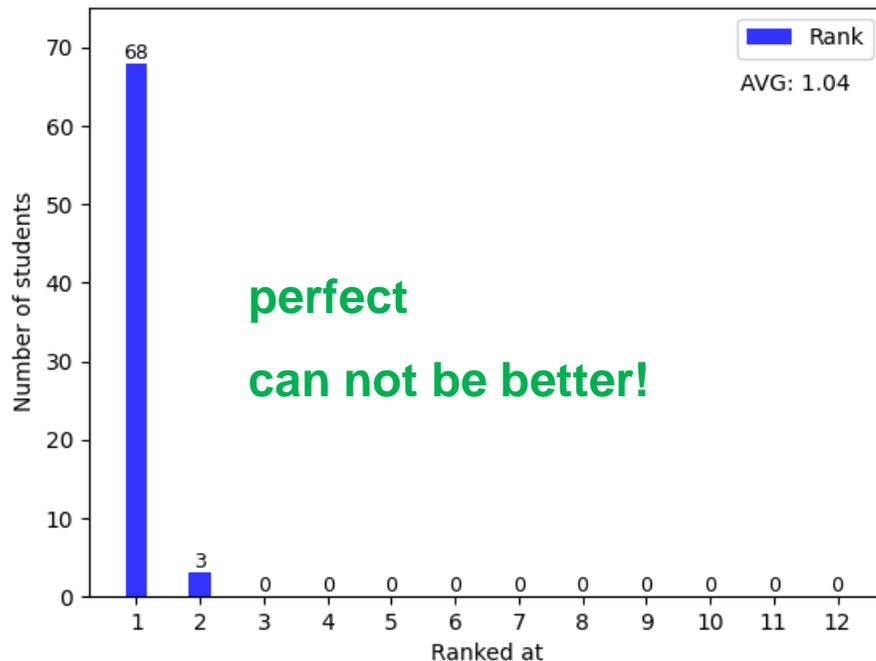www.upb.de/cs/pg
www.upb.de/cs/pgen
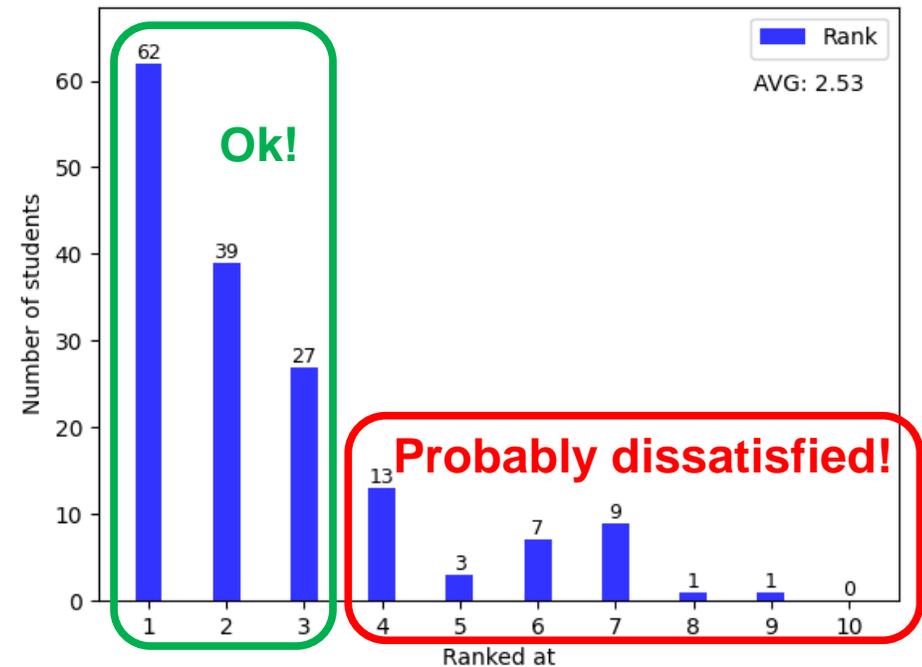
How to Get a Project Group
Stable Marriage

A allocation only creates satisfaction if the demand is evenly distributed over the offer.
If too many students prefer the same project group,
not all of them will be able to get their first preference!

Example
Project Groups starting Summer 2022　　　　　**Seminars starting Summer 2022**

perfect

can not be better!

Ok!

Probably dissatisfied!

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How to Get a Project Group
Notification & Decision

Phase 4: Notification & Decision

- The students are informed which project group they have been assigned (by PAUL and Jupyter system)

- Final result will be entered into PAUL, students move
  from: the course L.079.07099 All Project Groups Summer Term 2025
  to: the assigned course
  by PAUL administration

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How to Get a Project Group
Notification & Decision

Phase 4: Notification & Decision

Do students have to participate in a project group they do not like?

- No! They can refuse the assigned project group!

- To do this, <u>deregister</u> from the assigned project group

Option 1

- You start another project group in the <u>following semester</u>

Option 2

- The project groups are opened for PAUL's **Revision Phase** March 31 – April 30

- Only the <u>remaining spots</u> will be available!

- What does that mean?

   - If spots become available e.g., because students have cancelled, or if free spots are available and have not been assigned yet

   - These spots can be registered directly in PAUL in the project group

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More Information, Webpages, Links, pdf Files

Main web page for project groups: http://www.upb.de/cs/pg

- **Listing** of all project groups (each listed group points to advisor's PG web page)

- Information of the overall **registration and notification process**
  https://cs.uni-paderborn.de/studium/projektgruppen/zuordnungsverfahren
  https://cs.uni-paderborn.de/en/studies/project-groups/matching-method

- **Guidelines for project groups**
  „guidelines for project groups"
  Rahmenrichtlinien für Projektgruppen"

- Please read it before you start a project group!

Thank you for listening!

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