GROUP PROJECTS SUMMARY

INTRODUCTION TO GAME THEORY 2020

GROUP FORMATION VIA SPREADSHEET

Once you have formed a group, you can start working on the project.

The remaining groups will be formed randomly on May 25.

Consult the spreadsheet latest on evening of May 25 to see which group you are in.

Figure out a way to communicate – I won't tell you how. Up to you!

PROJECTS

You write a 10-30 page report, like a research paper, on your topic. Intro, Methods, Results, Discussion. Something like that. Your call!

You submit that by Monday, June 15, 2020. Details on how will come in time.

You may submit along with it slides or recorded presentations to explain what you did beyond your paper.

It should be a net of one working week's work per person.

GROUP PROJECTS =

PROS

Synergies

Learning transfer

Social skills

CONS

Freeriding

Collusion

Grading

1/N?

- i.e.

Shd all members of a group get the same grade?

1/N?

- What if some people did more than others?

RELATIVE EFFORTS?

- **Who know this?**
- **Who can verify it?**

CONSIDER THE SCENARIO – HOW TO SPLIT?

- n people bake a cake together
- the cake is worth 1 dollar
- a third party holds it but has no idea of who did what
- people submit proposals about how it should be split
- the third party aggregates these proposals and pays

THE SITUATION

- **E.g. 5 students do a course project together**
- **the project gets –for example- a 5.5**

- **What should the individual marks be?**

5.5 TO ALL?

5.5?

- **What if some people did more than others?**

RELATIVE EFFORTS?

- **Who know this? The examiner doesn't.**
- **Who can verify it? The examiner cannot.**

YOU DO!

- **You each specify what the contributions of everyone were**

I USE

Public Choice (2008) 136: 19–37
DOI 10.1007/s11127-008-9276-z

Paying the partners

T. Nicolaus Tideman · Florenz Plassmann

Journal of Economic Theory 139 (2008) 176–191
www.elsevier.c

Impartial division of a dollar

Geoffroy de Clippel[a], Herve Moulin[a,*], Nicolaus Tideman[b]

FINAL GRADE

Equal to the outcome of the mutual evaluation exercise based on this mechanism by de Clippel et al. via DVSN.app

HOW?

THE GENERAL USE CASE

- A group collaborated and earned a project grade
- *Who deserves which individual grade?*

Our desiderata

THE GENERAL USE CASE

- A group collaborated and earned a project grade
- *Who deserves which individual grade?*

Our desiderata

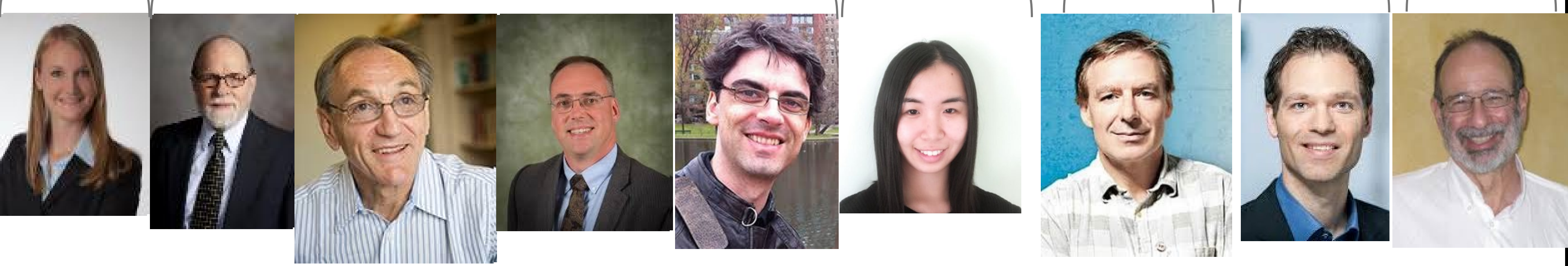
- *A mechanism*
  - ✓ *Preventing free-riding*
  - ✓ *Fostering synergetic collaboration*
  - ✓ *Enabling fair division: instead of one size fits all*

  ➢ *Without dissecting or micro-managing as the professor (i.e. without the teacher "looking into the process")*

PROLOGUE ON A MECHANISM

1. First theory for basic case by *de Clippel et al* (JET 2008)
2. Adapted for a collective action framework
3. Implemented as a grading tool at ETH

1. 3. 1. 2. 3. 2.



SOLUTION

The mechanism desiderata:

✓**Adequate**

- average individual mark
- = overall group grade

✓**Consensual**

- grades implement consensus when everyone agrees

✓**Anonymous**

- equal treatment of everyone

✓**Impartial**

- own verdicts of one's own contribution cannot improve one's grade

SOLUTION

- **Prof grades the whole project**
- **Students review each other**
- **A formula aggregates the reviews to yield individual grades**

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*:with some rounding up in favor of students

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Unique(ish)

"formula" fulfilling these!

THE FORMULA

Average relative contribution jk $S^m_{jk} = \frac{1}{|Q'|-2} \sum_{i \in Q' \setminus \{j,k\}} S^{im}_{jk}.$

Average RC jk without i's opinion $S^m_{jk}[-i] = \frac{1}{|Q'|-3} \sum_{l \in Q' \setminus \{j,k,i\}} S^{lm}_{jk}.$

Auxiliary function assigning share to i when j excluded

$$g^m_i[-j] = \frac{1}{1+S^m_{ji}+\sum_{k \in Q' \setminus \{i,j\}} S^m_{ki}[-j]}$$

Final payment $f^m_i = \frac{1}{|Q'|}\underbrace{(1 - \sum_{j \in Q' \setminus \{i\}} g^m_j[-i])}_{\text{i's residual in his slice}} + \underbrace{\frac{1}{|Q'|} \sum_{j \in Q' \setminus \{i\}} g^m_i[-j]}_{\text{share in the other slices}}.$

COMPLICATED?

Yes, kind of.

But…

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Yes, kind of.

But the properties are intuitive and the rating is very simple

AND it is the unique formula achieving:

Adequateness

Consensus

Anonymity

Impartiality

Aim: Aligning individual and collective incentives through, projects suffer less from free-riding, get better, and individual marks are fairer.

COMPLICATED?

Yes, kind of.

But the properties are intuitive and the rating is very simple

Plus the burden is on the computer software, not on the student…

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AN EXAMPLE

Carolin, Heiko, Sarah, Tobias

THE GROUP GETS A 5.25. WHO GETS WHICH GRADE?

[RECALL: IF EVERYONE SPLITS EQUALLY EVERYONE GETS THE SAME GRADE]

THE BASICS

Carolin, Heiko, Sarah, Tobias

Carolin’s evaluation

Heiko	30	%
Sarah	35	%
Tobias	35	%

THE BASICS

Carolin, Heiko, Sarah, Tobias

Heiko’s evaluation

Carolin	32 %
Sarah	34 %
Tobias	34 %

THE BASICS

Carolin, Heiko, Sarah, Tobias

Sarah’s evaluation

Carolin	32	%
Heiko	32	%
Tobias	36	%

THE BASICS

Carolin, Heiko, Sarah, Tobias

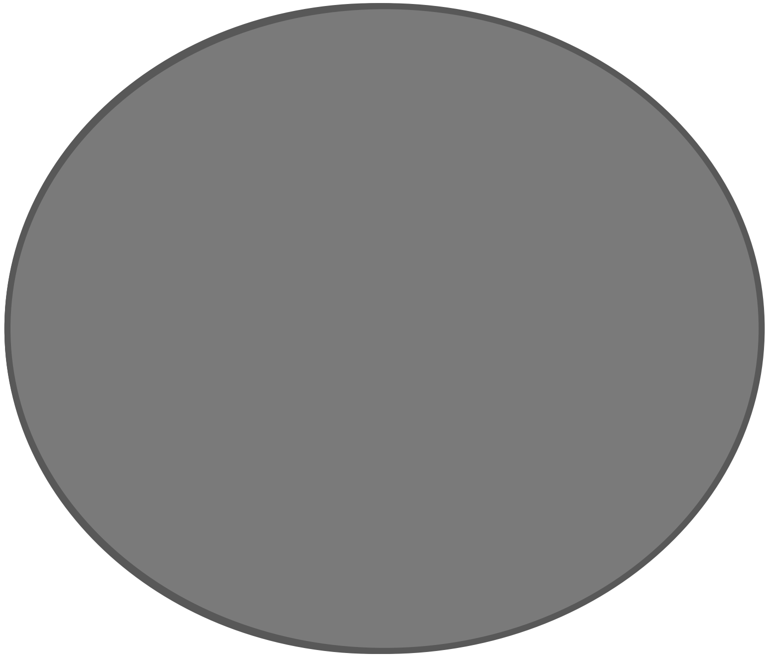
Tobias' evaluation

Carolin	34	%
Heiko	33	%
Sarah	33	%

The group gets a 5.25.
Who gets which grade?

Carolin	5.25	24.43%
Heiko	5	23.59%
Sarah	5.5	25.57%
Tobias	5.5	26.41%

ILLUSTRATION OF THE FORMULA



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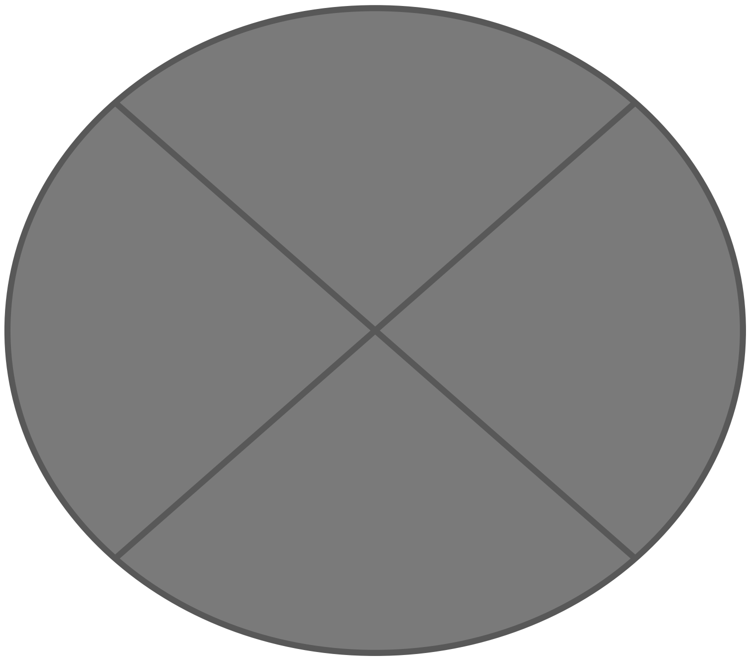

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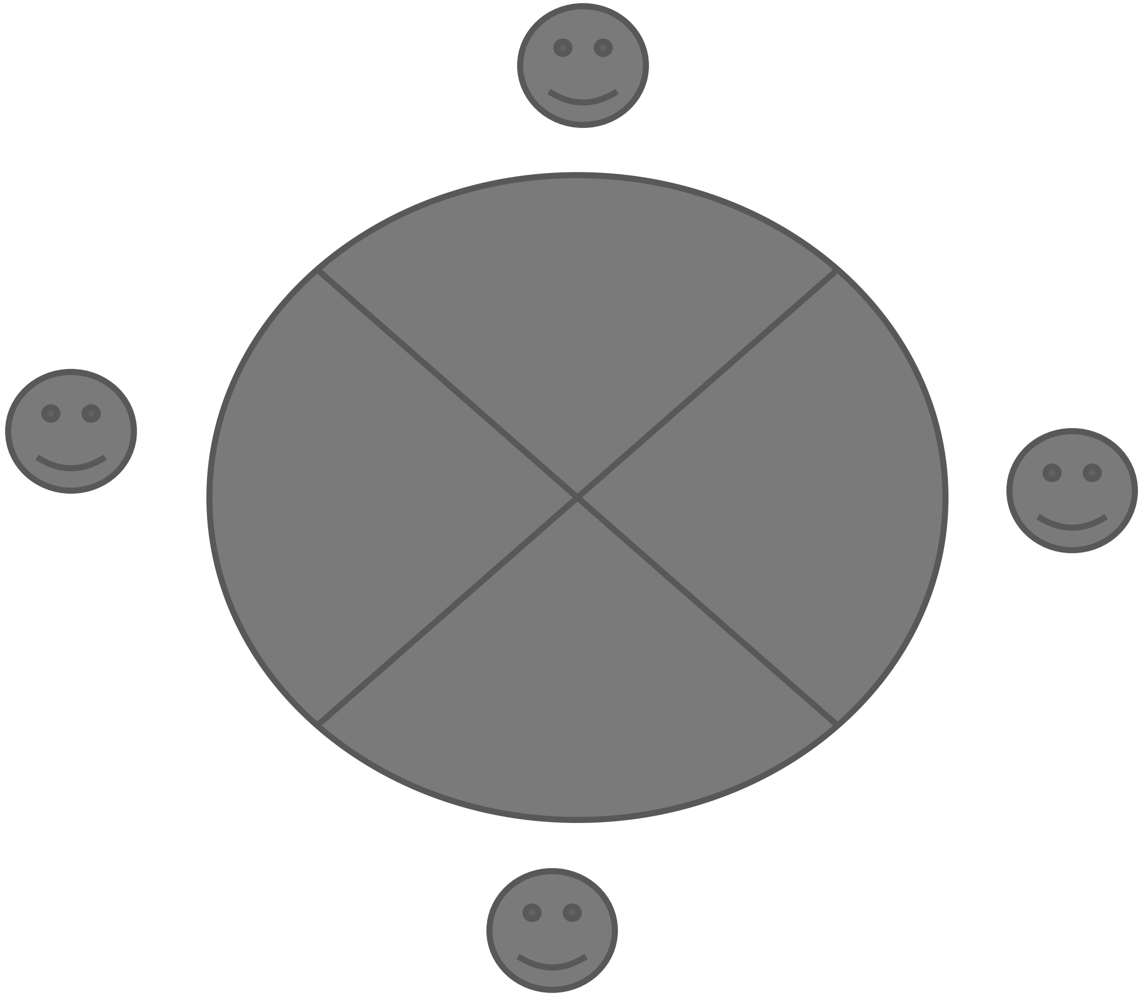

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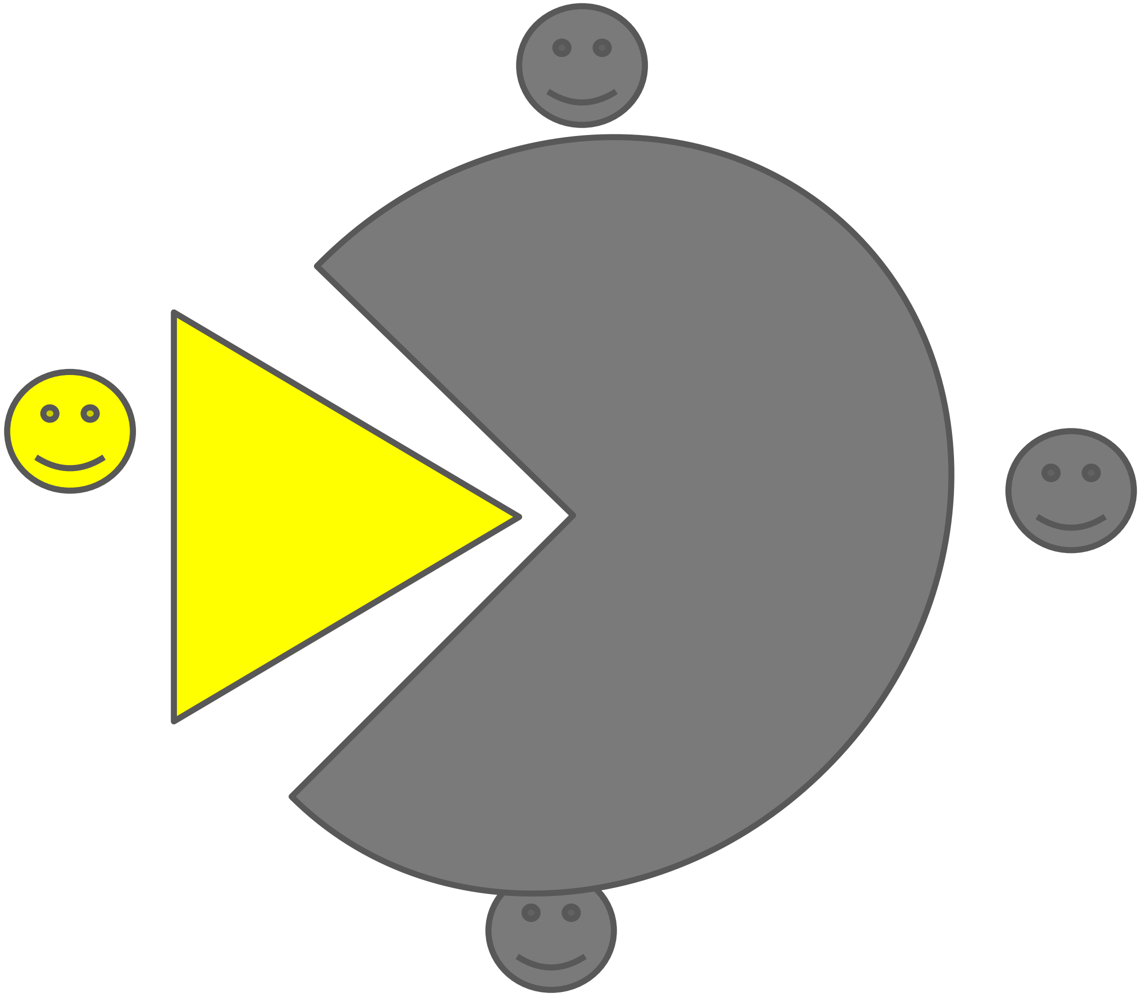

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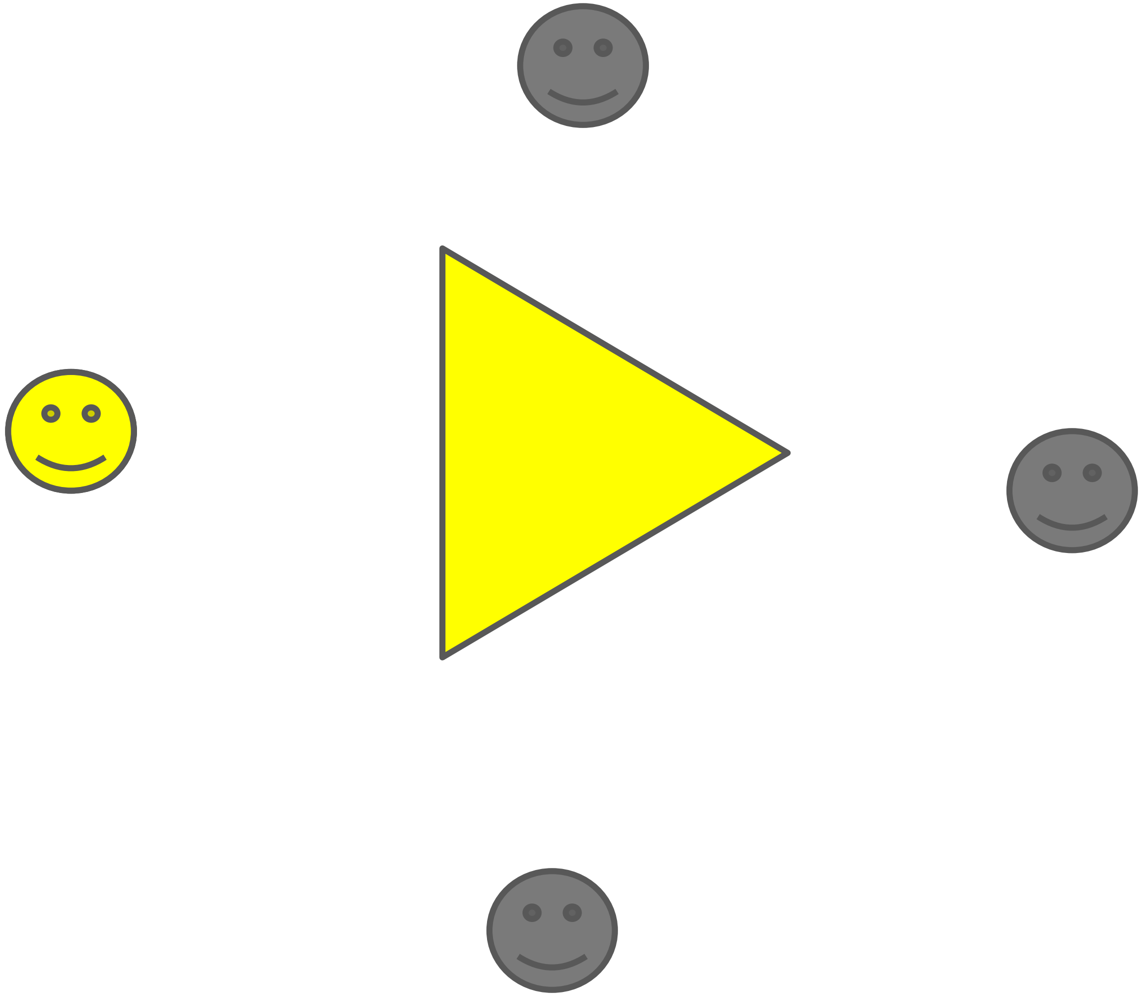

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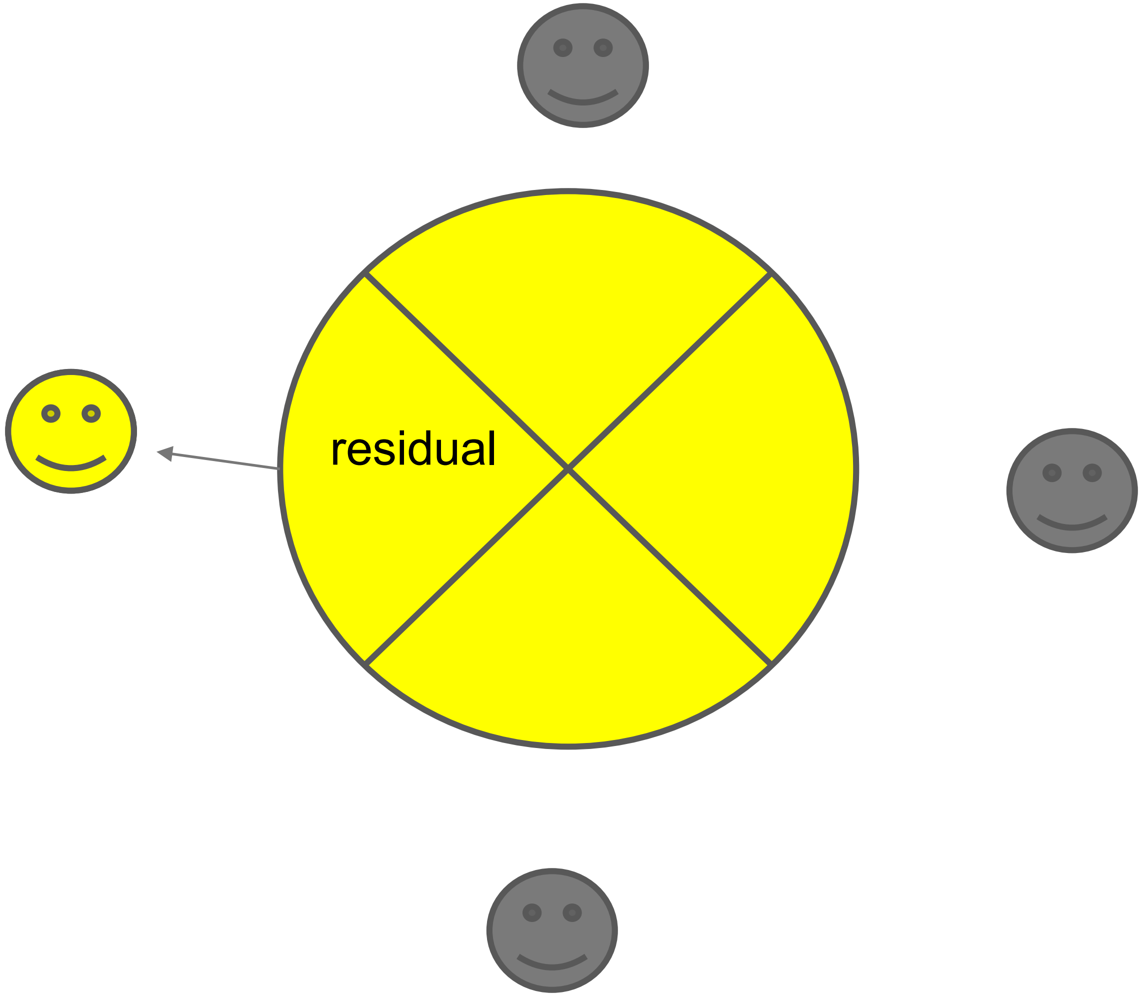

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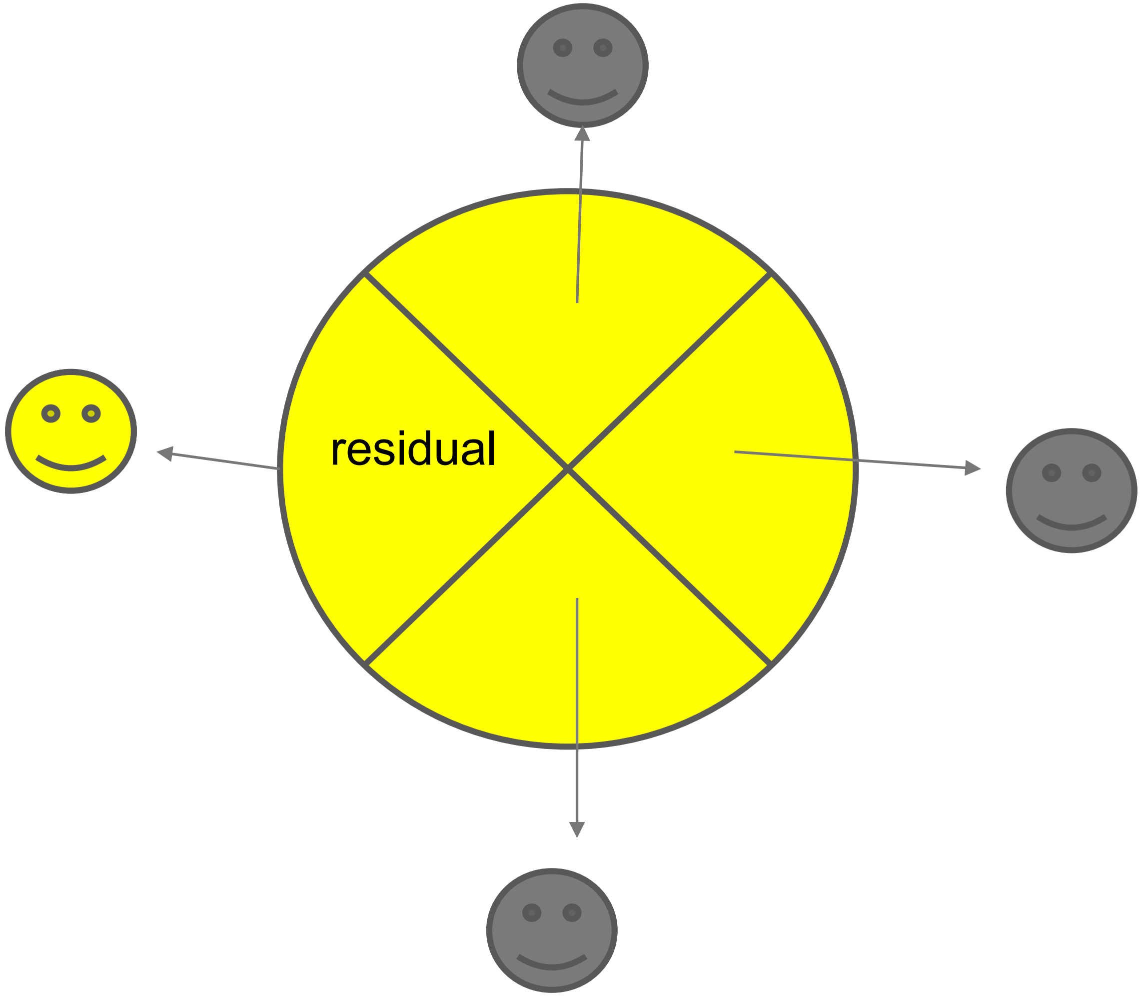

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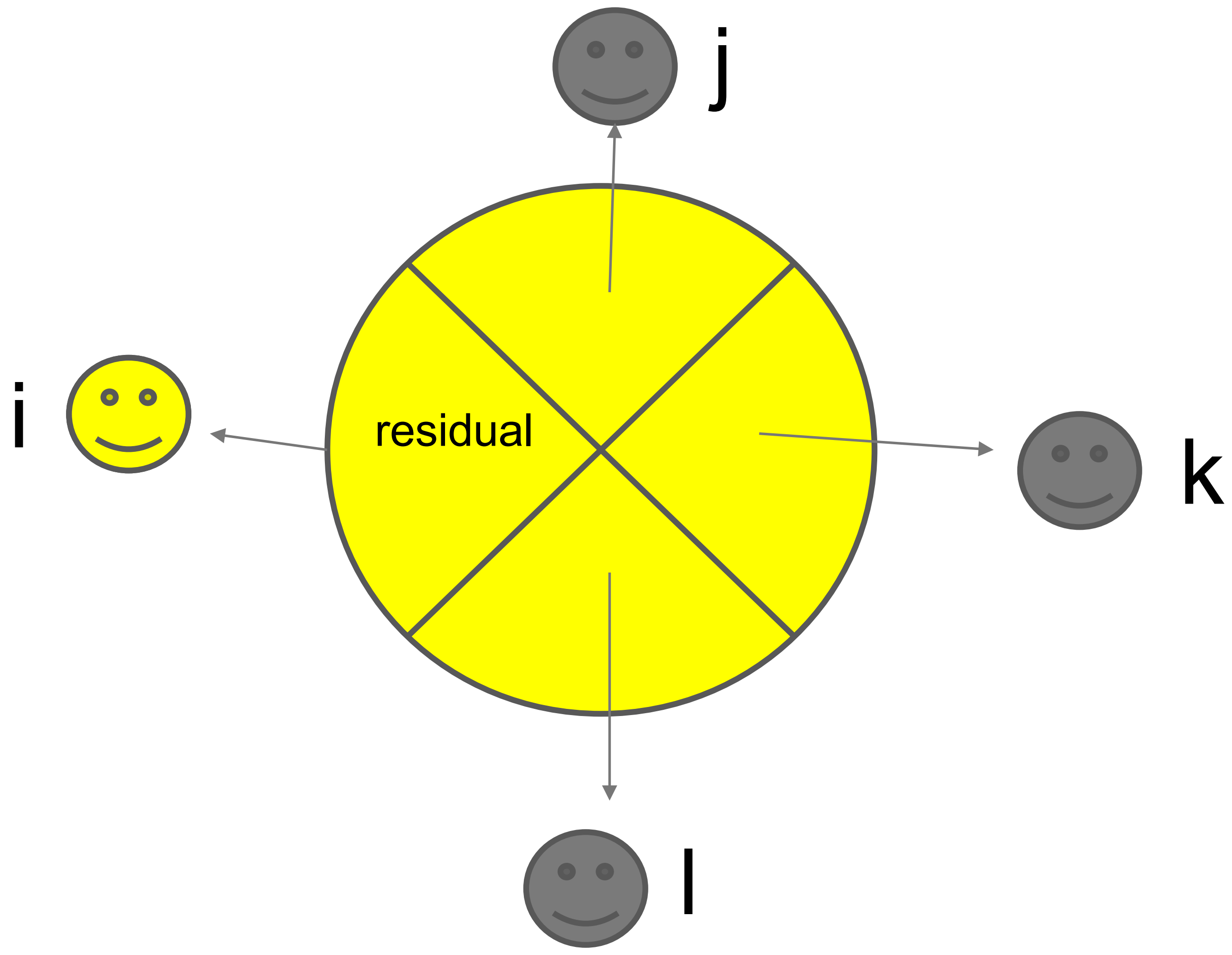

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THINK ABOUT IT

OR READ

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EXAMPLE (MADE SIMPLE)

L	**33, 33, 33**
ML	**50, 25, 25**
MR	**50, 25, 25**
R	**50, 25, 25**

OUTPUT – NOTE CONSENSUALITY MUST BITE HERE

say\get	L	ML	MR	R
L		33	33	33
ML	50		25	25
MR	50	25		25
R	50	25	25	
Gets	40	20	20	20

JUST AVERAGING WOULD GIVE

say\get	L	ML	MR	R
L		33	33	33
ML	50		25	25
MR	50	25		25
R	50	25	25	
Gets	50/133 =37	28/133 =21	28/133 =21	28/133 =21

DVSN.APP --- INFO FOR SIGNUP WILL COME SOON WHEN GRADING NEARS