

Mechanical Analysis and Design ME 2104

Lecture 5

Function

Prof Ahmed Kovacevic

School of Engineering and Mathematical Sciences
Room C130, Phone: 8780, E-Mail: a.kovacevic@city.ac.uk
www.staff.city.ac.uk/~ra600/intro.htm

Ahmed Kovacevic, City University London

Plan for today

- Clarify issues from the last week (15 min)
- Lecture (35 min)
 - » Functional Model
- Team meeting (Finish OT, start FM) (45 min)
- Additional lecture (15 min)
 - » Modelling Tennis ball server

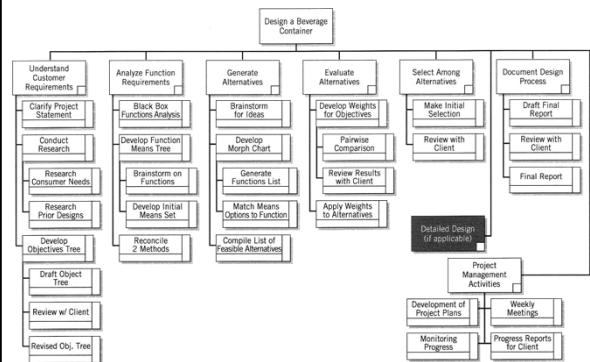
Ahmed Kovacevic, City University London

Clarify issues from the last week

- Team issues:
 - » Reports from Coaches – mixed success
 - » Coaches **MUST** be present in the group
 - » Objective of having a meeting:
 - Review progress on work given in previous meeting
 - Understand requirements for next meeting
 - Distribute work
 - » Take tasks step by step – if finish ask your coach to help you identify new tasks
 - » Coaches are already assessing you...

Ahmed Kovacevic, City University London

Clarify issues from the last week



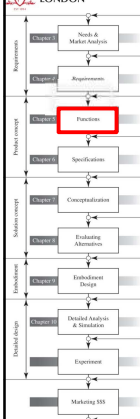
Deliverables for Phase 1 (Vision)

Report (Moodle):	3 rd November @ 17:00 – Word and pdf
Presentation:	4 th November @ 10:00 – PPT + Notebook
Team management:	Function:
Working agreement	Black Box - Functional Model
Team Branding and Logo	Full Actual Functional Model
WBS	Parameter Analysis
Team calendar	
Gantt chart	QFD:
Group Notebook	Competitors analysis
Requirements:	Weighting of the Objectives
Figure of Merit analysis	Importance of the Engineering ch
Budget, very short Introduction	Projectile Motion Calculation
Market Research	Pressure Calculation
Client Statement/Constraint	Detailed Requirements List
Design Constraints	
Afinity diagram	Team Vision
Objective Tree and Weightings	Plan for Phase 2 – Concepts
Preliminary Requirements List	

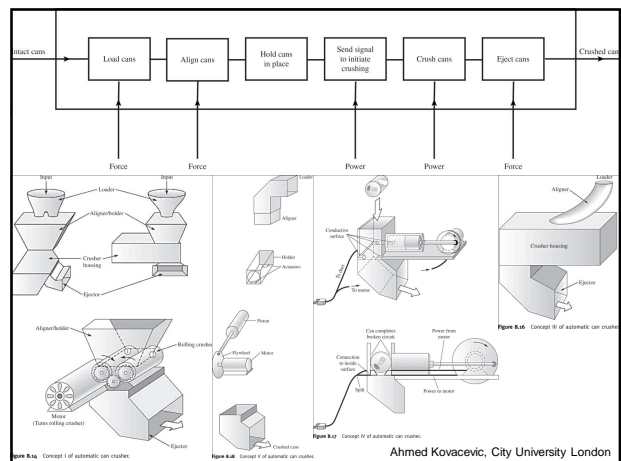
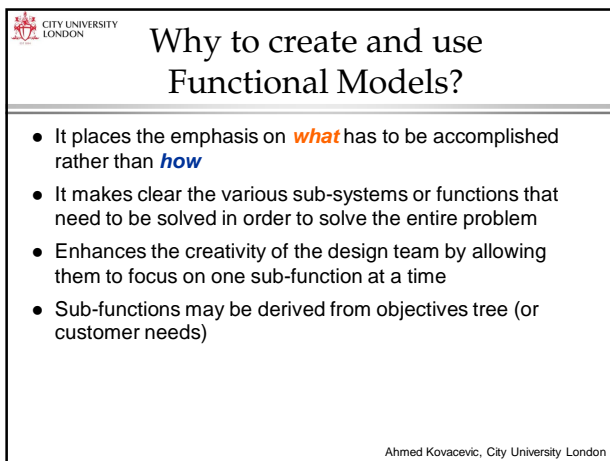
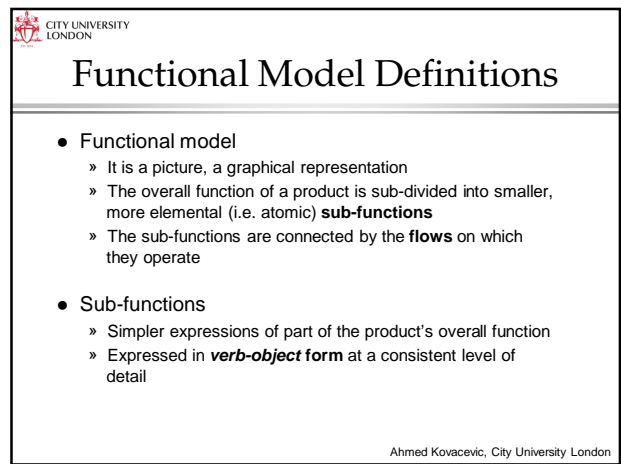
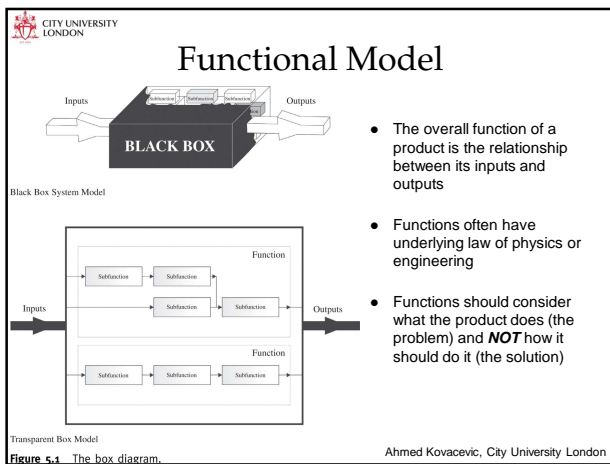
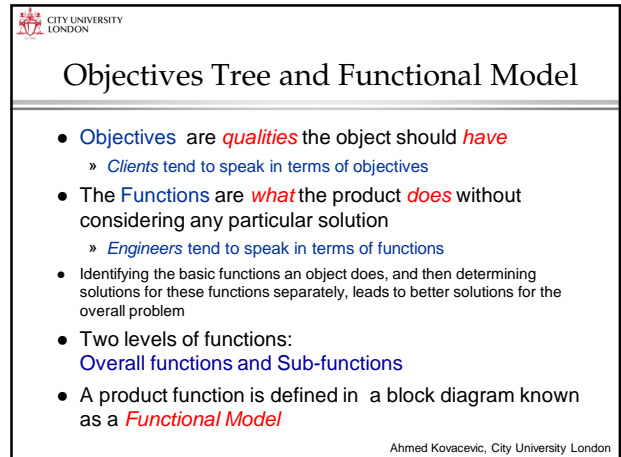
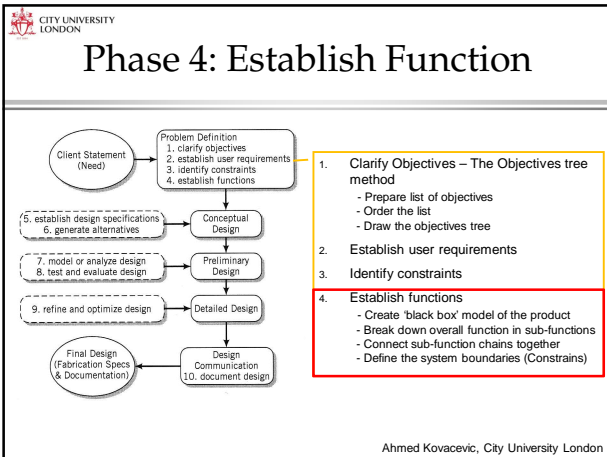
Ahmed Kovacevic, City University London

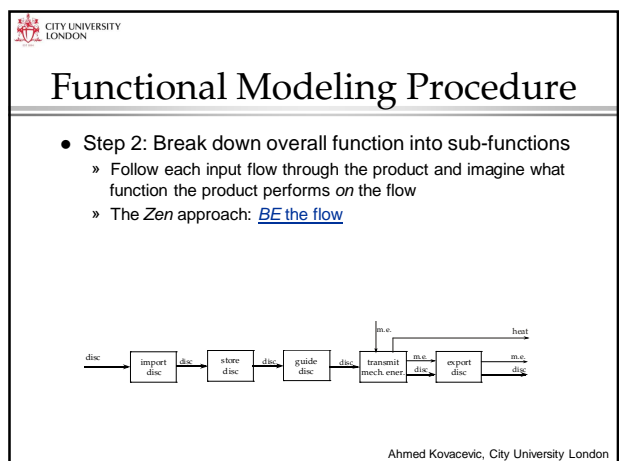
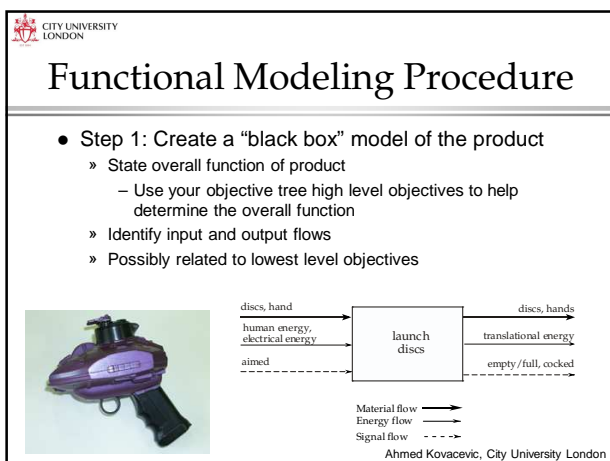
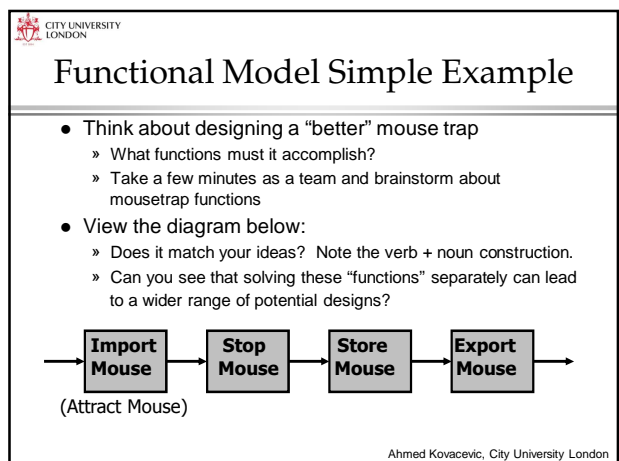
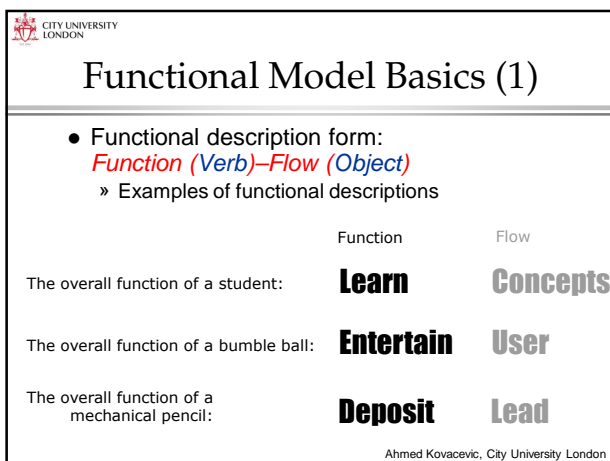
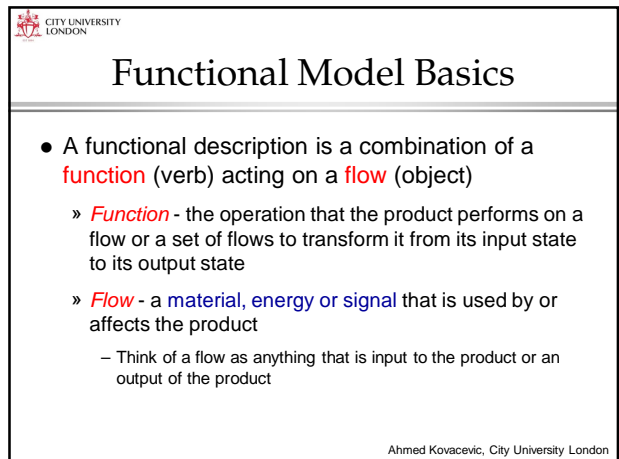
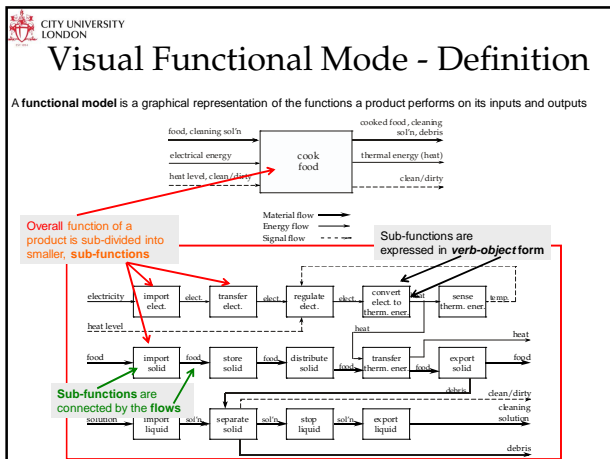
Functions - Lecture

- Engineering Design Process 2nd Edition, Chapter 4
 - » Discuss the essentials of function analysis
 - » Create function structures based on need statements
 - » Discuss the importance of function analysis



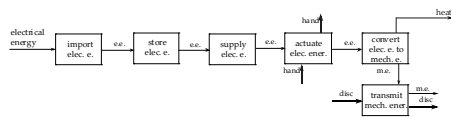
Ahmed Kovacevic, City University London





Functional Modeling Procedure

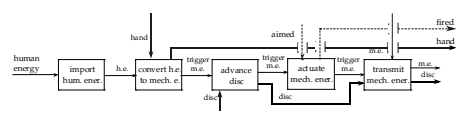
- For the flow of *electrical energy*, what is its associated sub-functions?



Ahmed Kovacevic, City University London

Functional Modeling Procedure

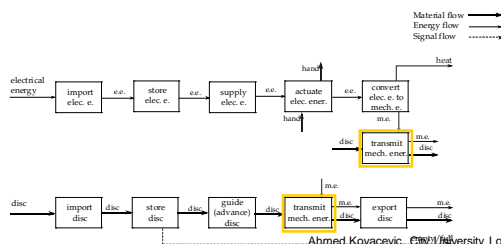
- Flow of *the user mechanical energy*,
- what are associated sub-functions?



Ahmed Kovacevic, City University London

Functional Modeling Procedure

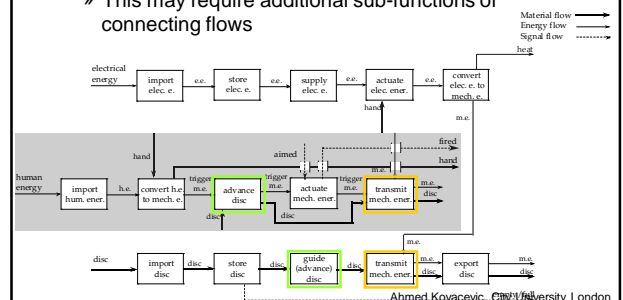
- Step 3: Connect the sub-function chains together
 - This may require additional sub-functions or connecting flows



Ahmed Kovacevic, City University London

Functional Modeling Procedure

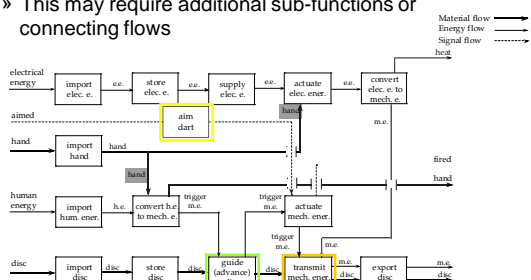
- Step 3: Connect the sub-function chains together
 - This may require additional sub-functions or connecting flows



Ahmed Kovacevic, City University London

Functional Modeling Procedure

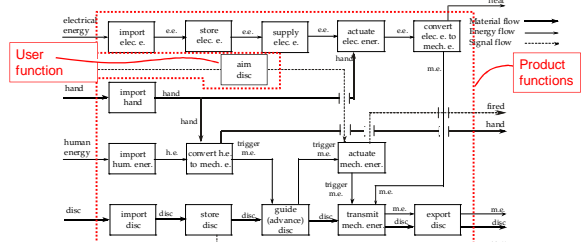
- Step 3: Connect the sub-function chains together
 - This may require additional sub-functions or connecting flows



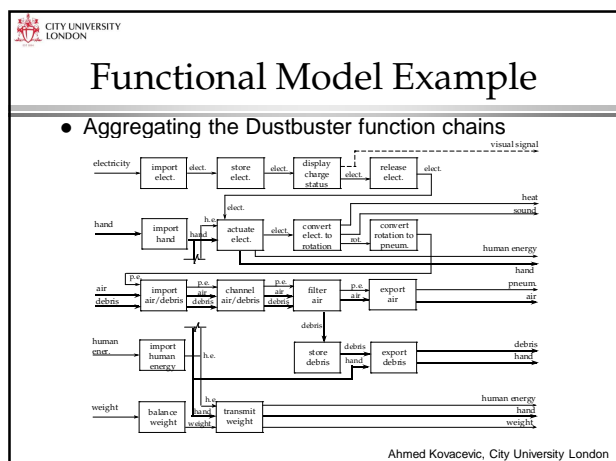
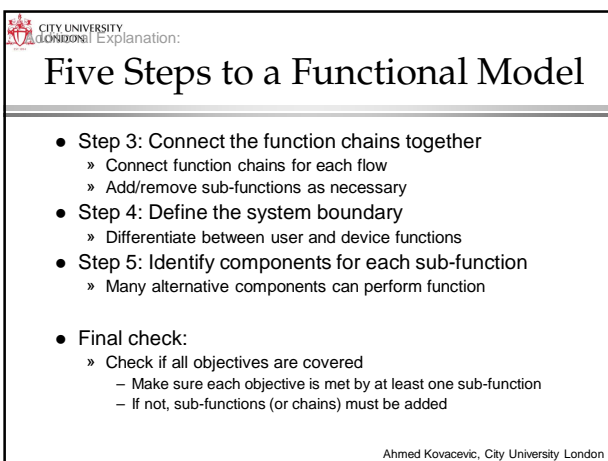
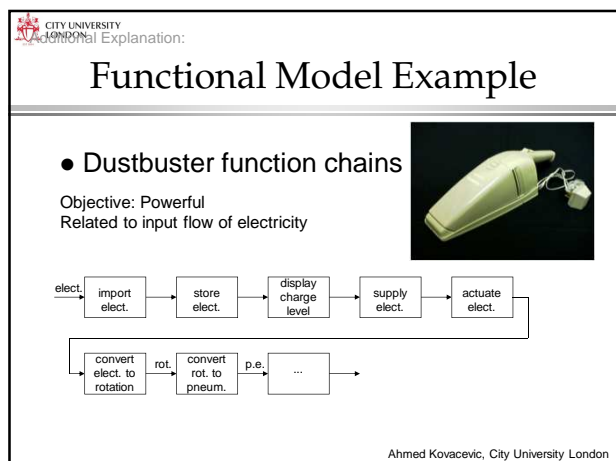
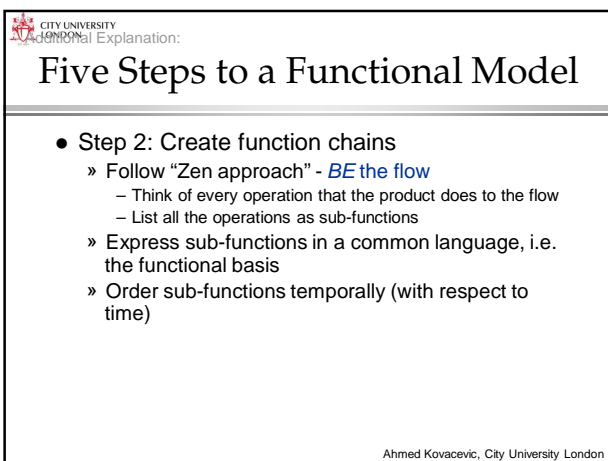
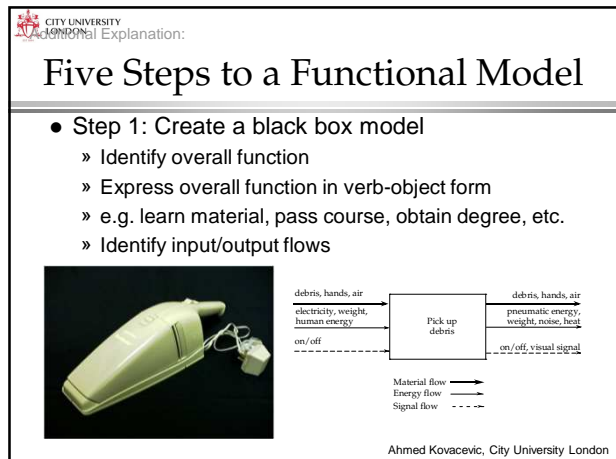
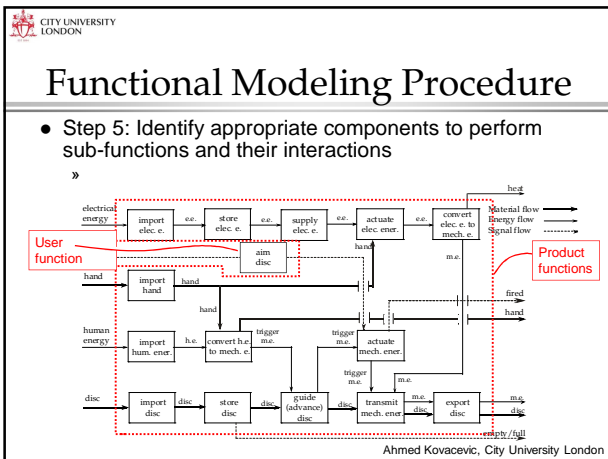
Ahmed Kovacevic, City University London

Functional Modeling Procedure

- Step 4: Define the system boundary
 - This ensures that only product sub-functions are considered for future design work



Ahmed Kovacevic, City University London

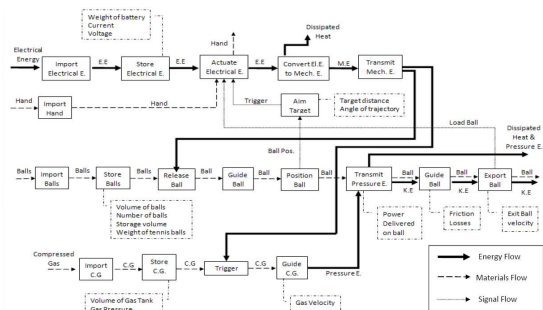


Functional Modeling Summary

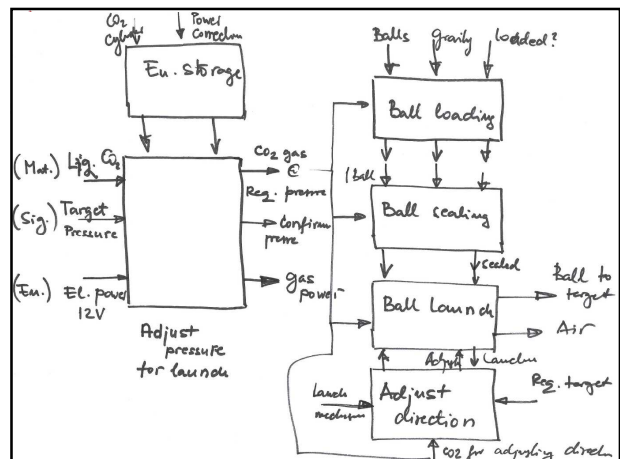
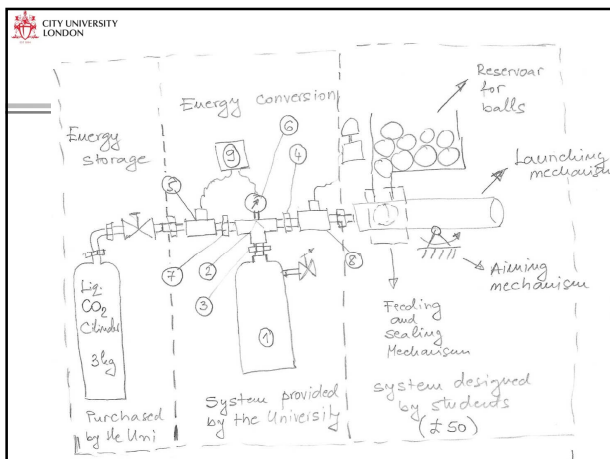
- What's the difference between **objectives** and **functions**?
 - Objectives** tell us what the final product will "be", what qualities it will have
 - Functions** tell us what the object will "do", without regard to any particular form
 - Functions will always relate input to output
 - Functions capture the transformation that takes place between input and output
- Though the difference may seem subtle, it is a very important distinction

Ahmed Kovacevic, City University London

Functional model example last year



Ahmed Kovacevic, City University London



Deliverables for Week 5

- » Updated Notebook
- » Updated Gantt Chart
- » Meeting minutes from last week
- » Finalised & weighted Objectives Tree in 4 levels
- » Functional Model of the

Ahmed Kovacevic, City University London

Team Meeting

Ahmed Kovacevic, City University London