The System Design Project
Purpose

Barbara
Aim: to design a system

The System Design Project is an Informatics institution - in fact it pre-dates the School of Informatics.

The system to be designed in the project has varied over the years:

- Robot shopping
- Mars lander
- Robot mine clearance
- Robot football
- This year...
Aim: to design a system

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- Robot football
- This year… Assistive robotics (more about this later)
Aim: to design a system

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- Robot football
- This year… Assistive robotics (more about this later)

But the goal of the course remains the same
In summary

The System Design Project is intended to give students practical experience of:
(a) building a large scale system
(b) working as members of a team
(c) documentation and presentation of a project.

We expect you to take a professional approach to all these elements.
Learning outcomes

On completion of this course, the student will be able to:

1. Work as a member of a team in designing and implementing a complex and multi-faceted system
2. Plan and monitor the effort of a project to meet milestones and deadlines, within a limited time scale
3. Draw together knowledge and understanding of wide areas of software and hardware systems
4. Demonstrate and present the outcome from a practical project
5. Document the feasibility, design and development of a potential product
1) Work as a member of a team

- In previous courses you have perhaps worked in groups of two or three, but for SDP you are in groups of 8 or 9, which is a very different experience.
- Your best individual strategy to get a good mark is to help your team to get good marks.
- Remember the key factor for good teamwork is effective communication. Patience and understanding is also important!
2) Plan and monitor the effort

- The amount of work requires division into subtasks and subteams, but also work on integration.
- Your initial time (and some time along the way) should be spent in planning, so that you have a good idea of what needs to be done when.
- Once you have a plan you are able to monitor progress and adjust how you are working (or the plan!) if necessary.
- We expect you to use project tools such as Trello, Github and Slack.
3) Draw together knowledge

- Ideally, your team is more than the sum of its members, so you should take time to identify your complementary experiences and strengths.
- You are encouraged to use (with attribution) existing codebases and designs, and should spend time exploring resources.
- This should also be a chance to put into practice much that you have learnt on your degree up till now (including Professional Issues topics).
4) Demonstrate the outcome

- On the final day representatives from a number of companies join the course organisers to judge the presentations and demonstrations of your systems.
- In the past companies represented have included Accenture, Google, Amazon, KAL and IBM.
- The representatives will be judging whether they would invest in your system and/or your team.
5) Document the design

- You will submit three group reports:
  - A proposal, submitted week 2, describing what you propose to do, including how you are organising yourselves and managing the project.
  - A user guide, submitted shortly before the demo day, documenting how your system works.
  - A technical report, submitted shortly after the demo day, giving details of the design and implementation of your system.
- There will also be an individual report (submitted with the technical report) reflecting on your own contribution.
Questions so far...?
Timetable

Calum
# Planning Week

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- Focused SDP work
- Outlining a project plan
Report Hand-ins

- 3 Group reports (15% each)
  - Proposal
  - User Guide
  - Technical
- Individual process reflection (10%)
### SDP Workshops

**Wednesday mornings:**
- Robot building
- Project management
- Quantitative analysis
- Commercialisation
- Usability
- Technical report writing
- SDP in careers

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Demo days

Wednesday mornings:

- Self-determined milestones
- Present progress
- Questions from postgrad experts
- Next demo day plans

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## Delivery Week

- **Two all-day events**
- **Specifics tbc**
- **Wednesday: Technical Focus**
  - Final demos
- **Friday: Marketing Focus**
  - Industry “investors”
  - Product sales demos
- **Prizes!**

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Domain

Chris
Assistive Robotics

- A robotic appliance that helps the human user in some capacity where they have difficulty to complete the task themselves.

- A very open domain, all that is needed is for you to identify a problem, and design a prototype solution.
Internal Transport: MiR100

- Problem: A considerable amount of staff resources are dedicated to transporting goods within a factory

- Solution: A low cost, easy to use robotic platform
Body Extension: Da Vinci

- Problem: The human hand needs to perform delicate tasks consistently well, which may not be possible due to impairment and/or time

- Solution: Extend the hand with a robotic agent that does not tire
Care: MiRo

● Problem: Elderly care is not keeping up with the demand that is drastically needed

● Solution: Create an autonomous agent that can monitor in a safe and comforting manner
Resources

Chris
Equipment

Each group will have access to:

- Raspberry Pi
- Lego EV3 brick
- Arduino board
- A personal desktop
- Near infinite supply of Lego
- £200 starting budget per group
The SDP team

Barbara Webb
Course Organiser

Garry Ellard
Technician

Calum Imrie
T.A.

Christopher McGreavy
T.A.
Mentors & Experts

**Mentors**
- Your group guide
- Will monitor your progress
- Management advice
- Project advice
- No technical guidance

**Experts**
- Group of specialists
- Office hours at AT
- Different areas of expertise
- Accessible by all teams
- Give technical advice
Your team!

Chen, Wanjing
El Houcheimi, Sarah
Macleod, Cameron
Onuonga, Edwin
Patterson, Daniel
Pogosyan, Derenik
Scott, Jeremy
Smola, Filip
Wilson, Stewart
Your team!

Banerjee-Richards, Ben
Coneboy, Harrison
Fernandez Ortiz, Aida
Frost, Andrew
Girdzius, Andrius
Gupta, Mayank
Jalal, Ojasvi
Luo, Yiming
Vanli, Sinan
Your team!

Denholm, Simon
Gill, Timmy
Howley, Harry
Jin, Ming
Peixoto Colmerauer Dos Santos, Yanna
Sanz Maroto, Jorge
Song, Cj
Wasikowska, Agnieszka
Yang, Zhenxu
Your team!

Coates, Jonathan
Horsburgh, Jack
Jiao, Zihang
Kostadinov, Ventsislav
Liive, Kristjan
Ng, Jia Yong
Pollard, Dimitri
Zhang, Caesar
Your team!

Drgon, Matus
Hanratty, James
Li, Jiening
Li, Xuran
Malon, Przemek
Mullan, Sean
Singh, Sophia
Stirling, Sean
Your team!

Davey, Tom
Gritsevski, Daniel
Hu, Songbo
Kandwal, Hemang
Kershenbaum, Benji
Masselos, Laura
Svoboda, Martin
Vu Minh, Duc
Xiong, Jiayuan
Your team!

Akinola, Daniel
Bartozzi, Christina
Davies, Dewi-Tim
Kalinak, Kali
Leaver, Sophie
Luo, Zhongyao
Singh, Gursimarjit
Yuan, Moy
Zhang, Ray Zhang
Your team!

Elo, Ben
Kollar, Samuel
Lape, Elena
Manas, Peter
Riddell, John
Routledge, Declan
Tseng, Yu Jo
Wang, Raymond
Your team!

Anastasiou, Marios
Galit, Ilie
Jourdan, Ben
Kalligeros, Pieris
Mcdevitt, Adam
Pilavakis, Nikolas
Tang, Dominic
Walpole, Ed
Weeks, Tom
Your team!

Ali, Anna
Bawden, Freddie
Cunningham, Kieran
Doherty, Claire
Dyer, Jacob
Rader, Alexander
Sen - Hasan, Oktay
Whitelaw, Zach
Yaprakov, Harry
Your team!

Binti Ahmad Ghazali, Nurul Syakirah
Chen, Cuijing
Dulan, Asmita
Fitchett, Luc
Parikh, Ishan
Pham, Minh Tri
Sadiq, Nyal
Scott, Brodie
Yang, Jerry
Your team!

Bruce, Alex
Cerny, Lukas
Dinardo, Keir
Du, Hanqin
Karaslavov, Ivan
Kuneva, Nikoleta
Phipps, Robert
Tangri, Iona
Wu, Felix
Your team!

Elsherei, Mourad
Graiver Rapoport, Joanna
Huang, Kexin
Li, Adam
Molnar, Daniel
Rice-Gray, Zeke
Varadi, Bence
Wang, Tianyu
White, Alastair
Your team!

- Aamir, Raees
- Bakhai, Ami
- Castillo Trujillo, Julia
- Hyland, Joseph
- Patankar, Qais
- Polit, Michal
- Wilhelm, John
- Yuan, Ricky
Your team!

Aminoff, Christoffer
Johnson, Ciaran
Mawhinney, Gabriel
Milou, Patricia
Nae, Raluca
Pearson-Bray, Theo
Pougala, Biko
Szewczyk, Jakub
Villalobos Lemus, Guillermo
Your team!

Burtoiu, Bianca
Campbell, Silver
Ditchfield, Jane
Jantunen, Luukas
Litschel, Kieran
Pearson, Finlay
Waugh, Kieran
Ye, Stephen
Zhang, Xu
Your team!

Dimitriou, Vangelis
Duggan, Tony
Filippakis, Nick
Howden, Luke
Kvasnicka, Erik
Modalavalasa, Likhitha
Mooney, David
Rodger, Amy
Wang, Hao
Your team!

Ap Rheinallt, Gwion
Drennan, Luke
Han, Guanghui
Karim, Sameer
McCann, Spencer
Olausson, Theo
Sheffield, Ben
Wang, David
Your team!

Bell, Elizabeth
Chen, Qinxiang
Lazarova, Mariya
Maio, Joao
Robertson, Struan
Sipeki, David
Srinivas, Sharan
Telang, Ashish
Wolter, Lasse
Your team!

Fernandez Salamanca, Blanca
Fumagalli, Aristide
Goodwin, Jaydn
Hu, Tianyi
Kosciuszko, Tomasz
Kumar, Nishtha
Rechanski, Kiril
Steele, Murray
Tarazona Querol, Manuel
Planning Week 1

Calum
Planning Week

- Monday - Introduction, Team Building and Meeting Mentors and Expert Introductions
- Tuesday - Background Research, Initial Product Decision
- Wednesday - Robot building workshop, User Stories, Subtasks
- Thursday - Robot platform workshop
- Friday - Prepare and Deliver Pitches
Summary
(what makes SDP different)

Barbara
SDP is about...

- Setting your own goals
- Dealing with a large task:
  - Not possible to do alone
  - Not broken down for you
- Dealing with the real world:
  - Planning for the unexpected
  - Planning for human fallibility
- Not just doing, but communicating what you have done.
Questions?