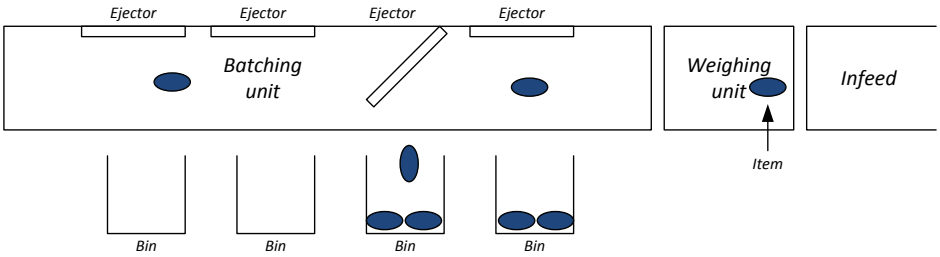
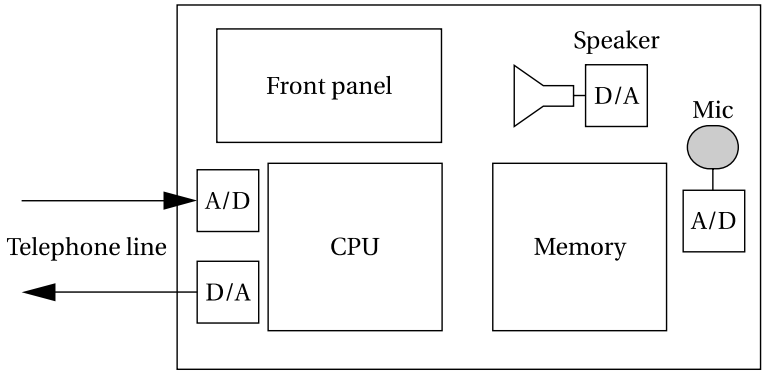
Titel	Poultry piece batching system
Kontaktperson	Troels Fedder CTO Poultry Galore tfj@iha.dk
Beskrivelse	The poultry processing company “Poultry Galore” processes poultry, e.g. chicken. One sub-process is the *batching* of pieces of chicken into fixed-size portions. Currently this is done by hand, but the company is looking to automate this process to minimize waste and maximize throughput. A candidate architecture for such a system consists of an *infeed*, a *weighing unit* and a *batching unit* as sketched below.  • The *infeed* is a conveyor belt which accelerates the pieces of chicken (called *items*) to match the speed of the weighing unit and batching unit conveyors. • The *weighing unit* weighs the items as they move across the unit. • The *batching unit* consists of a conveyor on which the items travel. When an item is in the correct position it is ejected into bins using ejectors. When a bin is full, it is manually emptied and further processed.

Titel	Digital Answering Machine
Kontaktperson	Stefan Hallerstede CTO “We hear voices” sha@iha.dk
Beskrivelse	Design a digital telephone answering machine. The system will store messages in digital form rather than on an analog tape. The answering machine will ultimately be connected to a telephone subscriber line. At the other end of the subscriber line is the central office. All information is carried on the phone line in analog form over a pair of wires. In addition to analog/digital and digital/analog converters to send and receive voice data, we need to sense two other characteristics of the line. • Ringing: The central office sends a ringing signal to the telephone when a call is waiting. We use analog circuitry to produce 0 for no ringing and 1 for ringing. • Off-hook: The telephone industry term for answering a call is going off-

	hook; the technical term for hanging up is going on-hook. (This creates some initial confusion since off-hook means the telephone is active and on-hook means it is not in use, but the terminology starts to make sense after a few uses.) Our interface will send a digital signal to take the phone line off-hook, which will cause analog circuitry to make the necessary connection so that voice data can be sent and received during the call. Assume that the interface is not to the actual phone line but to some circuitry that provides voice samples, off-hook commands, and so on. This is the hardware design of the answering machine unit: 

Titel	Skema planlægning
Kontaktperson	Bente Besenbacher Uddannelsesansvarlig Sundheds IT uddannelsen Ingeniørhøjskolen Århus Universitet Email: bbe@iha.dk
Beskrivelse	I forbindelse med planlægningen af skemaet for næste semester er der en lang række faktorer som skal gå op. Pt foregår skemalægningen manuelt og det er en manuel proces at sikre, at alle randbetingelser for skemaet er overholdt. Der ønskes et system til (delvis) automatisering af skemalægningsprocessen.

Titel	Hotspot events
Kontaktperson	Aage Birkær Laursen CDL Ingeniørhøjskolen i Århus Email: abl@iha.dk
Beskrivelse	På IHA holdes en række arrangementer for undervisere – de såkaldte hotspots. Disse er pædagogiske events som har til formål at give underviserne på IHA ny inspiration til at forbedre deres undervisning. Hvert semester planlægges næste semesters hotspots. Der er en eller flere undervisere på et hotspot, der skal sendes invitationer ud til underviserne, registres hvem der deltager, bestilles forskelligt (lokale, forplejning mm.) og endeligt skal der udsendes et evalueringsskema til deltagerne.

	Dette sker manuelt i dag, der ønskes et system som kan (delvis) automatisere processen.

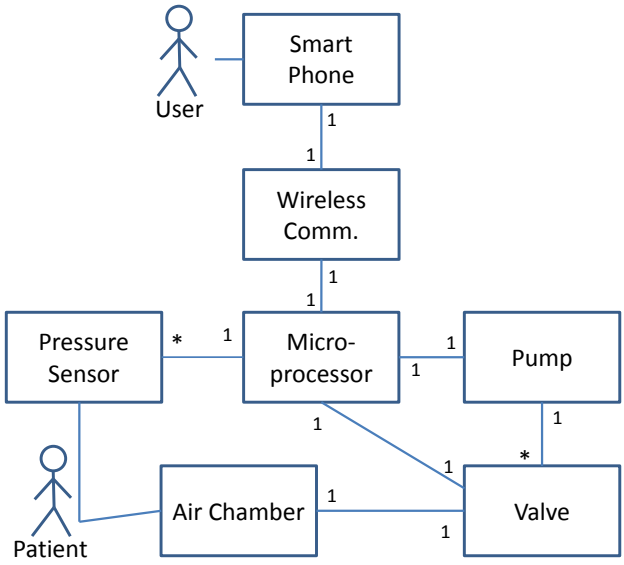
Title	Training Information System
Contact person	Tina S. Hetherington Test Manager DAHLIA IBM GBS Bytoften 1, 8240 Risskov, Denmark Email: TSH@dk.ibm.com
Description	Each second and third working day of a month, a large multinational company provides introductory training to employees who have joined the company in the previous month, called joiners. In this course, a member of the Group Board and members of the National Board give talks, and teachers introduce the joiners to the philosophy and operational processes of the company. Usually the joiners are divided into four to nine groups, which follow the course in parallel. The Training Information System (TIS) supports the course coordinator and other personnel of the Training Department in preparing and organizing the course. The course coordinator uses the system to retrieve joiners from the personnel Information System through an online connection. On request, the system assigns the joiners to groups for the 2 days, trying to avoid allocating joiners from the same office to the same group and trying to ensure that the groups on the second day consists as much as possible of people who were not in the same group on the first day. This way, each participant meets as many people from different offices as possible. On the request of the coordinator, the TIS print the lists of participants per day per room and include the total number of people on each list. The coordinator then gives these lists to the speakers. The system also prints badges, which are prepared the day before the course starts. Before the course starts, all badges plus course material are laid out on a desk. Between 7:30 and 8:30 in the morning of the first day, joiners arrive and collect their badge and other material. Usually, some people turn up who are not on any list; these were not yet registered in the personnel Information System when data were downloaded. These are directed to a registration desk, where their data must be entered in the system and a badge printed. The system also allocates these unexpected participants to the personnel Information System. At any time during the course, a speaker may request that the coordinator provide an updated list of participants for his or her course. The coordinator then prints this list on the spot and hands it to the speaker.

Title	Handling of exercises and reviews for discrete mathematics
Contact person	Joey Coleman jwc@eng.au.dk
Description	The Discrete Mathematics course taught to engineers at AU has an unusual exercise evaluation scheme that involves a very high degree of student participation and a lot of coordination on the part of the lecturers. We wish to automate as much of the "bookkeeping" activity as possible, including: • Student submission of weekly exercises, potentially jointly • Randomised assignment of exercises to multiple student peers for

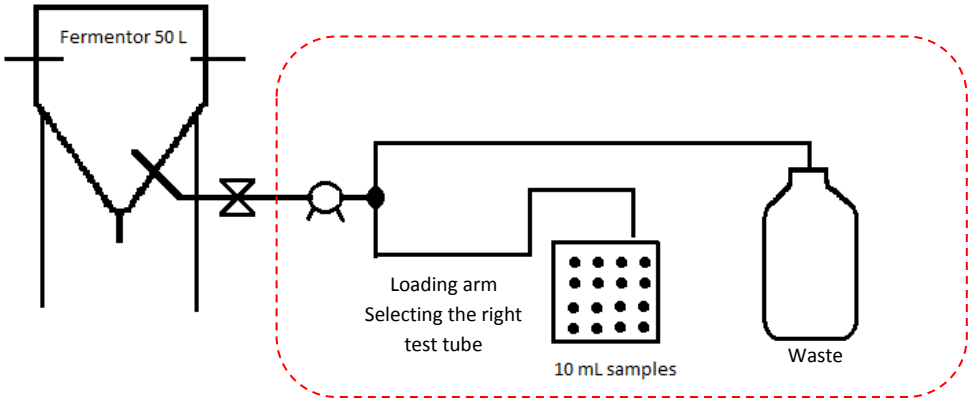
	review • Delivery of submitted exercises to their assigned peers • Control of the number of peers to which an exercise is assigned • Peer submission of review, including comments and an ok/not ok indication • Lecturer overview of all exercises, etc • Lecturer upload of exercises • Lecturer assessment of both initial exercise submissions and submitted reviews • Possibility for re-submission of the initial exercise • Ensuring that repetition of assignments of a given student to a (set of) peer(s) is minimised Use of the system should be easy, and should not require the use of logins beyond the usual AU user ids.

Title	Airport surveillance system
Contact person	Sune Wolff swo@eng.au.dk
Description	Airport security needs to ensure that unauthorized persons are not running around on the airstrip or on other unwanted locations. We are in need of a surveillance system that can automate a lot of the surveillance tasks. Such a system could include: • Central monitoring station where security personnel can get an overview of the current security situation in the airport; • One or more radar(s) to track persons and vehicles within the airport perimeter; • Zones defining safety critical areas within the airport perimeter; • Rules defining unacceptable behaviour of persons and vehicles within the defines zones; and • One or more camera(s) to follow persons or vehicles that have broken any of the rules. The system must ensure that: • Intruders are continuously followed by at least one camera; • Cameras maintain a sufficient zoom level to enable the security personnel to visually identify the intruders; and • The entire airport (2 by 3km) are covered sufficiently.

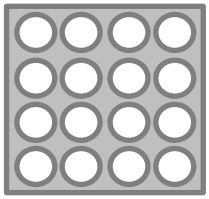
Title	Intelligent Medical Compression stockings
Contact person	Finn Overgaard Hansen CTO E-stockings International foh@iha.dk

Description	E-stockings International produces medical compression stockings used by people with leg venous insufficiency and for wound healing. The company has just initiated a new development of an intelligent compression stocking, where the needed pressure is supplied by an electro mechanical system controlled by a microprocessor – a classical embedded system. A smartphone is used for configuration and calibration purposes as well as for testing purposes etc. The pressure on the legs is obtained through a set of air chambers with different pressure in each chamber. The hardware architecture is shown on the following figure. 

Title	Is the beer right?
Contact person	Christian Dannesboe & Anders Thidemann chda@iha.dk akth@iha.dk Aarhus School of Engineering Processtechnology, Fermentation Lab 604 Dalgas Avenue 2 DK-8000 Aarhus C
Description	The production of beer is a time-consuming process that requires strict quality control. Fermentation is the process that converts sugar into alcohol, and this process normally takes between 7 to 10 days. Some key analysis can be done online, but others are handled off-line and require samples to be taken at fixed intervals (ie. every 3rd hour). This project covers the fabrication of a beer autosampler. The device will enable students to enjoy the comfort of a warm bed, as their samples are automatically tapped from the fermentor during the night. Sketch of the system:



The autosampler must be able to handle filling of test tubes in ascending order, with the test tubes being arranged in a 4x4 metal matrix (equipped with cooling).

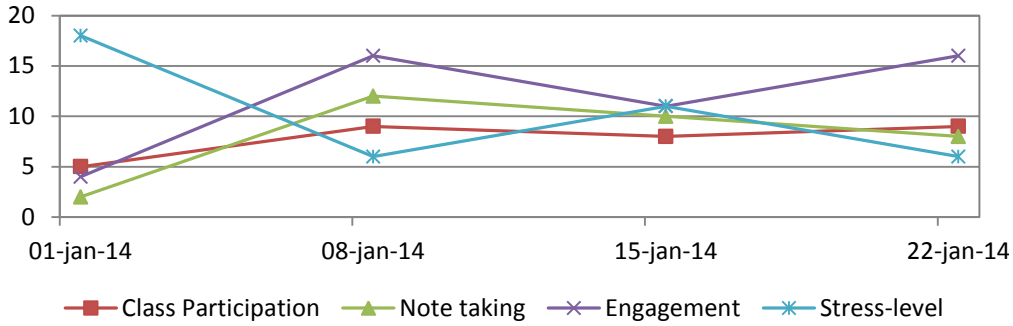


To ensure that "fresh" beer goes into each test tube, the sampling hose must be flushed every time a beer sample is filled into a test tube.

A autosampler status screen must display the number of test tubes filled, along with the deadline for intervention.

Title	Evaluating students' academic self-efficiency during a course
Contact person	Christian Dannesboe (chda@iha.dk) Aarhus School of Engineering Processtechnology Dalgas Avenue 2 DK-8000 Aarhus C
Description	In 1987 Robert Wood and Edwin Locke developed a questionnaire used to evaluate the academic performance of their students. The questionnaire enables the calculation of a student's "academic self-efficiency" based on rankings within specified skills (ie. note-taking, memorization, exam concentration) The project covers the programming and launch of a local AU system to handle the questionnaire, as well as storing the rankings of students' academic self-efficiency in a local SQL database. The system: Every week a short questionnaire is (auto)send to all students in a class and they submit new evaluations. Once the data is received, their academic self-efficiency score is calculated, and a trend-line graph is sent back to the user. The graph shows the self-efficiency history, and thereby allows the user to identify areas for development as well as spotting changes in performance.

Preliminary sketch:



Requirements:

- The access to student's individual data must be password protected
- The questionnaire + feedback must be OS independent (browser interface?)
- The course instructor must be able to pull out summarized trends on the entire class
- The course instructor must be able to verify that students submit data
- The course instructor must be able to schedule automated emails with a link to the questionnaire.