Functional behavior	The robot - in isolation - does not perform its intended basic functionality according to specification during the demo (- 20 points)	Evidence has been given that the robot - in isolation - performed its intended basic functionality according to specification at some time (+ 20 points)	The robot - in isolation - performs its intended basic functionality according to its specification during demo/testing (+ 20 points)	The robot is sturdy, and mechanically and electronically well-built (+ 10 points)	The robot reports on its internal state in - for debugging purposes sufficient - detail (+ 10 points)	*The robot automatically stops working when there is no input of discs* (+10 points)	*The robot informs user about tasks done in the factory with different sound notifications* (+15 points)
Fault detection	The robot detects faults that did not actually occur - false positives (- 15 points)	Evidence is provided that the robot was able to detect and/or identify at least three distinct types of faults at some time (+ 10 points)	The robot ***detects*** three or more types of faults as faults during demo/testing (+ 15 points)	The robot ***identifies*** three or more distinct types of faults during demo/testing. (+ 10 points)	The group is able to ***predict*** correctly how the robot will react to three 'surprise faults' invented and introduced by the jury during testing (and this reaction is non-trivial). (+ 15 points)	*The robot can recover from detected faults by guiding the user.* (+15 points)	*When an intensive fault detected, the robot automatically stops powering the motors to ensure that any component in the robot does not take a permanent damage* (+15 points)
Engineer-ing process	System spec The robot has been well specified. I.e. a clear set of use-cases, usage-constraints, and safety-properties is given that respectively describe intended behavior, desired operating conditions, and behavior that is to be avoided by the robot at all times. (+ 20 points)	Component and unit spec There is a clear decomposition of functionality of the robot into components/subsystems, and of components into units, and the function of these separate components and units has been well specified. (+ 20 points)	Implementation Good programming practice is shown. There is evidence of a good code-and-model reviewing process. Code has been properly commented and documented. (+ 15 points)	Implementation Code is based on a model-based design workflow. There is a clear higher-level model indicating how the group thinks about the software, and a clear link between that model and the software itself. (+ 15 points)	System and component test Testing scenarios are available and have been logged that cover each of the points in " Functional behavior" and " Fault detection" . (+ 20 points)	*Test Coverage: scenarios are available and have been logged that cover all parts of the code. Coverage means, that for each line of code there is a test that 'touches' it.* (+15 points)	*A simulation model has been used for "simulation in the loop" testing of the control software. Score may vary depending on the detail ofthe model.* (+5 to +20 points)
Formulate your group challenge	*Melody: The robot plays a melody that is correctly synchronized with pattern of sorting the discs during the execution of basic functionality* (+20 points)	*Melody: The robot plays a melody that is correctly synchronized with pattern of sorting the discs or reports the issue to user without force trying to complete the task when a fault in the robot occurs* (+10 points)	*Arranging Discs: The robot arranges discs correctly in a chosen pattern after sorting during the execution of basic functionality* (+20 points)	*Arranging Discs: The robot arranges discs correctly in a chosen pattern after sorting or reports the issue to user without force trying to complete the task when a fault in the robot occurs* (+10 points)	*Arranging Discs and Melody: The robot reacts to two or more distinct types of faults that occur in it, in a way that influences the remaining robots in the factory as little as reasonably possible.* (+15 points)	The user can close the melody or arranging discs functionality of the robot manually. (+10 points)	The challenges have implemented without affecting the basic functionality of the factory. (+15 points)
Reporting	Proper logs and records of decisions have been made of all the activities within the DBL. The logs clearly reflect which activities were carried out and when, giving enough details for others to reproduce any experiment or other activity. The records of decisions clearly state which decision was taken and when, which problem it is intended to solve, how it will solve the problem, which other alternatives were considered and why they were discarded, what the risks are of the chosen decision, and who is responsible for carrying it out. (+ 20 points)	Logs, records of decisions, and final poster all clearly explain the system on two levels of abstraction. A high - architectural - level, at which the overall workings are explained in a way that can be grasped quickly, and a low - implementation - level at which the details are given with a reference to the high-level model explaining why the details are such. Clear figures are used for the explanation of the high level. The logs and records of decisions contain clear references to those high-level pictures, thus linking low level descriptions to the higher level architecture. (+ 20 points)	The final poster has a clear structure. It covers at least briefly the user-requirements (system level), robot specification and software specification (component level), robot design and software design (unit level), and robot implementation and software implementation. References are given to the logs and records of decisions, pointing out details of design decisions, details of tests, etc. (+ 20 points)	The general appearance of the poster is pleasing. Tables and graphs have been properly laid out. Figures are readable and free of distractions that do not contribute to the goal of the report. The logs, records of decisions, and poster have been written in correct British or American English (+ 20 points)	The group has given a convincing final demo and pitch, well rehearsed, structured, complete, well-tuned to the audience, enjoyable, yet concise. (+ 20 points)	*The group has given an outstanding mid-term presentation, both in content as in presentation.* (+20 points)	The group has backups of code, simulation etc. There is a working video of the robot available for possible problems that may occur during the final demo. (+20 points)
Various	A deadline or other group-responsibility was missed (- 5 points per deadline)	Practical material and locker-keys were not returned in time (- 40 points)	Exceptionally bad functioning of the group as a whole on multiple occasions (- 40 points)	Room for the student-assistants to express their feelings about this group (+/- 20 points)	Room for the practical coordinator / grading teacher to express his/her feelings about this group (+/- 20 points)	Room for rewarding points for various other outstanding achievements (+ 30 points)	The group has managed to work collaboratively with equal work load. (+20 points)

Table 1: Guideline for the final scoring by the practical coordinator, tutors, and jury. The blue and green areas are considered essential and cannot be adapted! To calculate the final grade for the group, first check if the blue score is higher than 120, and check that the green score is higher than 60. If not, the group

should not pass the course. If the blue and green scores are sufficient, the final grade is determined by weighing: 4 times the percentage scored in blue boxes, 1.5 times the percentage scored in green boxes, and 4 times the percentage scored in the white boxes. The scores in red and yellow boxes may be subtracted or added to blue, red, or white at the discretion of the jury.