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| **#** | **Student****Some numbers of teams and team members have been changed.****This is now an actual updated list of teams and their tasks.** | **Homework 1 Standard Project- Evolutionary Programming****This homework must be software****This is strictly an individual homework.** | **Homework 2** **Standard Project- Search and Labyrinths** **This homework must be software This is individual or group homework.** | **Homework 3** **Standard Project- Fuzzy Logic and Neural Nets,** **Inverse kinematics This homework must be software This can be a group homework.** | **First Project Hardware and Integration tasks** |
|  | **MCECSBOT PROJECTS** | **Homework 1 Proposal.** |  **Homework 2 Proposal.** | **Homework 3 Proposal** | **Proposal for first tasks in practical robot design.** |
|  1 | Tu TruongTutruong89@gmail.comUndergraduate embedded systemsLego robot, gun turretAutomated validation for Intel, C, C++, ARM, scripting Theory 30%Programming 30%Practical 40% | 1. Create a model of Robot Arm kinematics for your robot arm (do this together you’re your team partner).
2. Visualize arm motion graphically. (together with partner). Use any available graphics software. Ask Mathias Sunardi for the software and model of Erin.
3. Create or adapt an editor of motions so that we will see on screen how your robot arm moves. (share work with partner).
4. Edit some motions (individual). Illustrate how you can change motion quickly in your editor and see the motion on the screen.
5. Work on the format of the motion to be stored in a library of motions.
6. Write report (individual)
 | 1. Write software to use search to avoid hitting the body of the robot by the arm itself.
2. You may use inverse kinematics or only forward kinematics with some imposed by you fixed constraints.
3. Show examples
4. Document in a report
 | 1. Write any motion control software for your arm using any ideas from fuzzy logic, neural nets or inverse kinematics.
2. Show examples
3. Document in a report
 | **TEAM 1.****Robot Arm for MCECSBOT** 1. Write a plan of your robot arm design together with all technical drawings.
2. Write a list of components and where you propose to purchase them.
3. Collect materials that you need. Start early on this.
 |
| 2 | Berrian Travis J Undergraduate Computer Engineering, Embedded Systems***Very mechanically inclined, many practical engineering skills***, pneumatics, welding, fabrication. | 1. Create a model of Robot Arm kinematics for your arm. (together with partner).
2. Visualize arm motion graphically. (together with partner).
3. Create or adapt an editor of motions so that we will see on screen how your arm moves(share work with partner).
4. Edit some motions (individual)
5. Write report (individual)
 | Same as Tu Truong. With time you may propose your own variants and modifications. |  Same as Tu Truong | **TEAM 1.****Robot Arm for MCECSBOT**Contact Mathias Sunardi to get Erin’s work, components and models. You can work on the same arm as her or on your own arm design. |
| 3 | Adams JesseJjadams@pdx.edu Graduate Enjoys projects, does well.171,102. 510, 520RC car using Arduino, closed loop feedback. LED CubeRobotic Club. Intel server. | 1. Learn theory of Kalman filter for Sonar
2. Write software of Kalman Filter in Matlab or C or C++ (in a team)
3. Learn about applications of Kalman Filter (individual)
4. Write report (individual)
 | 1. Analyze errors from sonar and from KINECT in different parts of the FAB and EB.
2. Improve software.
3. Write report (individual)
 |  | **TEAM 2.****Sonar and Kinect Navigation for MCECSBOT**Continuation of Spring Project |
| 4 | Barrett JeramyJeramy.barrett@gmail.comUndergraduate CS161,CWorks in a company software, Lego robots at Pacific University – 4 courses - ping pong ball navigation. Long experience with computers and hardware. Good grasp of mechanics and large electrical systems. Team,Theory 10%, programming 20%, application build 70% | 1. Learn theory of Kalman filter for Kinect
2. Write software of Kalman Filter in Matlab or C or C++ (in a team)
3. Learn about applications of Kalman Filter (individual)
4. Write report (individual)
 |  |  | **TEAM 2.****Sonar and Kinect Navigation for MCECSBOT**Continuation of Spring Project |
|  |  | **HOMEWORK 1** | **HOMEWORK 2** | **HOMEWORK 3** |  |
| 5 | Barton MitchMitch\_barton@yahoo.com Undergraduate CS101,CA102, 371,372,585,586BS in Physics. Much design experience digital analog. Team,Theory 30%, programming 20%, application build 50% | 1. Learn in detail about the new laser sensor that I emailed you about (individual).
2. Make some experiments with software from company for this sensor.
3. Learn about applications of Kalman Filter for laser sensors (individual)
4. Write report(individual)
 |  |  | **TEAM 3.****Laser** **Navigation for MCECSBOT** Software - Continuation of Spring Project, Hardware new. Also connect head and integrate with body motions. |
| 6 | Lamb Philpjl@pdx.eduUndergraduate C# software engineer for 4 yearsMicroprocessor based embedded systems TeamTheory 30%Programming 40%Robot practical 30% | 1. Learn theory of Kalman filter for laser sensor
2. Write software of Kalman Filter in Matlab or C or C++
3. Learn about applications of Kalman Filter(individual)
4. Write report(individual)
 |  |  | **TEAM 3.****Laser based navigation****For MCECSBOT**Software - Continuation of Spring Project, Hardware.contact Omar MohsinThe first task all all MCECSBOT teams is to put the robot together as it was originally. Add head. |
| 7 | O’Connell Conorcono@pdx.edu Undergraduate Computer engineeringC, C++, interfacesOPSU 2010 ROV project Tested on theory, work in group40% theory, 40% programming, 20% robot design. | 1. Learn theory of Kalman filter for laser sensor
2. Write software of Kalman Filter in Matlab or C or C++
3. Learn about applications of Kalman Filter(individual)
4. Write report(individual)
 |  |  | **TEAM 3.****Laser based navigation****For MCECSBOT** Software - Continuation of Spring Project, Hardware new. |
|  | **GUIDEBOT PROJECTS** |  |   |  |  |
| 1 | Box Davedavidebx@gmail.comUndergraduate Capstone video tracking, 371,372,373,351,485,486C programming, Arduino, ***Camera Gimbal object tracking system (captone)*** Watt measuring device Team. Theory 25% Programming 50%. Design 25% | 1. Write or adapt an editor for GuideBot robot motions of body, arms and head.
2. Use this editor to edit some motions of arms and head.
3. Write a report (individual)
 | 1. Create the data base of locations and all other information for the robot.
 |  | **TEAM 4****GUIDEBOT DESIGN** Continuation of Spring Project. Integrate head, arms and body/base of GuideBot. |
| 2 | Brams DylanDylan.brams@gmail.comUndergraduate C, C++, operating systems, perl, Verilog, C#, ***ATMEGA design project,*** game programming, dynamic prediction algorithmNo bigger project experience, LEADER | 1. Write or adapt an editor for GuideBot robot motions of body, arms and head.
2. Use this editor to edit some motions of the base.
3. Write a report (individual)
 |   |  | **TEAM 4****GUIDEBOT DESIGN** Continuation of Spring Project |
| 3 | Walker Uriaeuwalker@pdx.eduUndergraduate C, C++, C161, CS162, 163No robot experienceVerilog, 371,372, built computers Team or aloneTheory 20%Programming 40%Robot building 40% Interactive Motion Programmer. | 1. Use GP or GA to evolve motions and interactions of GuideBot Robot.
2. Write a report (individual)
 |  |  | **TEAM 4****GUIDE BOT DESIGN** Continuation of Spring Project |
| 4 | Bernard RichardRbernard@pdx.eduUndergraduate CS333 operating systems, C, C++, Java, Arduino. PCI USB linuz driver, voice driver RS232 Parallax BoeBot, line following, embedded pneumatic controller for a gun TeamTheory 35%Programming 30%Practical 35%Hardware/software | 1. Learn the work done by the Spring and Summer teams on GuideBot Navigation (See Omar and Mathias)
2. Improve their report, give more examples.
3. Cooperate with team member who works on Kalman filter.
4. Write a common report with him, show your part and his part.
5. Write a plan of future work
 |  |  | **TEAM 5****NAVIGATION FOR GUIDEBOT** Continuation of Spring ProjectWork with other GUideBot team on attaching two KINECTs to the robot. |
| 5 | Qedan YusufYusuf9191@gmail.comUndergraduate CS161,CS162, CS163, 333, ECE102, data structures, games FIRST FPGA, accelerometer hardware software, analog TeamTheory 33% Programming 33% robot building 33% | 1. Learn theory of Kalman filter for GuideBot navigation with Kinect and Sonars.
2. Write software of Kalman Filter in Matlab or C or C++
3. Learn about applications of Kalman Filter for robots similar to GuideBot (individual)
4. Write report (in team)
 |  |  | **TEAM 5****NAVIGATION FOR GUIDEBOT** Continuation of Spring Project |
| 6 | Saadoun Omarsaadoun@pdx.eduUndergraduate Lego, FRC, C, C++, 371,372,373,171,351, Large mechanical robot for FIRST | 1. Learn Microsoft tool for speech synthesis
2. Demonstrate robot speaking about topics related to laboratories, faculty, etc
3. Write a complete report documenting your work.
 |  |  | GuideBot Mechanical Design and basic motions, interactionsARM design. Possible Robot Vision? This project is yet not clear. Alone? Vision? Motions? Dancing? Interaction? |
|  | **VARIOUS** |  |  |  |  |
| 1 | Bradon KanyidUndergraduate Computer Engineering,CS163, 201,333,494IRC bot for URL database logging, in python/sq lite. Ported emulator from PC to a portable embedded system. Many other small projects in C, ***15 years experience in C.*** FPGA, Embedded systems, Machine Learning, ***LISP dialect, likes theory******25 theory, 50 software, 25 robot design.*** | 1. Learn inverse kinematics problem theory.
2. Solve inverse kinematics problem for robot arm using evolutionary programming.
3. Write an individual report
 |  |  | **Magellan Competition.** |
| 2 | Clark Chrischrisjclark@gmail.comUndergraduate Computer Engineering C,C++,Python Good programmer, Mechanical , hardware software, Arduino. 25% theory, 25 % programming, 50% practical AI, ML, Mechanics, Kinematics, Motion | 1. Present the software concept of your Magellan robot.
2. Write the software that uses sensors for Magellan application
3. Write an individual report
 |  |  | **Magellan Competition.** |
| 3 | Tricker Tylertntricker@gmail.comSignal analysis, concurrent systems, closed loop systems, distributed processing, dynamic applications, pathfinding inverse kinematics, heterogeneous systems, group theory, calculus | 1. Learn navigation theory (localization, mapping, SLAM, etc) for Magellan robot.
2. Write a simulator.
3. Write an individual report
 |  |  | **Magellan Competition.** |
| 4 | Croos Merianmxc@rentrak.comGraduate PHDExtensive experience in software, C, C++, C#, Perl. Prefers aloneTeam OK50% programming50% robot building Anything roboticsHome automationAgricultural robotsVision based system such as tomato picker which can be deployed in home gardens or Project assigned by Perkowski | 1. Learn navigation theory (localization, mapping, SLAM, etc) for agricultural robots
2. Write a simulator of your agricultural robot – simulate planning and navigation in some garden or field.
3. Write an individual report
 |  |  | **Robot Navigation for Agriculture** |
| 5 | Engstrom Michaelengstrom@pdx.eduGraduate SOC, Embedded, VHDLVirtual line following robot, ***counting robot hand Spring 2012***, self-leveling platform Robot motion, environment-based decision+behavior,FPGA programming, Servo control, Video output, virtual robot | 1. Learn kinematics theory for robot arm of your choice.
2. Write inverse kinematics software
3. Write an individual report, possibly use the graphic simulator of Jason (there are many software tools that can be used for this).
 |   |  | **TEAM 6****HANDSHAKING ROBOT**Which robot? Which hand? What sensors? |
| 6 | Peterson JasonJason.peterson03@gmail.comUndergraduate C# database tool designC++, C, Python, Java, Perl.Theory 20%Programming 30%Building 50% Kinect vision for facial recognition,Change to new project? | 1. Write a graphic simulator of the handshaking arm
2. Demonstrate various handshaking behaviors on the simulator
3. Write an individual report
 |  |  | **TEAM 6****HANDSHAKING ROBOT** |
| 7 | Goetz Andyagoetz@pdx.eduCECS161,163,333,494, maze solver Dijkstra, Atmel several50 % programming,25% theory25% robot buildingVice President for artistic design | 1. Learn theory of voting (as discussed) GOOD idea.
2. Write software
3. Write an individual report
 |  |  | **TEAM 7****EVOLUTIONARY ART** |
| 8 | Huffman Camillecamilleh@cecs.pdx.eduUndergraduate Computer EngineeringC,C++,operating systems, 333, CS202***Quadcopter concurrency validation*** Art generation | 1. Read about art-generating software.
2. Using known packages or from scratch, generate artwork for your robot .
3. Show examples.
4. Write report.
 |  |  | **TEAM 7****EVOLUTIONARY ART** |
| 9 | Riedl KevinKRield@cecs.pdx.eduIRC python bot, 371,372,373, 333, 495,202,201 Physics, Chemistry biology485Quadrotor at PSU, fixing things, electronics and computersNumerous Arduino Theory 20% Software 60% robot design 20% Motion, vision, mechanics, construction, programmingManager, leader. H1-GA for their task | 1. Read about GA and other evolutionary methods to generate art.
2. Document this work, give references.
3. Discuss with team members how the stuff will be integrated.
4. Create GA and experiment with various parameters related to crossover, mutation, fitness function and selection.
5. Discuss user interface.
6. Show examples.
7. Write report.
 |  |  | **TEAM 7****EVOLUTIONARY ART** |
| 10 | Jain PunyaPunya10@gmail.comUndergraduate Computer ScienceC,C++, Java, Python, Matlab, html, scripting.Game design, Scripting in Intel, ***much industrial experience in software******Lego robotics 7th internationally***, organic chemistry, music (opera singer) biology. FPGA microcontrollers, ECG, pulse oxymeter. Work alone, team is also OK. 30% 70% software Would like to make a robot sing opera using Fourier analysis of signals. Opera singer, knows theory. | 1. Read about related research. Document it in a good report.
2. Using known software packages or from scratch, generate one example of a singing robot (do not worry about interface or compiling techniques at this time)
3. Present a general idea how a music notation can be converted to a song performed by opera singer
4. Discuss future user interface.
5. Discuss future transformation methods. Show examples.
6. Write report.
 |  |  | **Individual Project:** Robot Opera SingerFrom vowels |
| 11 | S TUndergraduate C, C++, Matlab, Java, circuit designmedication dispension systems Individual project Theory 45% Programming 45% robot building 10% Image processingGenetic algorithmEmbedded software and hardware | 1. Read about GA and other evolutionary methods for your application
2. **WE NEED TO MEET AND DISCUSS IN DETAIL.**
 |  |   | **TEAM 8****KINEMATICS OF ANIMALS**  |
|  | **ROBOT THEATRE** | <http://web.cecs.pdx.edu/~mperkows/SUMMER/index.html>The text of the play is here. Act 1 is not for your class. You animate acts 2,3 and 4. |  |  |  |
| **1** | Wolfe Devindevin@wolfepac.netUndergraduate, Computer Engineering351 Verilog,371,372,373,333,fsm projects, PCB design.C, C++, C161, CS162, 163, Java, Python.Radio, digital counters, FPGA, Verilog, linked lists, tree sorting, search programs, speech interface, Linux drivers, Team leader33% Progr,33% theory, 33% mechanical design | 1. Read MS Thesis of Aditya Bhutada.
2. Learn and understand his software
3. Adapt his software to Niels Bohr Robot
4. Write an individual report but coordinate with your team partner.
 |  |  | **TEAM 9****ROBOT THEATRE .****NIELS BOHR ROBOT**This is predominantly software project related to using sensors and executing scripts that are called from radio-controlled interface. The robot will have autonomous and remotely controlled actions and is destined for robot theatre. |
| 2 | Yang Shi Yangshi.psu@gmail.comSome FPGA experience, C, Verilog Programming 50%Robot Building 30%Theory 20% Motion generationInteraction | 1. Read reports about Bohr robot from 2009 and 2010.
2. Learn and understand software for speech synchronized with emotional gestures.
3. Demonstrate some new behaviors on a robot
4. Write an individual report but coordinate with your team partner.
 |  |  | **TEAM 9.****ROBOT THEATRE.****NIELS BOHR ROBOT** |
| **3** | Dang KhiemMail2khiem@gmail.comUndergraduate Computer Engineering. Some C,C++, simple 372 projects. FPGA, ***PC design***. ARM assembly. No robot experience. ***Build speaker systems.*** team20%theory,30% software, 50 % robot design | 1. Use Aditya Bhutada’s editor to implement part of robot theatre play Incredible Quantum Tablet (from Internet). Work with one individual KHR 1 robot. Call it KHR1A.
2. Create a video.
 |  |  | **TEAM 10****LITTLE ROBOT STAGE AND PERFORMANCE. Robot KHR-1** |
| 4 | Duran Randyrduran@pdx.eduUndergraduate Consumer electronics, electronics technician, C, C++, Java, Matlab, microcontrollers. 50% software, 50% practical design . GuideBot | 1. Use Aditya Bhutada’s editor to implement part of robot theatre play Incredible Quantum Tablet (from Internet). Work with one individual KHR 1 robot. Call it KHR1B.
2. Create a video.
 |  |  | **TEAM 10****LITTLE ROBOT STAGE AND PERFORMANCE****Robot KHR-1** |
| 5 | Paul Prince | We need to meet and discuss |  |  | **TEAM 11****LITTLE ROBOT STAGE AND PERFORMANCE****Robot ISOBOT and others, lights** |
| 6 | Omar Alattar907 574 672omaralattar@frontier.comI would like to do a robot theater project with a greater emphasis on programming and maybe a little theory (10%?). I would like to do very little if any mechanical robotics.I was also wondering about getting access to the robot theater lab, a student Monday was saying something about emailing him to get access but I wanted to make sure this was correct before doing so, can you verify teamVision?Control?FPAA , memristor? Advanced control? |  |  |  | **TEAM 11****LITTLE ROBOT STAGE AND PERFORMANCE****ISOBOT and others, lights**No mechanical, only software and sound/light control |
| 7 | Matthew BranstetterMatthew.branstetter@hotmail.com161,163,351, Verilog, some arduino C++ Theory 20%, programming 20%, robot design 60% | 1. Read work of previous student **Josh Gerwin** about dancing hexapod.
2. Learn and understand his software
3. Show one practical application of his software to **dancing hexapod** robot
4. Write an individual report but coordinate with your team partner.
 |  |  | **TEAM 11****LITTLE ROBOT STAGE AND PERFORMANCE****Dancing hexapods.**No mechanical, only software and sound/light control |
| 8 | Hanks Codycody@byterule.comUndergraduate C#, repair PCs, some robot work. 33% each, robot doll walks, talks, etc | 1. Read MS Thesis of Aditya Bhutada.
2. Learn and understand his software
3. Show one practical application of his software to **Albert Einstein** robot
4. Write an individual report but coordinate with your team partner.
 |  |  | **TEAM 12.****ROBOT THEATRE.****Albert Einstein** **ROBOT**The goal of this project is to integrate Einstein Robot to the theatre framework of Aditya Bhutada. Demonstrate practical scripts. |
| 9 | Tejashri ChaudhariTdc2@pdx.edu | 1. Read MS Thesis of Aditya Bhutada.
2. Learn and understand his software
3. Show one practical application of his software to **Albert Einstein** robot
4. Write an individual report but coordinate with your team partner.
 |  |  | **TEAM 12.****Albert Einstein** |
| **2** | Ali T. AlaliAta088@hotmail.comArduino,Matlab, C good, C++ moderateControl System design 451371, 441, 410 power 461 communicationNo big project experience Team50% robot design20% theory30% software Automatic and remotely controlled robots, Iphone control, ipAD, Speech interaction with robot | 1. Read MS Thesis of Aditya Bhutada.
2. Learn and understand his software
3. Show one practical application of his software to Marie Curie robot
4. Write an individual report but coordinate with your team partner.
 |  |  | **TEAM 13****ROBOT THEATRE .****MARIE CURIE ROBOT**This project is 50% design. You use the existing completed head of Marie Curie and her body. You add sliding motion and legs. No work on arms is expected. |
| 14 | Amin Acmassian No robot experience, C, C++, MS Comp Engn. |  |  |  sensors | **TEAM 13****ROBOT THEATRE .****MARIE CURIE ROBOT** This project is 50% design. You use the existing completed head of Marie Curie and her body. You add sliding motion and legs. No work on arms is expected. |
| 11 | Brawn Maiseemaisee@pdx.eduUndergraduate Capstone video tracking, 371,372,373,351,485,486C programming, Arduino, ***Camera Gimbal object tracking system (captone)*** Watt measuring device Either, better alone. Intelligent robotics, machine learning, HRI programming. | 1. Create a model of Robot Arm kinematics for your arm.
2. Visualize arm motion graphically.
3. Create or adapt an editor of motions so that we will see on screen how your arm moves
4. Edit some motions
5. Write report
 |  |  | **TEAM 14****Robot Arm Design for robot theatre** ***Individual Project*** This arm can be potentially used later on on Marie Curie robot |
| 13 | Rami Alshafi | 1. Take from Perkowski software for feature extraction and other image processing software for KINECT.
2. Add morphological and convolution-based software.
3. Use this software to find humans, obstacles, walls, windows, door and other objects.
4. Document work with several examples.
5. Do a class demo.
6. Write a report.
 | 1. Install speech synthesis software
2. Link this software to the image recognition software from Homework 1.
3. Modify image processing software to have a higher speed and quality of recognition.
4. Do a class demo and write a report.
 |  | **TEAM 15**Kinect for blind , Individual project.1. Build a helmet with KINECT on top.
2. Decide where the computer will be located (in a backpack, connected to a belt? Etc)
3. Write a plan for the project mechanical and electrical design.
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| **Bohr Robot** |  |  |
| Final Report, ECE578, Group 1, Fall Semester, 2009Located at the bottom of 478 class page | David Gaskin(d.b.gaskin@gmail.com)Nathan Makowski(nathan.makowski@gmail.com)Caroline Stepnowski(kestpur@comcast.net)Roger Bingham(roger.bingham@gmail.com)Matt Blackmore(blackmom@pdx.edu)Shaun Ochsner(scochsner@gmail.com)Jacob Furniss(jacob.furniss@gmail.com). | Includes complete description of mechanics, electronics and much of basic software of Niels Bohr robot. Includes head and arm description and “to do list”. |
| Fall 2009Located at the bottom of 478 class page | Blackmore, Furniss, Ochsen. | Complete documentation to robot arm. Used on Niels Bohr robot. |
| Final Report Dec 2010. Located at the bottom of 478 class page | Arada, JC (aradaj@pdx.edu) Le, Dang Zung(ddle@pdx.edu) Thueson, Mark (m\_thueson@hotmail.com Chhokar, John ( jchhokar1980@gmail.com | Speech, animation, VSA, future work. |
| Bohr Robot Speech Located at the bottom of 478 class page | John Chkokar |  |
| Schroedinger Cat Robot |  |  |
| Dec 2009. ECE 478.Located at the bottom of 478 class page | Hawash, Booth, Koran, etc | Schroedinger Cat – complete documentation from year 2009. |
| Dec 2010Located at the bottom of 478 class page | Chris Forrstrom | Improvements to Schroedinger Cat robot. |
| **Albert Einstein Robot** |  |  |
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| **MCECSBOT** |  |  |
|  |  |  |
| **GUIDEBOT** |  |  |
| PeopleBot project Documentation, December 2010. | Rashmi Dubey | Speech and natural language communication. |
| **PeopleBot** 2007ECE 478 Project | Joel PetracciGavin Gallino | Speech and mechanical arm design. |
| **GUIDEBOT**ECE578Fall 2011Final Report12/11/2011 | Jim Larson |  |
| **GuideBot proposal Fall 2011.** | Jules Alfani, Hamed Mirlohi, Robert Fiszer, Jim Larson, Mike Lowe | Initial Proposal. |
| **SPEECH** |  |  |
| Speech synthesizer and recognitionLocated at the bottom of 478 class page |  |  |