

Take the robot's challenge: The Harvest robot

Picture your robot, a fully autonomous, sensitive and sensible harvesting machine, working in a dwarf tree forest on a moon like surface (white). The season for *jujube* fruits (a ping-pong ball shape food) is just about to start, and thus this nice paradise fruit is whitening from orange (immature) to full white (mature).

Look at the nice aromatic fruits in the top of the branches that need to be detached from the tree, loaded in a bin and transported along the forest...

Would your robot be able to take the challenge?

MONDAY

(deciding and designing a fruit picking tool)

- 1) Have you ever decided the best way of harvesting? Are you going to climb? Are you going to shake? Are you just going to wait for wind or other natural forces to help?
- 2) How do you detect the branches?
- 3) Can you find fruits in the top of a branch? Do you feel it being mature?
- 4) Will we have a nice feast at the end of the day? How fast can you feed our population with *jujube* fruits? How aggressive is the system?
- 5) Have you thought about carrying the fruits afterwards

TUESDAY

(let's focus on the vehicle and navigation)

- 1) Wake up your robot. Are you able to do it with your hands off? Imagine: a clap of your hands, a whistle, or any personal way?

- 2) Make it move inside a bounded area with a blue contour (dark gray for a black and white vision robot)
- 3) Make it follow a black path along the tree lines
- 4) Put him back to sleep under your personal request
- 5) Does it look efficient? Does it look professional? Does it lose its way? Is it quick enough compared its mates?

WEDNESDAY

(communications and global control)

- 1) Now that you have two different robotic components: vehicle and fruit picking tool, will you be able to put them to communicate? Cooperate? Collaborate?
- 2) Are the components shouting one another? Are they using a fancy kind of telepathy? How much intelligence do you need?
- 3) Will you be able to complete the path along the forest harvesting one, two, several, many mature fruits?
- 4) How many sensors and motors have you used? Are you following the always nice principle of parsimony (maximum simplicity)?
- 5) How much time do you need for the job? How much maintenance of the system?

BASIC RULES

- Try to divide the material according to both system components: vehicle and fruit picking tool.
- Make use of the documentation we arranged for you: books and manuals.

- Remember that you have access to the official web of our subject Robotics in Agriculture, or several internet sites and blogs that might be useful.
- You are welcome to contact the organizers at the dedicated schedule for technical questions related to the design and programming.
- Feel free to request some minor additional material to facilitate any specific tasks.
- Never forget that this is a nice time for learning, designed for joy and to enjoy as well. Good Luck!

COMMENTS ON AGROTECH: AN INNOVATIVE LEARNING EXPERIENCE

1. Had you ever seen the Lego Mindstorm before this event?

- Yes (7)
- No (21)

2. Have you had any contact with the agricultural world before this week?

- Yes (18)
- No (10)

1. Once sentence to define the reason to come...

- Interesting topic and city
- Meet interesting new people, visit a foreign country and making new experience

- Learn
- To meet new people and have fun
- Real Madrid
- Enjoy beautiful Madrid, challenging competition and meet lovely people from all over Europe
- Experience something I'm going to remember forever
- I like to travel, I like to meet people
- I like it
- Obligación, qué se yo...
- Experience
- To meet other European students of technology and exchange ideas
- To try what a BEST event is like
- To learn more and see the beautiful Spain
- Hacer un favor a una amiga y disfrutar de un trabajo internacional en grupo
- Challenge
- Learning an meeting people
- To learn how to make a robot and have fun
- Madrid
- To get experience in speak stiles and visit your country
- The competition, the subject, the place...
- To meet people from different countries and practice some team work
- Para disfrutar la vida
- I like robots, I want to know more about it and I want to try team cooperation with unknown people
- Growing up together
- Invited to visit Madrid, project robot and enjoying international cooperation
- The reason is so get friends, learn about robots

- I always look for new experiences

2. Was the problem statement clear at the beginning?

- At the beginning there was a little bit too much information at the same time. The problem was well stated but the way to do it seemed to be complicated. After a moment it was more clear
- No, but it became clear; also think we should have started out with the vehicle and not the fruit picking tool
- Yes (16)
- No. You should have told us your rating system before hand we did not know that collecting a maximum number of fruits in a minimum time is the goal.
- No (4)
- Más o menos
- Yes, but I think we should have known the course, the tricks also
- A little bit
- Not enough. We thought we will be having multicolor fruit...Generally we thought at the beginning that task would be more complicated
- Not completely
- Not completely
- Not so much (for me at least)

3. Did you get enough information during the event?

- Yes the assistants were always there and ready to help us.
- Yes. the Spanish students were really useful
- Yes(22)
- Yes/no (1)
- Not every time

- Not, at all
- Sí, pero tuvimos que consultar en internet.

4. Is it feasible to solve the challenge in the time assigned?

- At first, I thought we would not be able to manage it but at last it was ok, I was surprise of what we can do in so less time.
- One additional day for optimization and troubleshooting would be been nice.
- Yes(16)
- It is but needs to be creative.
- No
- Si pero falta tiempo para las pruebas.
- No poco tiempo para un problema tan grande.
- I think the time was not enough for this assignment
- Yes but with a good team working cooperation
- Con un buen programador si.
- It would be better to have days more.
- No we didn't have enough time to test the robot in the forest .
- It could be litter more.
- Only if it doesn't have to work properly.

5. Is the material adequate for the challenge?

- I think it was a good option because it was not to complicated , but let you do a lot of things.
- It was difficult to work with the Spanish online material and the internet connection was really slow.
- Yes(22)
- Yes, may be too week/ flexible.

- Yes, but some little pieces were necessary.
- Bueno... hay que mejorar los sensores.
- Yes .more then adequate

6. Is your group prepared for the challenge?

- I was glad, I was with them, because we had each of us kind of a specialty so we were able to share the work and be efficient.
- Nobody was familiar with mechanical engineering.
- Not the group, but I prepare myself a lot.
- Si, Tomicca es un crack programando.
- Si somos dos personas bien preparadas para construir y otras dos para programar.
- Yes(10)
- Not at all.(3)
- We didn't have enough tests before challenge.
- We are born for challenges.
- Yes, we mostly had some team design experience.
- En el inicio no, pero yo si que creo que podría.
- It was prepare in satisfactory level.
- Not all of us.
- Well, it doesn't work properly, but I like team work.
- Not really (2)

7. What knowledge do you miss for better success?

- Programming(9)
- Time(2)

- Ingles(1)
- No ledge about playing with lego.
- Mechanics(4)
- La verdad que ninguno pero otros participantes tenían problemas de comunicación.
- None all together we covered everything.
- More information about the function about motors and sensors.
- I can't think something now.
- Mi personally some knowledge about design. I am mechanical engineer but not studding that field.

8. Did the collaborative students facilitate your work at a significant level?

- Yes(21)
- Mostly yes (1)
- A lot (3)
- Not that much, because some time we have difficulty in explaining.
- Yes they were helpful in getting starting with programming and pointed you in the right direction at the beginning.
- Yes because they were giving us examples from the web and the explained very well the subject because they worked on it before.
- Really good guys.

9. Are the rooms and the spaces adequate for the event?

- Yes(22)
- I think so even if more space good be better.

- Para el número de personas que había el aula de audiovisuales se quedaba un poco pequeña.
- They were very nice.
- Not enough.
- I think that we should have had bigger tables.
- Yes the university is beautiful.

10. What is the best issue in the event?

- Creating very clever machine.
- The fun making the lego robot.
- Group working(III)
- Performance.
- The innovation and creativity that student have different.
- The people.
- I cant really tell.
- Exploring
- To learn about the fundamentals of team working.
- Idea
- Knowing foreign people(II)
- Knowledge that concerned robots.
- I liked the whole idea of the event.
- Being in Spain meeting people having fun.
- Working multidisciplinary and multinational groups(II)
- Programming the robot.
- Being creative at the university.
- Make new experiences in multicultural teams and meet new people.

- Team cooperation and task assignment. I trusted the software engineer and he trusted me.
- Everything is perfect.
- Playing with robots.
- The party. I like the international evening you learn a lot about other culture and the robots we are very proud of our robots.
- Watching the result of our work.
- Driving trucks.

11. What is the worst issue in the event?

- Getting up in the morning(3)
- The impossibility to have always the same behavior of the robot.
- Nothing(3)
- First place of staying at night.
- That robot didn't work.
- Lack of time (4)
- The chairs.
- Although the mechanical part of the robot was ready, the programmers could not finish the robot.
- Perder clase de la Universidad y tiempo de la beca.
- We didn't have enough time to sleep.
- The amount of time we had to work.
- Precision of the sensors.
- No free time at all.
- Time limit.
- The schedule is really strict there should be a little more time for personal use.

- When the day come to the evening we were tired/estrés and the communication was a big difficult because of the language(like Babylon tower)
- No sleep (That is a problem which will be solved all next week)
- Having to have them work
- Knowing that with a little more time our robot would have been much more efficient

12. Have you joined other BEST events before?

- Yes (7)
- No (21)

13. Does this one meet your expectations?

- More (10)
- Yes (16)
- No (2)

14. Would you try again?

- Yes (24)
- Yes/No (2)
- No (2, ending studies)

15. Your very personal feeling in 50 words

- Course was very pool with interesting work and a lot of party. Building robot is a lot of fun and felt like playing instead of working. (The) only thing is that we did have not had enough time to see Madrid and there are a lot of places that we should visit and there is few hours to do it.

- I enjoy the competition because it is a unique event. Moreover, the people in my team were really great. All the knowledge we acquired and experience of work, it is really practical and useful.
- Robot, agro, rain & sun, game “merda”.
- Well the event was generally good, but we had a few of those site seeing, I was expecting to see so many different places, historical and cultural but we were not taken to any and also not to any agricultural sites, where we could see real robots which are used to pick fruit.
- Una muy bonita experiencia.
- The competition was amazing experience. I learned much interesting and useful skills and had a great time in Madrid.
- I think that was a good experience, we have put together the 4 words: travel, learn, fun and friends. It was something new for me and for sure I will try again. Keep it this way... you are the BEST.
- I love Spain and Madrid. This is a lovely place which I never forget. I believe that my hard effort to come here was worthy. Thank you all.
- Ha sido una experiencia muy interesante. Hay muy buen ambiente, siempre aprendes algo nuevo, practicas inglés (todos hablan perfecto inglés salvo los españoles). En general ha superado mis expectativas.
- I think that it would be better if we had lectures before working sessions. We also need more time to do our work (maybe a day more should be better).
- I think it is a great opportunity to meet other European students to exchange ideas in matters of current technology and be able to collaborate and co-work for days. It has been an amazing experience and I would like to do it again.
- The task was not so easy at the beginning but we did it at the end, and we felt happy and fulfilled. It was nice to work in team and to cooperate with others.
- Another experience that widens my horizons
- I will miss all the wonderful people I've meet here! I will miss coffee breaks, city walks, and even working sessions (feeling kind of strange without assembling structures today). 50 words? Come on, everything has been already said.
- I liked the international context, the cooperation, the work (I like to program) and to apply my skills to a completely new field.

- There is not anything to express but I feel really happy to be in Madrid and participating this event.
- I am really happy to be able to attend this event. I also enjoy my first visit in Spain. I am already planning a summer trip to come back to Spain.
- It was a very interesting competition. It was the first real team cooperation because at school we already know our team. Here it was a real cooperation because we also had to know the mind of our team mates and find how to communicate in the right way. I liked the competition mood, our collaborative feeling. I liked also the serious way to evaluate the robots, the stressing time lack. Good Job!! I will go home with a good impression and more knowledge about work cooperation. Thank you.
- It is much better than I have imagined it. Specially, I will miss those happy-morning-waking-ups!!! I will definitely apply again. It is such an incredible experience...I cannot write more, cause I'm still drunk from yesterday pub crawling...wow...My BEST wishes. I love you all!
- I had really a great time and enjoyed a lot. I hope that this event will help me in the future.
- I am glad that I went to Madrid. It is an unforgettable experience. I met a lot of great people and I had a lot of fun and I gained a wonderful experience of teamwork and building a robot. And I learned that the easiest solution can be the most powerful one.
- It was a really good event for me, I really enjoyed it. A lot of interesting things; being more conscious of what building a robot is, working in team with interesting and different people having fun.
- Less than 50 words: creía que iba a ser más dura al principio pero luego he acabado disfrutando de la experiencia.
- It was good to build a robot which was doing the collecting (harvesting). Our team had just three members. It could be better to be 4. It was hard to start building the construction of the robot, but at the end we managed it. Thank you very much for organizing this course.
- I want to spend more time in the city.



RESULT OF JURY vs. STUDENTS

The jury									
G1	G2	G3	G4	G5	G6	G7	G8	G9	G10
	1 ST PRIZE		2 ND PRIZE						3 RD PRIZE
The students									
G1	G2	G3	G4	G5	G6	G7	G8	G9	G10
3	10	2	3	5	1	2	0	1	4
	1 ST PRIZE			2 ND PRIZE					3 RD PRIZE