

Computing, Electronics and Robotics
summer school runbook

August 20, 2019

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0.1 Overview

The Smallpeice summer school is a collaborative event between the Smallpeice trust, Sourcebots, and ECS.

0.1.1 Key roles

The following roles will be used throughout this document.

- **Sourcebots organisation lead** Sourcebots representative in charge of leading summer school tasks.
- **Smallpeice course coordinator** Smallpiece representative in charge of organising the Smallpiece side of the event.
- **ECS course coordinator** ECS academic in charge of organising the university side of the event.
- **Head Judge** person in charge of the game and rules queries during the event.

Chapter 1

Organisation

1.1 Initial planning

The initial planning for the summer school happens in around October/November. At this stage the key tasks are to work out who is doing the organisation and the details of the course in order to open registrations.

1.1.1 Key roles allocation

The key leads in each organisation need to be identified. Sourcebots needs a representative to manage discussions with ECS and keep track of tasks. ECS need to select an academic who will be in charge of the course from their end. Smallpeice will let us know of the course leader from their end.

- **TASK: 1:1. ECS to select academic lead**
- **TASK: 1:2. Select primary Sourcebots organisational contact**

1.1.2 Create Improvements list for coming year

At this stage any major improvements to the summerschool should be identified. The appropriate tasks to implement these changes should be added to this runbook.

- **TASK: 1:3. Review retrospective to identify improvements**

1.1.3 Budget acquisition

Smallpeice provide the funds for the food, accommodation and evening activities. The funds required to run the daytime robotics activities come from the university. In order for ECS to allocate the required funds a draft budget is required. This budget can be largely worked out from the previous years costs but may require additional planning if changes are planned with new costs.

- **TASK: 1:4. Perform rough inventory for budgetary planning**
- **TASK: 1:5. Create a draft budget for ECS budgetary planning**
- **TASK: 1:6. ECS to confirm budget and provide cost codes**

1.1.4 Course definition

The course details need to be confirmed between ECS Smallpeice and Sourcebots. A description of the course needs to be created in order to promote the course. The description can probably be kept from the previous year unless significant changes in content are planned. In addition the number of students needs to be confirmed.

- **TASK: 1:7. Confirm course definition.**

1.1.5 Date confirmation

Proposed dates are usually suggested by Smallpeice after discussions with the university Hospitality and catering department. Before dates can be confirmed there are several key resources that need to be booked. The most important of these is the Cube where the competition will be held.

- **TASK: 1:8. Get provisional Cube booking**
- **TASK: 1:9. Book electronics labs**
- **TASK: 1:10. Confirm summer school dates with Smallpeice**

1.2 Later stage planning

Closer to the event there are several planning steps that need to be done.

1.2.1 Computing resources

There are several computing resources that need to be acquired. Conference accounts are required for the students so they can log into the lab computers and use the WiFi. In addition there needs to be a laptop per team for use in the cube.

- **TASK: 1:11. Confirm conference accounts**
- **TASK: 1:12. Borrow laptops**

1.2.2 Catering conformations

Before the event the catering details and bookings need to be confirmed.

- **TASK: 1:13. Confirm formal meal attendance**
- **TASK: 1:14. Confirm break catering**
- **TASK: 1:15. Confirm meal catering**
- **TASK: 1:16. Book SUSU refreshments**

Insert time

1.2.3 Information pack information

About a month before the event Smallpeice send out the event information and several pieces of information need to be included in this pack.

- **TASK: 1:17. Confirm week schedule**
- **TASK: 1:18. Invite parents to finals**
- **TASK: 1:19. Book carparking**

1.2.4 Rules creation

The rules for the game will need creating. This involves the design of the game which should conform to the game design criteria.

- **TASK: 1:20. Prepare rules Q&A**
- **TASK: 1:21. Create rules**
- **TASK: 1:22. Prepare filming and Photography plan**

1.2.5 Risk assessments

At this stage the risk assessments for the various activities during the week need to be created.

- **TASK: 1:23. Create Competitor risk assessment**
- **TASK: 1:24. Create Volunteer risk assessment**

1.2.6 Prepare Student packs

At the introductory talk each student is given a pack. These bags include printouts of the rules and a map of campus, and prospectuses. The bags also include the USB sticks they will use when programming the robots.

- **TASK: 1:25. Print rules documents**
- **TASK: 1:26. Pack bags of pens etc. for students**
- **TASK: 1:27. Acquire bags for student packs**
- **TASK: 1:28. Print maps for student packs**
- **TASK: 1:29. Acquire prospectuses**
- **TASK: 1:30. Create kit USB sticks**
- **TASK: 1:31. Pack team packs**

1.3 Kits

The main equipment used by the teams during the summer school is are the robotics kits. The kits contain the core electronics and control components needed to build the robots. There will need to be one kit per team plus spares. a 25% spares ratio to give a good safety margin. Kit numbers can drop a bit below this without issue as this avoids the need to make small board orders.

1.3.1 Testing kit

In order to ensure there is enough kit for the summer school it should be tested and inventoried far in advance of the summer school. There are test scripts and procedures for all of the boards and parts in the kits. Any shortages or kit parts should be added to the ordering list.

- **TASK: 1:32. Inventory all kit**
- **TASK: 1:33. Test kit**
- **TASK: 1:34. Order kit replacements**

1.3.2 Kit software

The software for the kit will likely need updates and improvements. These will need including into the software image and appropriate testing. The docs should also be updated if any user facing changes are made.

- **TASK: 1:35. Perform software updates**
- **TASK: 1:36. Test software**
- **TASK: 1:37. Update kit docs if required**

1.3.3 Kit packing and preparation

Before the event the kits need to be packed into boxes for the teams to use. In addition a demobot needs to be prepared for showing during the introductory talk.

- **TASK: 1:38. Prepare and pack kits**
- **TASK: 1:39. Pack Sensor kits**
- **TASK: 1:40. Assemble demobot**

1.4 Logistics

The summer school requires a large amount of kit to be moved around in order to facilitate the activities. This generates a large amount of logistics activities that need to be planned in advance in order to minimize effort during the week.

1.4.1 Estates transportation assistance

The bulk of the heavy items are needed in the cube. In order to minimize the amount of heavy lifting required estates and facilities can move the equipment from the cupboard to the cube and back at the end of the event.

The Initial move to the cube needs to be done in several blocks in order to work with the pottering teams schedules. The kit for the arena construction needs to be sorted so that the kit arrives in the cube by the time it is needed. The details of what kit is being moved when then needs to be sent to estates so that they can bring the appropriate kit to move the kit. The return move is done in a similar manner with the initial move on Friday afternoon and the remainder moving on Monday.

- **TASK: 1:41. Create estates movement plan**
- **TASK: 1:42. Book estates to move kit to cube**
- **TASK: 1:43. Book estates to move kit from cube**

1.4.2 Other kit movement

The bulk of the kit for other locations is moved by volunteers. Which kit needs to go where needs to be planned in advance along with arranging for the use of the required tools to move it.

- **TASK: 1:44. Create kit movement plans**
- **TASK: 1:45. Arrange for transportation tools**

Role	Number of volunteers required
Organisation lead	1
Team mentors	1 per two teams
Labs Lead	1
Workshop supervisors	2
Arena build team	3

Table 1.1: Roles for volunteers during the summer school

1.5 Volunteers

At around April time work to invite and select volunteers from Sourcebots for helping run the summer school is required. This needs to be done late enough so that those with summer internships know what their status is over the summer. The number of volunteers required needs to be worked out at this time and the number of volunteers limited to this amount. Table ?? shows the main roles and numbers required for those roles to give an idea of how many volunteers are needed. In addition to these there will need to be several free volunteers available to assist with other tasks such as running workshops.

- **TASK: 1:46. Open signups for volunteers for the summer school**

1.5.1 Catering and accommodation

At around June we will need to confirm to Smallpeice which volunteers require accommodation or have dietary requirements. To do this we need to work out who is around for what days as we will need a good number of the volunteers on the weekends before and after. Historically as well as the course days we have been able to get accommodation on the Saturday and Sunday before and the Friday and Saturday afterwards for volunteers who are available then.

- **TASK: 1:47. Collect accommodation and catering requirements from volunteers**

1.5.2 Volunteer briefing

On the Sunday before the event there will be a briefing for all the volunteers in order to bring everyone up to speed on the plans for the week and what needs to happen. At the same time any kit being loaned from volunteers should be recorded to make sure it is returned at the end of the event.

- **TASK: 1:48. Create volunteer roles document**
- **TASK: 1:49. Brief volunteers**
- **TASK: 1:50. Create interactive volunteer schedule**
- **TASK: 1:51. Prepare forms for loaned kit**

Chapter 2

Week activities

2.1 Talks, Lectures and Tours

2.1.1 Introductory talk

The introductory talk is the first activity of the week and is broken down into several sections from different speakers.

Talk	Speaker
Housekeeping	ECS course coordinator
Smallpeice Welcome	Smallpeice course coordinator
ECS Welcome	Head of ECS or similar
How to build your robot	Sourcebots representative
Game rules	Head Judge

Table 2.1: Speakers for each section of the introductory talk

Housekeeping

The housekeeping talk covers important information for the course participants lasting around 5 minutes. The main areas to cover are health and safety and the structure of the following talks.

Smallpeice Welcome

This is the welcome from Smallpeice and covers the basic structure of the course along with the rules for participants. This talk lasts around 15 minutes and is given by the Smallpeice course coordinator.

ECS Welcome

This talk provides some information on the university and the courses available. A representative from ECS (Often the head of school, or Director of outreach) will give this talk, ideally the speaker will also be present at the formal meal and the prize giving at the end of the course. This section should last around 15 minutes.

How to build your robot

This talk goes through the basics of robot assembly and the main activities during the week. This talk will last around half an hour.

The talk starts by introducing the Sourcebots volunteers, each saying a bit about themselves and what they do. After introductions the basic activities of workshops, lectures and robot hacking are introduced. The talk then goes through common pitfalls and problems providing information on good robot design. The kit and the component parts are then introduced along with safety information about batteries and tool use.

Game Rules

The final talk of the section is the game rules briefing by the head judge. Half an hour has been allocated for the talk, however, if it ends early the extra time can be used for the teams to start planning their robots.

This talk should go through how the game works and the game rules, a Q&A session at the end provides a chance for teams to confirm any queries before they start designing their robot.

- **TASK: 2:52. Confirm presenter for ECS welcome presentation**
- **TASK: 2:53. Prepare robot building presentation**
- **TASK: 2:54. Prepare rules presentation**
- **TASK: 2:55. Have robotics kit ready for demoing at intro talk**

2.1.2 Lectures

There are three lectures during the course on topics that are relevant to the students such as computer vision. Each of the lectures will be about an hour long and are given by a lecturer at the university.

- **TASK: 2:56. Select lecturers for lecture slots**
- **TASK: 2:57. Book rooms for lectures**

2.1.3 Tours

During the course the students will be given tours of several university facilities. The tour consists of the following facilities.

- Tony Davis High Voltage lab
- Nanofabrication clean rooms
- Boldrewood towing tanks

The students will be split into several groups and rotated through the various tours. Each tour will last around 15 minutes, with 5 minutes of time for moving between tours and slack in case of overruns. Due to the walking time between Highfield and Boldrewood the slots on either side of the towing tank tour should be kept clear to give time for waling.

- **TASK: 2:58. Arrange tours of each of the facilities**

2.1.4 Admissions talk

During the formal meal an admissions advice talk is given by the ECS admissions tutors or suitable alternative. This talk provides information on the admissions process and courses at Southampton and other universities.

- **TASK: 2:59. Confirm speakers for admissions talk at formal meal**

2.2 Workshops

2.2.1 Mechanics Workshop

The Mechanics workshop is the first of the workshops taking place straight after the introductory presentations. The purpose of this workshop is to have the students plan their mechanisms and robot structure.

- **TASK: 2:60. Acquire mechanics workshop materials**
- **TASK: 2:61. prepare material fixing examples**

2.2.2 Programing Workshop

The programming workshop takes the teams through the basics of python programming and use of the simulator.

- **TASK: 2:62. Create programming workshop activities**
- **TASK: 2:63. Ensure programming software installed on computers**

2.2.3 Electronics Workshop

The electronics workshop guides the teams through building several sensors for use on their robots.

- **TASK: 2:64. Create electronics workshop activities**
- **TASK: 2:65. Purchase electronics workshop components**
- **TASK: 2:66. Print electronics workshop hand-outs**
- **TASK: 2:67. Print electronics workshop documents**

2.3 Competition

The competition presents the culmination of the week as teams compete in the Arena against the other teams.

2.3.1 Arena build

The cube needs to be prepared for the competition, this will take the majority of the week. Documentation on the arena build for the cube can be found in the ...document.

- **TASK: 2:68. Arrange for estates to move arena parts to the cube**
- **TASK: 2:69. Purchase arena construction materials**
- **TASK: 2:70. Hire scaffolding for arena**
- **TASK: 2:71. Book tables and chairs from SUSU**
- **TASK: 2:72. Book tech from SUSU**

- **TASK: 2:73.** Find arena screens
- **TASK: 2:74.** Plan arena lighting schedule
- **TASK: 2:75.** Print marker and signge

2.3.2 Tinker time

Thursday afternoon and early, Friday morning, and during breaks is used for tinker time where teams can test their robots in the arena. During this time a volunteer will manage slots for teams to come into the arena and test. Timeslots are booked on a whiteboard and the PA system is used to announce the slots.

2.3.3 Competition briefing

On Friday morning the Head Judge will give the competition briefing explaining how the league will work.

2.3.4 Friday break closure

During the Friday morning break the cube is closed to allow for the arena to be converted into competition mode and any last minute tests to be run. At this point the house lights are turned off and the arena lighting setup is turned on. The music is also swapped to the epic playlist and the preselected intro song is started at which point the competitors' are invited back into the arena ready for the first match.

- **TASK: 2:76.** Plan competition intro sequence

2.3.5 League

- **TASK: 2:77.** Prepare league schedule

2.3.6 Knockouts

- **TASK: 2:78.** Prepare knockout schedule

2.3.7 Prize giving

- **TASK: 2:79.** Purchase prizes
- **TASK: 2:80.** Design certificates
- **TASK: 2:81.** Design awards cards
- **TASK: 2:82.** Print awards cards and certificates
- **TASK: 2:83.** Prepare post competition schedule
- **TASK: 2:84.** Find speaker for post finals talk
- **TASK: 2:85.** Book awards speaker