

Name:	Student #:
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Instructions

- This is a take-home test and is due at the start of class on the 20th of March 2017.
- The work must be accomplished individually.
- You may not write any more than 2 pages including diagram(s).
- You must hand in (physically) this test paper as a cover sheet filling in the information above.
- Your work should be word-processed (no incomprehensible handwriting) checked for spelling and grammar and written in a 12 pt font. If you do not adhere to this rule you will lose many, many marks.
- Cite any sources of information you use.
- The test will be marked out of 10 (+1 bonus). Simpler realistic systems are preferred (no magic allowed)

You have been engaged as a consultant to the Government of the United Kingdom (UK) through the Defence Chemical Biological Radiological and Nuclear Centre¹. They want you to help resolve a rather sensitive problem. A shipment² of plutonium dioxide powder was stolen³ during transit between a decommissioned nuclear facility in the UK and a processing facility in France. This shipment has now been located on the island of Sark⁴, off the coast of Normandy in the single-story meeting hall of the Chief of Pleas⁵.



The only entrance to the building is a closed (but unlocked) door to the hall. It has been determined that the shipping container is leaking. The container was “booby trapped” by the thieves before they escaped. As there is a severe threat to public safety, no humans are permitted to be inside or within 200m of the hall.

You are asked to describe a robotic system in sufficient detail so that it can be created and used for:

1. Gaining entry to the building.
2. Determining the number of rooms.
3. Provide enough information to create a dimensionally accurate floor plan.
4. Find the plutonium container.
5. Develop a plan to eliminate the threat posed by the booby trap.

Discuss your proposed system in terms of what it would look like, its parts, how it would be controlled and behave, what it can sense and how that data can be provided to human operator(s).

¹ <https://www.gov.uk/government/publications/defence-chemical-biological-radiological-and-nuclear-centre-dcbrnc/defence-chemical-biological-radiological-and-nuclear-centre>

² <http://www.world-nuclear.org/information-library/nuclear-fuel-cycle/transport-of-nuclear-materials/transport-of-radioactive-materials.aspx>

³ <http://www.independent.co.uk/news/uk/home-news/dirty-bomb-threat-as-uk-ships-plutonium-to-france-793488.html>

⁴ <https://en.wikipedia.org/wiki/Sark>

⁵ <http://www.gov.sark.gg/>