Hong Kong Diploma of Secondary Education Examination 2026
DESIGN AND APPLIED TECHNOLOGY

SBA Project – Suggested Contextual Challenges

Candidates are required to choose ONE contextual challenge from the following and complete the SBA project:

1. A device for medication management and facilitation of medication taking

Context:

Patients with chronic health problems often need to take multiple medications several times a day. The complex daily medication schedule can be a source of stress. To address these issues, a device for medication management and facilitation of medication taking can provide more effective support to patients, enabling them to take their medication on time and in the correct dosage conveniently, thereby improving disease control.

Design Problem:

Design and make a device for medication management and facilitation of medication taking. This device must satisfy the following requirements:

(a) Store at least five different pills separately, allow patients to set different dosages and medication times for each pill, and automatically dispense the required quantity of pills at the right time, for a period of at least one week;

(b) Provide medication reminders to patients in a variety of ways at a predetermined time until the patient confirms that the medication has been taken;

(c) Include a function that automatically provides the right amount of water to drink when it is time to take the medicine;

(d) Add a function that provides practical value to the patients. (For example, properly preserving the medicine.)

2. A small smart cart that carries teaching-related items

Context:
Teachers often need to carry a large number of teaching-related items, such as books and teaching aids, within the school campus. They shuttle back and forth between the staff room and different classrooms. This is not only tiring and inconvenient but it also increases the risk of accidents. To address these issues, a small smart cart to transport teaching materials around the campus would make work easier and safer for teachers.

Design Problem:
Design and make a small smart cart that carries teaching-related items. This cart must satisfy the following requirements:

(a) Be able to automatically and flexibly follow a teacher as s/he moves and, in special situations, allow for manual control, giving teachers convenience and ease of use;

(b) When encountering an obstacle or being too far away from the teacher, it will automatically stop moving and prompt the teacher;

(c) Safely and stably transport items weighing 3 kg or more;

(d) Add a function that provides practical value to teachers. (For example, it solves a problem that teachers encounter when they use the cart at campus.)

3. An automatic device to repel wild birds

Context:

In many densely populated residential areas around Hong Kong, large flocks of wild birds gather. They often roost on windowsills, flower boxes, or balconies. The excrement of these birds not only affects environmental hygiene but may also pose a threat to human health. Their chirping sounds, often made in the early mornings and evenings, as well as their pecking of plants cultivated by residents can be a nuisance. To address these issues, an automatic device to repel wild birds can improve residents' living environment.

Design Problem:

Design and make an automatic device to repel wild bird. This device must satisfy the following requirements:

(a) Be equipped with three different independent repellent methods to drive away birds, one of which should be operated by mechanical components. These methods must not impact or disturb nearby residents;

(b) Be equipped with at least one sensor which can detect the presence of wild birds and automatically activate a specific repellent method in response to different situations;

(c) Allow users to choose the appropriate combination of repellent methods and adjust their corresponding settings through wireless control;

(d) Add a function that provides practical value to residents. (For example, how the device can be easily and securely installed in the required locations.)

Remarks: Candidates must ensure that they will not cause pain, suffering, lasting injury or distress to the wild birds during the research, development, or testing of their design project.

Notes for submission:

- Candidates should submit the following two items:
  - a working physical model/prototype, or a virtual 3D model plus a partial working physical model;
  - an A4 or A3 size portfolio.

- 'Prototype' refers to all working solutions including products, models and systems that are sufficiently developed to be tested and evaluated. A final prototype could be a highly finished product made as 'proof of concept' prior to manufacture, a scaled working model or a functioning system where a full-sized product would be impractical.

- The physical model/prototype produced by the candidates as the final solution for the project should be able to perform proper testing and evaluation in the environment it is intended for. The main body of the final physical model/prototype should be made from raw materials and not be directly built using commercially available kits. However, commercially available mechanical components, control components and programming devices are permitted. Solely using computer modelling and simulation in lieu of physical model/prototype are not considered as appropriate alternatives in this regard.

- For details of the requirements and assessment criteria of this subject applicable to the SBA projects starting from 2021 HKDSE, please refer to:
  http://www.hkeaa.edu.hk/DocLibrary/SBA/HKDSE/DAT-2021-Draft_Assess_Criteria-0318-E.pdf

Remarks:
The HKDSE Examination Regulations stipulate that a candidate may be liable to disqualification from part or the whole of the Examination or suffer a mark or grade penalty for breaching the regulations. For details, please refer to the SBA Teachers' Handbook for Design and Applied Technology:
http://www.hkeaa.edu.hk/en/sba/sub_info_sba/dse_subject.html?10