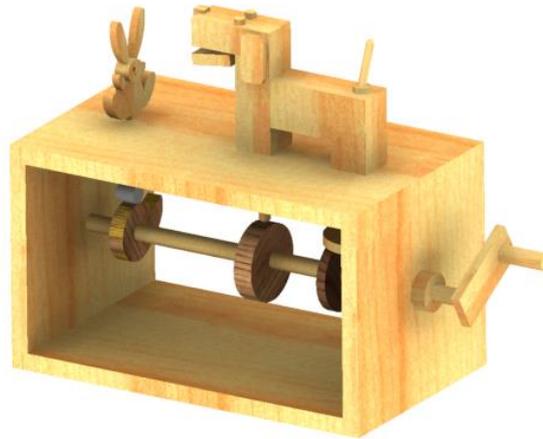


Toy Design Competition 2018

Toy Design Category (Automata)

1. Introduction

This competition is an exciting activity that provides a platform for students to challenge their creativity and skills in designing fascinating animated mechanical toy sculptures called Automata.



Automata are originated from the Cabaret Mechanical Theatre (CMT), a highly acclaimed travelling exhibition originated from the UK that combines the work of Arts, Science and Technology. Nearly all of the work in the CMT collection is humorous. These mechanical toy sculptures showcase the fine art of engineering and are valued highly in the collectors' circle. They can be brought to life by cranking a handle to move a shaft mounted with a series of machine parts such as cams, gears, linkages, belts and pulleys, ratchets, etc. which are in turn connected to the various parts of the sculptures to produce the desired movement.

This Toy Design Competition 2018 is organised by the Singapore Polytechnic's School of Mechanical and Aeronautical Engineering.

2. Competition Rules

- 2.1 The theme of this year's Automata Design Category is "Promotion of Healthy Lifestyle".
- 2.2 Participants are required to create interesting Automata to promote healthy lifestyle through recreational activities, such as sport and cultural activities, and use the most appropriate mechanism(s) to drive the actions and deliver their respective stories.
- 2.3 The competition is open to all Secondary School students in Singapore.
- 2.4 The number of students in each team should not be more than four.
- 2.5 Each individual or team shall submit only one entry.
- 2.6 The size of each Automaton should not exceed 45 cm (Length) x 35 cm (Width) x 40 cm (Height).

- 2.7 Participants may design and draw their Automata assemblies and parts manually or using any CAD software. However, the use of CAD software will help them to design, size, dimension and animate their automata movements more effectively before they start to fabricate it.
- 2.8 A Special Award will be presented to the team that can use any CAD Software to design and generate their Automaton with best virtual animation effect.

3. Design Guidelines

- 3.1 Participants should first visit various Automata websites, such as the <http://www.cabaret.co.uk/>, <http://automata.co.uk/> and <http://www.flying-pig.co.uk/> websites before embarking on their own design. They should also visit various Design and Technology websites, such as the <http://www.technologystudent.com/> (click “MECHANISMS” and “GEARS AND PULLEYS”) to learn how Automata parts can be animated by gears, timing belt and pulley drives, cams, linkage mechanisms, ratchet mechanisms, crank and crank shafts, etc.
- 3.2 Participants are required to build their Automata using materials such as plywood, chipboard, softwood (balsa), wood, ball/ cube/dowel, basswood sheet/strip, ice cream stick, plastic, high density foam, kapaline board, etc. They can also use 3D Printer and 2D Laser Cutting Machine to create their Automata parts.
- 3.3 Participants should use Ø10 mm wooden or steel rod as the main cranking shaft and driving shaft(s) of other critical Automata parts so as to minimize shaft deflection and power transmission losses which will result in malfunctions of moving parts.
- 3.4 The Automaton crank should be installed on the right-hand side and the direction of cranking should be indicated on the same side. Clockwise direction of cranking is preferred.
- 3.5 Parts may be joined together by adhesive (glue), nails, self-tapping screws or dowels. Pins may be used to create joints. Strings, wires, standard gears, belts and pulleys, etc., can be used to create the movements of the Automata.
- 3.6 Compression, extension and torsion springs of appropriate size and stiffness (about Ø0.5 mm wire diameter) should be connected to cam followers, cranks and linkages, etc. to create the return or oscillating movements of moving Automata parts.
- 3.7 Participants should source for the above mentioned materials and standard parts before sizing their Automata. These materials and standard parts can be purchased from shops, such as Art Friends, Daiso and hobby shops.

4. Competition Details & Prizes

- 4.1 The submitted entries will be judged and ranked by a panel of judges formed by the organising committee.
- 4.2 The prizes are:

1 st Prize	\$500 Cash + Trophy for School
2 nd Prize	\$350 Cash + Trophy for School

3rd Prize \$200 Cash + Trophy for School
5 Merit Prizes \$100 Cash each

Special Design Award for team with best virtual animation effect using any CAD software (\$100 Cash). Animation file must be in mp4 or avi format.

Commendation Awards for all deserving entries (\$50 Cash).

4.3 All winning students will be presented with certificates.

5. Judging Criteria

5.1	Design Description	10%
5.2	Poster Design (A2 size .ppt template)	10%
5.3	Functionality	20%
5.4	Model Quality	20%
5.5	Originality and Creativity	40%

6. Registration & Final Submission

6.1 Participants are to register their interest to their teacher I/C. The teacher I/C shall collate and submit to the Organising Committee using the registration form available at (<http://bit.ly/2APdZn3>) or in the TDC.18 website at <http://www.sp.edu.sg/schools/mae/>.

6.2 Closing date of registration is **28th Feb 2018**.

6.3 Participants should submit their entries through their teacher I/C to the Organising Committee by **4th July 2018** for judging.

6.4 Each submitted entry must include:

- The physical model of the Automaton.
- The hardcopy of a typewritten Entry Submission Form(<http://goo.gl/Jxhmv6>) (attached with an A4 size hardcopy of the Automaton write-up with not more than 100 words which shall include: (i) Photo(s) of the Automaton and (ii) either a manually drawn pictorial sketch or 3D rendered or shaded image of the Automaton (if CAD software is used).
- **The softcopy of the following either in USB/thumb drive or through download link (eg. Google drive, dropbox, wetransfer etc.):**
 - An official typewritten Entry Submission Form.
 - Softcopy of the above mentioned Automaton write-up
 - Photo(s) of the Automaton and a group photo of the participating team
 - One A2-size poster based on the template which will be emailed to the teacher-in-charge. The poster shall include:
 - The name of the Automaton.

- A group photo of the participating team with students' full names (from left to right) and the name of the teacher and school below it.
 - A short write-up of the Automaton with not more than 100 words. The write-up shall include its storyline, how each of the movements is being actuated by the various mechanisms.
 - Either a scanned image of the manually drawn pictorial sketches or 3D rendered or shaded image of the design (if CAD software is used).
- 6.5 Teachers can store and submit all their students' entries in a thumb drive/CD or through download link if there are many entries to be submitted. Submission entries must have Automaton Title and Name of School clearly written and labelled on the thumbdrive/CD or download link.
- 6.6 All works submitted should be original and should not have been awarded by the organiser of another similar competition before.
- 6.7 All participants are responsible in ensuring their submission will not infringe existing copyright/patent law.
- 6.8 The Organising Committee or sponsor is not liable for infringement or abuse of any design as a result of entry in this competition or as a result of subsequent publicity.
- 6.9 Entries that do not meet the competition rules will be disqualified.
- 7. Announcement of Results**
- 7.1 The winners and their ranking will be announced during the Toy Design Competition 2018 Prize Presentation Ceremony to be held in the Singapore Polytechnic Auditorium on **27th July 2018**.
- 7.2 In the event of a tie, the organising committee reserves the right to redistribute the prizes.
- 7.3 All decisions made by the judging panel are final.

For more information and registration, please contact:

Toy Design Category (Automata)

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