



H.C. ANDERSEN  
FESTIVALS  
Odense · Denmark



INNOVATION  
CENTRE  
DENMARK

# INTERNATIONAL STEAM GAMES

An International Competition between  
Chinese and Danish students



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## 1. Introduction

The H.C. Andersen Festivals is a non-profit organisation jointly launched by Odense municipality in 2013 to commemorate Hans Christian Andersen's Life and Works. The festival receives funding from individuals, corporations, and government entities.

Every year, in the third week of August, the H.C. Andersen Festivals is held in Odense, Denmark. This year marks the 10th anniversary of the festival. The festival's slogan, "Anything can happen!", embodies the spirit of Andersen's imaginative and creative works.

Since 2015, the H.C. Andersen Festivals has collaborated with partners to launch an International STEAM Creative Competition for students every year. This year, the International STEAM Games will be held in cooperation with KUBO Robotics. By using the KUBO Robots and the Tagtile® coding language, the competition provides a hands-on coding experience for students, while they explore the world of H.C. Andersen's fairy tales.

The theme of the International STEAM Games is "Visiting H.C. Andersen's Hometown". The tasks include completing a coding mission, designing a costume, and giving a presentation which enhances the student's teamwork, collaboration, and problem-solving skills.



## 2. Core Values

H.C. Andersen Festivals and KUBO believe that coding is not just a technical skill, but an essential ability that will empower students to become digital creators. Additionally, early exposure to programming will help close the gender gap in computer science and robotics industries by encouraging girls to pursue careers in these fields.

When teaching students to code, we prioritize four core values: coding knowledge, teamwork, the courage to make mistakes, and self-expression. We believe that these values further students' coding skills and provide them with valuable life skills they can use in the future.

The International STEAM Games 2023 Competition focuses on the student's development in the following areas:

- Identifying patterns and their impact on code
- Coding with the unique TagTile® language
- Optimizing algorithms
- Exploratory learning
- Computational thinking and creative problem solving
- Teamwork and collaboration
- Hands-on practice
- Communication and presentation skills

## 3. KUBO Hands-on Coding System

KUBO is a screen-free educational robot designed to take students from passive consumers of technology to empowered creators. By simplifying complex concepts, KUBO teaches students, as young as 4 years old, to code.

The unique TagTile® coding language is based on a puzzle-like concept and follows simple and logical steps. Each TagTile® represents a command that KUBO can read and execute. A combination of TagTile® pieces creates an algorithm that tells KUBO how to solve a task. Using KUBO and the TagTile® language is easy and resembles putting together a puzzle. With KUBO, the students will have a great foundation for understanding coding, and it prepares them for learning more advanced coding languages such as Blockly, Scratch, and Python.

Through the KUBO Tagtile® language, students will learn programming through hands-on practice, Contains the following coding concepts and knowlegdes:

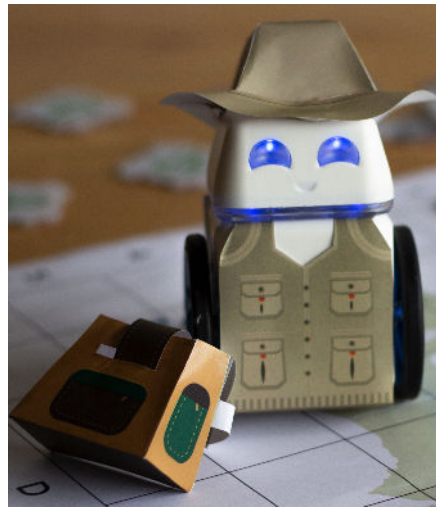
1. Routes
2. Functions
3. Subroutines
4. Loops and Recursive
5. Parameter
6. Libraries and Library calls
7. Speed, Time, Degrees
8. Variable
9. Pseudocode
10. Conditional function
11. Events
12. Randomness

This Competition will apply knowledges from 1 to 6.

## 4. Competition Mission

### 4.1 Theme Description

Odense, the hometown of Hans Christian Andersen, is a city that seamlessly merges the magic of fairy tales with the innovation of technology. This city is renowned for being the world's fifth-largest robot R&D cluster and has the largest artificial intelligence collaborative robot R&D centre. The combination of history and technology makes Odense an exciting destination for visitors from around the world. KUBO, with it's unique TagTile® coding language, is proud to be a part of the city.



## 4.2 Team Requirements

Number of participants : 2-3 students per team

Age requirement: 6-10 years old

Mixed age teams: allowed

## 4.3 Equipment Requirements

KUBO Coding Starter Set (#1030) and additional Function Tagtile® pieces from the KUBO Coding+ Set (#10102);

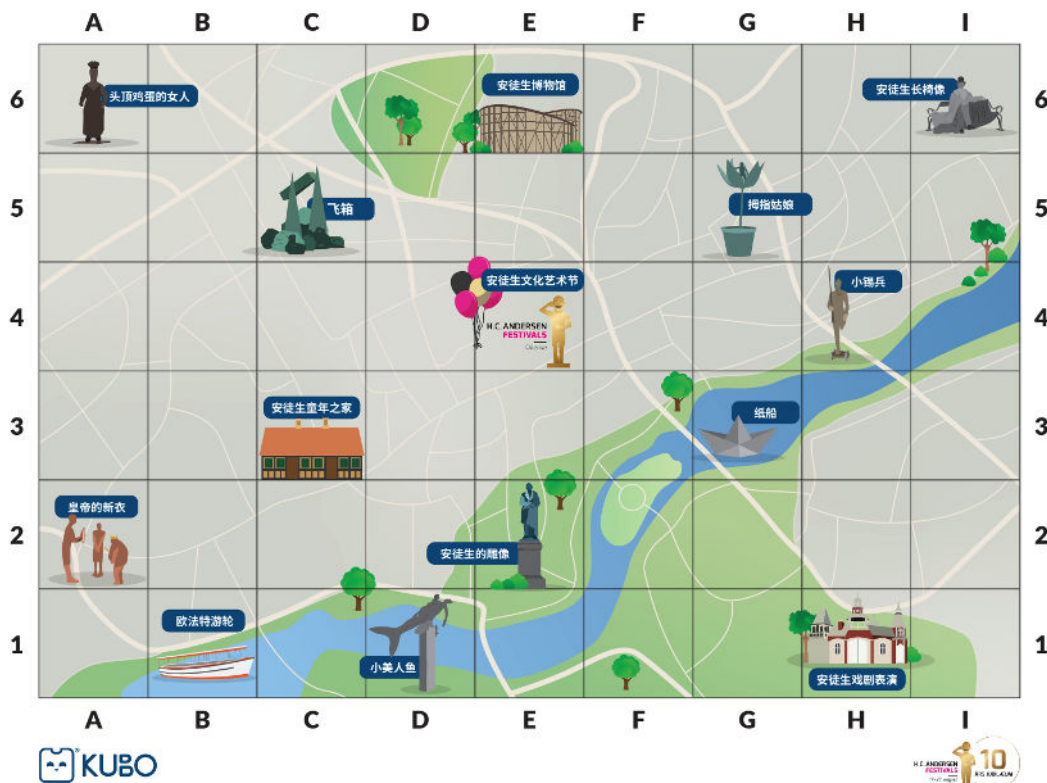
Paper and pencil is permitted for the On-site Coding Section;

Materials for the costume design for KUBO (Encourage the use of recyclable and lightweight materials);

## 4.3 Competition Map

Competition Map: "Visit H.C. Andersen's Hometown"

Map size (A3);



Mission points include:

1. H.C. Andersen Museum
2. H.C. Andersen Festivals
3. H.C. Andersen's Childhood Home
4. Odense Aarfart
5. H.C. Andersen Parade
6. Hans Christian Andersen sitting on a bench
7. The Hans Christian Andersen Statue
8. Thumbelina
9. The Steadfast Tin Soldier
10. The Paper Boat
11. The Little Mermaid
12. The Emperor's New Clothes
13. The Woman with the Eggs
14. The Flying Trunk

The map will be provided on the day of the competition.

## 5. Competition Format, Rules, and Scoring

### 5.1 Competition Format

The competition is divided into two sections: the On-site Coding Section and the Demonstration Section.

#### **On-site Coding Section:**

Each team must create a route to visit H.C. Andersen's hometown based on the mission points. Teams can determine the sequence of the mission points, except for the starting and ending points. The mission will be released on the spot, and every team must code their KUBO robot within the specified time. KUBO must pass through the mission points and arrive at the ending point. The score will be calculated according to the competition rules.

#### **Demonstration Section:**

In this section, participants will be required to demonstrate their KUBO costume and design concepts through a presentation. The presentation should not exceed three minutes and should include (but is not limited to) the following points:

- (1) Team introduction, including the team name, slogan, member names, gender, age, personal task division, and expertise.
- (2) Design concept, including design ideas and implementation process.
- (3) Relevance to H.C. Andersen, including which fairy tale that inspired the design concept.

After the presentation, the judges will be allowed to ask questions, and the score will be based on the performance of the presentation.

### 5.2 Competition Rules

1. The competition rules are based on the principle: if it is not prohibited, then it is permitted.
2. The competition mission will be released to participants at the competition day. To complete the competition mission, the team members must work together. The teams must code and debug using the KUBO Robot and the TagTile® language. The KUBO



Robot has to be programmed to run autonomously. The participating teams must create a costume and decorate their KUBO Robot before the On-site Coding Section. In the Demonstration Section, teams need to present the design and implementation process of their KUBO robot.

3. The total duration of the competition is 40 minutes, divided into three stages: Preparation, On-site Coding, and Demonstration. The On-site Coding stage is split into two parts: the Warm-up stage (no scoring) and the Competitive stage (scoring). Refer to Table 1 for time allocation for each stage.

*Table 1 Competition time distribution table*

Preparation stage		10 minutes
On-site Coding stage	Warm-up	10 minutes
	Competitive	15 minutes
Demonstration stage		5 minutes

4. Each team can only participate once.
5. The final score will be the total score of the points the team receives for both the On-site Coding and Demonstration stages.
6. In the Preparation stage, the participating teams must decorate their robot in advance and test the robot to make sure it can successfully complete the task with the costume on.
7. Once the team has completed the task and confirms the completion time with the referee during the competition stage, touching the robot or the code is strictly prohibited. Violators will receive a penalty.
8. After the teams complete the tasks in the competition stage, they need to keep the original code so that the referees can give it a score. If the original code is not available, no points will be awarded.

9. During the On-site Coding Section, participating teams are allowed to bring pen and paper to complete the task planning and design.
10. The Competition Organizing Committee has the authority to interpret and apply the rules of the competition.

### 5.3 Competition Scoring

To determine the final score, there are two sections that will be evaluated: the On-site Coding Section and the Demonstration Section. The scoring rules for each section are as follows:

#### 1. Scoring rules for the On-site Coding Section :

The score and description of the competition results are as follows:

*Table 1 Competition score and description*

ENTRY	SCORE	DESCRIPTION
Mission completed	20 points	If the mission is completed, the team will get 20 points. If not, the score will be 0 points
Mission completion time	20 points	Each team has 20 points from the start. For every 30 seconds they use, 0.5 points will be deducted from their final score. The maximum points that can be deducted are 20 points.
Coding concepts applied	20 points	The team will be awarded 5 points per coding concept you apply. It includes: routes, functions, subroutines, and loops. The maximum points that can be rewarded is 20 points.

Tagtile® pieces applied	20 points	Each Movement TagTile® used in the code will deduct 0.5 point from the score. The maximum points that can be deducted are 20 points.
Total score	80 points	

## 2. Scoring rules for the Demonstration Section:

Apart from completing the On-site Coding Section, the participating teams are also required to take part in the Demonstration Section. The Demonstration Section will take place after the On-site Coding Section.

Only the teams that have successfully completed both competition sections will qualify for winning the competition.

The total score of the Demonstration Section is 30 points, and the scores of specific items are detailed in Table 2 and 3.

*Table 2 Score table for the Demonstration Section*

ENTRY	SCORE
Team members' engagement	0-10
Presentation	0-10
The KUBO Robot's design	0-10
Total score	30

### 3. Points deducted for violations

Penalty points will be applied for any violations of the competition rules, as outlined in Table 3 below. In some cases, a violation may result in immediate disqualification from the competition.

*Table 3 Penalty point value table for violations*

Cannot provide the original code	The team will be disqualified
Touching the robot or code, after the mission is completed, without the referee's permission	-5 points/time

### 4. Total Score

The total score of each team is the sum of the scores of the On-site Coding section and the Demonstration Section. The total score will determine the first, second, and third prizes for the competition.

The different entry scores for the Demonstration Section will determine the following prizes: Winner of the Best Teamwork, Winner of the Best Presentation, Winner of the Best KUBO Robot Design.

In the event of a tie in total scores, the ranking will be determined by the time taken to complete the mission. The team that completed the mission in the shortest amount of time will be awarded the higher rank.

## 6. Competition Awards

International STEAM Games 2023 Prizes for both Chinese and Danish teams:

1. First Prize
2. Second Prize
3. Third Prize
4. Excellent Teamwork
5. Excellent Presentation

## 6. Excellent KUBO Robot Design

The winner ratio is: First prize (15%), Second prize (30%), and Third prize (55%). The results of the awards are based on the final results.

The winning teams will receive award diplomas, trophies, and medals issued by H.C. Andersen Festivals and KUBO Robotics as well as souvenirs and goodie bags.

## 7. Competition Day program

There will be a day with many exciting activities for the participants. The day program will be released soon.