



SITUATION

Knowledge of Natural Science, Mathematics and Computer Science facilitates our daily lives, and everyone uses this knowledge in everyday life, even if they are not aware of it at first glance, so knowledge of STEM (Science, Technology, Engineering and Mathematics) is useful in everyday life. Did you know that you encounter math every day? Math is all around us – the length of your steps determines how fast you move, how heavy your bag will affect the speed of your movements! The same thing happens in nature, for example, did you know that the Moon is about 400 times smaller than the Sun, but its distance from the Sun affects its ability to obscure the Sun and create a complete solar eclipse? Such mathematical calculations are not always possible in nature but can be done by performing simulations on a computer, where this process is imitated, because the simulation is an imitation of the operation of a real-world process.

This year's IT challenge will give you the opportunity to try your hand at creating such simulations.

ASSIGNMENT

Do you know how topical and global environmental problems are? Have you ever thought about their causes and possible consequences? For example, the melting of glaciers, water pollution or the environmental impact of SpaceX? In order to find out the answers to these questions, events do not have to take place in the real environment, to see the approximate course of events, it is enough to create a computer simulation, which provides answers on how the environment will change, for example, after the melting of glaciers.

The assignment of your team is to develop a **computer simulation with a process visualization** of an **environmental problem** in your country. For awareness-raising and inspiration on how computer simulations manifest themselves in different industries, we encourage you to look at the examples in the section "Resources, materials for inspiration".

ASSIGNMENT REQUIREMENTS

- The assignment to be performed is a computer simulation.
- The computer simulation must be stored in the public Github or GitLab repository and submitted to the competition as a link to the repository. The repository must contain files that activate computer simulation.
- The name of the repository must be "Ventspils_IT_Challenge_2020_TeamName" - where the name of the registered team must be indicated instead of TeamName.



- During the entire computer simulation, the information "Developed within Ventspils IT challenge 2020" must be visible.
- The computer simulation should contain information about the name of the team, the names of the participants, as well as the name of the mentor.
- The computer simulation must be interactive or able to interact with the user (for example, animation/video is not considered a computer simulation, as the user is then unable to interact and influence its outcome).
- The work must be developed in English. The task respects copyright – the sources of the used materials are indicated, the terms of the licenses of the used materials allow their use in such materials.

TECHNICAL PERFORMANCE OF THE ASSIGNMENT

- A link to the repository must be submitted on the competition website www.ventspilsitc.com from September 2 to October 14 11:59 PM.
- The task should be developed in open source online/offline software tool. Some, but not the only possible examples of technological solutions can be found in the section "Resources, materials for inspiration".
- The computer simulation trigger can be an executable binary file (.exe) or a link to a Web site (URL).
- If the computer simulation format is neither an executable binary nor a file on a Web site, then sequential access information in a text file (.txt) is required. Please note that when submitting in a format where computer simulation will require members to perform actions, such as compiling a file or installing a server, the jury reserves the right to consider the submitted result to be nonassessable.
- The "Start", "Exit" and "Stop" functions are implemented in the computer simulation.
- The computer simulation should contain an information window (e.g. icon "i") describing the nature of the computer simulation, i.e. what the computer simulation is about and for what purpose it can be used.
- In a computer simulation, the values of at least two parameters must be changeable, and the user changes the result of the computer simulation when the parameters are changed.
- The duration of the computer simulation should be between 40 and 60 seconds.

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EVALUATION CRITERIA OF THE WORK

- Factual and mathematical accuracy
- Execution of technical (functionality) and technological solution
- Design
- Relevance and applicability

WORK WILL NOT BE EVALUATED IF

- Work is not submitted on time
- Team has not complied with the copyright conditions – the names of all the authors involved in the work, the name of the team, the reference to the competition and the sources of the materials used are not indicated
- Computer simulation has no functionality, it is only visual
- Work is not submitted in English
- Minimum/maximum possible duration of the computer simulation is not observed



RESOURCES, MATERIALS FOR INSPIRATION

- Computer simulation of the consequences of COVID-19 depending on the chosen scenario and parameters - <https://exchange.iseesystems.com/public/isee/covid-19-simulator/index.html#page1>

Explanation: In this case, the sector is considered to be healthcare, the process of spreading the infectious disease COVID-19 is depicted depending on the scenario chosen by the user.

- Partially implemented computer simulation without the possibility of changing the parameters for the movement of birds - <https://raw.githubusercontent.com/wiki/hecomi/UnityECSBoidsSimulation/boids.gif>.

Clarification: in this case, the sector is considered to be the environment, the process of birds' behavior during migration is depicted. This computer simulation is based on Unity software.

- Computer simulation of traffic intensity, congestion depending on parameters - <https://traffic-simulation.de/routing.html>

Explanation: in this case, the sector is considered to be transport (road traffic), the process of traffic intensity depending on the values of parameters is depicted. This computer simulation is developed using JavaScript and HTML5.

- Computer simulation of rocket flight altitude and destination reach depending on parameters - <https://www.sciencelearn.org.nz/embeds/132-rocket-launch-challenge>

Explanation: In this case, the sector is considered to be aviation, demonstrating the manifestation of physical phenomena and their impact on the result.

- Computer simulation in astronomy of the motion of stars depending on their rotation - <http://physics.weber.edu/schroeder/sky/StarMotion.html>

Explanation: in this case, the sector is considered to be astronomy, depicting the process of star motion. This computer simulation is developed using HTML, CSS, JavaScript and HTML5.

NOTES

- It is recommended to test the operation of the developed computer simulation on different devices/browsers.