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# A proposal for Amazon company how to enhance delivery service

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**Year**: 2018/19

**Abstract:** Data, in today's business and technology world, is indispensable. The Big Data technologies and initiatives are rising to analyses this data for gaining insights that can help in making strategic decisions. Industries that have stiff competition listen carefully to customers — and if they don't, they face loss of revenue or eventual death. I focused on Amazon company and how he stored a big amount of Big Data and which tricks he used for logistics. I tried to improve a last part of logistic mechanism. Delivering to customers with drones. In this topic I did a SWOT analyses of the biggest weaknesses and treats.

**Key words**: Amazon, Big Data, Logistics, Drone

# Safety of motorcycle helmets

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**Academic year :** 2018/2019

**Abstract :** The project deals with safety features of motorcycle helmets and their functions. Firstly, the individual layers of a helmet are described and the materials used for each layer are introduced.
Secondly, the methods used for testing helmet safety features are presented and the experiments which determine their safety level are explained. These levels are than converted into certificates, which are categorized and listed in this project.
Finally, future helmet development is proposed. What new technologies can be implemented and invented in this area to increase the safety and comfort of riders worldwide.

**Key words :** helmets, safety, certification, motorcycle, smart

# A system for optimizing supply in public establishments with unmonitored access to goods

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**Institute:** CJHŠ, UIAM

**Acad. year:** 2018/2019

**Abstract:**

The goal of the project was to optimize the usage of funds in public establishments like libraries, board game cafes and arcades by tracking the local usage of goods that they offer. The project focused on both the hardware requirements and the software development and implementation of the system. In regards to cost effectiveness, the system was designed to have minimal hardware requirements. The implementation followed a rapid development model. Multiple languages were used to plan and implement the system. UML was used to model the analysis, the system was programmed in C# and SQL was used to create and access the system's database. The programs used during development were Enterprise Architect, SQL Developer and Sharp Develop.
Based on the data gathered and presented by this system, establishments can optimize the spending of funds, increase customer satisfaction, decrease the space taken up by unused goods and increase their customer base.

**Key words:**

tracking, information system, application, magazine, book, game

# Anti-Cheat Software Development

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**Acad. year:** 2018/2019

**Abstract:** The end goal of this project is to create a software that would recognize human body movements in space and based on that, detect and evaluate the probability of student's

cheating on a written exam. We decided to use machine learning to achieve such behaviour of this software. We also used Openpose, which is a software that estimates the human body parts positions in a two dimensional plain that we take and detect movement. This project has a great potential if further developed. It would have been used in an airport for example where it would scan people going through an airport control and watching out for anyone trying to smuggle something suspicious into an airplane.

**Key words:** machine learning, cheating, movement detection, software development, written exam

# Eco-friendly automobile production in Slovakia

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**Acad. year:** 2018/2019

**Abstract:** Aim of this research was to find whether automobile production in Slovakia is eco-friendly. Within the research, we studied the related ISO 14001 Standard and its implementation. Then we analysed and compared the ways of reducing the impact of automobile production on the environment in Slovakia. We selected three car manufacturers in Slovakia, Volkswagen Bratislava, PSA Group Trnava, and KIA Žilina and identified four key indicators: energy consumption, waste produce and disposed, water consumption and the amount of $CO^2$ emissions produced. Originally, we intended to contact in writing each car manufacturer. However, we realised that this method would take too much time due to business of the environmental managers. Therefore, after consultation with our special adviser, we reconsidered our strategy and decided to collect information about the eco-friendly production strategies from the Annual Reports of individual manufacturers. After studying the Annual Reports, we could compare how those three manufacturers meet the four established key indicators. The survey results are presented in a form of an explanatory table.

**Key words**: eco-friendly, production, automobile,

# Testing structure and material impact on the wheel elasticity using simulation software

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**Academic year:** 2018/2019

**Abstract:** This project is focused on testing structure and material impact on the wheel elasticity. Tests are in simulation software. Goal of the project is to find material and structure that can absorb road impacts the same way pneumatic tires does. Meaning of the project is to replace classic air pressured pneumatic tires. Pattern used for model is inspired by bee hive, so it is hexagon. For testing were used two materials – PEI and Alloy Steel with the same structure and with same laod. Data used in results are from simulation softwere and compare to those which are in the tables. Results says that both of the tasted materials are elastic enough to deform and come back to initial shape. The inner circle of the model won´t deform in the tests for both materials, so i recommend to make it from solid material like carbon. The outter circle, which is deformated can be made from materials with enough elasticity. Outter circle of the wheel can be printed on 3D printer and could replace the tire of the classic wheel.

**Key words:** materials, structure, elasticity, deformation

# Replacing materials containing benzophenone in IKEA Industry Trnava

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**Academic year:** 2018/2019

**Abstrakt:** Based on IKEA Values - one of which is *„Caring for people and planet"* – I got the opportunity to take part in a project about replacing materials containing benzophenone for more environmentally friendly options in IKEA Industry Slovakia s.r.o., branch establishment Trnava. The overall goal was to find proper replacements with the same properties as benzophenone materials have by the end of August 2019. My aim was to participate in every part of the process with the main focus on internal testing and analysing test reports and making statistics. The process consisted of development of benzophenone-free materials (done by suppliers), real production of samples on lacquering line, internal tests (surface resistance tests), external tests in CATAS laboratory in Italy and, if the previously mentioned parts worked correctly, application to the production process. If any of the parts failed, the process had to be repeated. Finally, substitutes were found, and they were successfully implemented into the production process. Overall, 46 materials had been used for surface treatment previously and after this project, 30 of them had to be replaced.

**Key words:** benzophenone, surface treatment, testing, production, environment

# INSPIRATION BY ANCIENT INENTIONS ON MODERN WORLD

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**Academic year:** 2018/2019

**Abstrakt:**

The main goal of my work was to make a connection between the ancient technology and modern world. I used research from three ancient scientists, Ctesibios, Philo of Byzantium and Hero of Alexandria. All of them did research in hydraulics and automation, such as pneumatics. The result of my work was the making of an hydraulic robotic arm based on the ancient research. The robotic arm is made from available materials, it's mainly eco-friendly and it's more than suitable for basic pick-and-place applications. It can be also upgraded to handle other types of applications as well. The secondary goal was to show the students, that if they are making some project on their own and are in need of an inspiration, they don't have to look only a few centuries to the past, but that there were amazing inventions and discoveries even thousands of years ago. Because science shouldn't be always serious, but it should be fun and they should be creative with their projects.

**Kľúčové slová:** ancient science, hydraulics, robotic arm, inspiration, technology, inventions

# Implementation of a Bipedal Robot Locomotion

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**Academic year:** 2018/2019

**Abstrakt:**

In this report we present one year accomplishments on our mission to build and control fully autonomous, bipedal robot. In order to implement legged locomotion, was first year of this journey devoted to gathering various data from fields as mechanics, mechatronics and most importantly, automation.

Decision was made, not to focus on single integrated board but rather on microcontroller itself, in order to ensure compatibility with various boards, those self-made included.

Control software is working on base of scripts written in Python programing language. These "PyScripts" are stored in robot's control unit and each is used for different motion such as walk, jump or squat. Controllers themselves are programmed in C++ language with JPL coding standard, which is most professional and most effective standard for hardware programming to date.

Data acquired helped us to model transition characteristic of our robotic system. Then the process of synthetizing regulator has began in order to gain full control of its bipedal locomotion.

# Project-based education at MTF

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**Academic year**: 2018/2019

**Abstract:** The aim of this research was to find out, if there is any interest from students in project-based education at MTF. The main idea of project-based education is to gather up a group of students and let them use and expand their knowledge through different kinds of projects. The advantages of projects: students will learn to effectively solve problems within their workgroups, they may travel around the world (competitions, various presentations, etc.), they could have a chance to write a bachelor/master thesis about the given project. We made a questionnaire and used it to collect the required data from the Bachelor's and Engineer's degree students we addressed. The next needed step would be to address MTF teachers with similar questionnaire to find their willingness and interest in project involvement. We found out that some of them are interested, since doc. Ing. Martin Kusý, PhD. already has an idea about MTF Community Hub, which would be a community zone for education, relax, sport and projects realization. This Community Hub could also work as an umbrella project for our own idea of project-based education.

**Key words:** questionnaire, project-based education, The Community Hub