MARQUARDT's

Design Competition

for students

2019-2020 Regulations

Contents

General aspects

Target

The competition addresses the undergraduate students and graduate students enrolled in master programs of technical faculties at "Lucian Blaga" University of Sibiu with knowledge in embedded systems.

Scope

The competition aims to develop on students the capacity to elaborate, manage and deliver on time a project.

Description

The competition's theme for this year (2019-2020) is **rain-sensing car wipers**. Students will have to build an embedded system application within this automotive context.

Some system parts are delivered by Marquardt (as a kit) and their integration within the system is mandatory; the other system parts are acquired by teams. For a description of Marquardt kit see Annex 1. During the development of their project, teams could decide changes in the design; the risks and the impacts of these decisions must be ackowledged by teams. Project status will be provided to the Marquardt Organizing Team for review.

The competition is developed on stages as follows:

STAGE 1: IDEA = teams will present their embedded system application idea and how they think to build-up the system.

STAGE 2: DRAFT = teams will accompany their idea with a draft document presenting a design for their application; a small research is needed to accomplish this stage and some decisions are made; teams should present how they will integrate Marquardt provided kit; we will review the drafts and 10 teams are selected to advance to the next stage.

STAGE 3: PROTOTYPE = selected teams will implement the chosen design into a working prototype; small scale changes are admitted and teams should acknowledge their risk and impact; intermediate project status is reviewed by the Marquardt Organizing Team and each student team will receive a feedback.

STAGE 4: FINAL = teams will present their status and their prototype in a final meeting; the winner will be announced.

At any stage teams can resign from the competition; in this case they have the responsibility to announce Marquardt Organizing Team not later than 1 week prior to the ongoing stage deadline; also they have to return the Marquardt provided kit.

Teams

The competition is predicated on teamwork, therefore teams of 2 students are eligible. Number of teams to register is unlimited. Number of teams advancing to Prototype stage is limited to 10.

Schedule

The below timeframe will be followed:

Stage1: October 2019

Stage2: November – December 2019

Stage3: December 2019 – April 2020

Stage4: May 2020

Teams must watch for the following deadlines:

Teams registration latest:	31 october 2019
Idea presentation latest:	31 october 2019
Draft presentation latest:	29 november 2019
Selected teams announcement latest:	13 december 2019
Marquardt kit provided latest:	20 december 2019
Intermediate status latest:	28 february 2020
Prototype showdown/review latest:	06 march 2020
Final status latest:	8 may 2020
Final presentation and winners latest:	15 may 2020

Should the dates be changed by Marquardt, then they will be announced.

Prizes

Winners will receive the following e-mobility prizes:

First place: 2x Electric bicycles (e-bike)

Second place: 2x Electric scooters

Third place: 2x Electric auto-balance vehicles (segway type)

Criteria

Within the predicated competition's scope, there are several aspects which Marquardt Organizing Team emphasizes in a short list below. They will act as criteria for declaring the winner of the competition (the order in the list does not constitute a priority):

⇨ <u>Project planning:</u>
Teams present and implement a schedule of their project activities.
⇨ <u>Project budget:</u>
Teams buy parts for the system and a budget is managed towards a low cost solution.
⇨ <u>Project allocation:</u>
Team members are splitting their project activities and responsabilities between them.
⇨ <u>Milestones achievement:</u>
Teams are watching deadlines to deliver on time the required output.
⇨ <u>Decision responsability:</u>
During the development of the project decisions are done, therefore teams watch their decisions' risks and impacts.
⇨ <u>Hardware-Software design:</u>
Teams elaborate a hardware-software design and present it, knowing its advantages over other systems and its limitations.
⇨ <u>Hardware-Software implementation:</u>
Teams coherently implement the predicated design.
⇨ <u>Communication:</u>
Teams communicate their results to Marquardt Organizing Team and receive feedback.

Rules

Team registration

1. Deadline for team registration is 31.10.2019, 23:59

2. Teams with 2 members can register.

3. As a member you have to be enrolled as undergraduate student to University "Lucian Blaga" from Sibiu or to be enrolled as graduate student to one of the University's Master Programs.

4. Students that are Marquardt employees cannot participate.

5. The registration can be performed by simply sending an email to the following address: catalin.stan@marquardt-ro.com

Include in the email all team members with the requested information (see Annex 2 for an email template): Name, Faculty, Year of study, Phone number, Email address.

You will receive a registration confirmation email.

6. The number of teams to register is unlimited.

7. Being member in multiple teams is forbidden.

8. You could combine the step of team registration with the step of sending the idea presentation (see STAGE 1: IDEA rules), but it is not mandatory.

STAGE 1: IDEA

1. Deadline for sending the idea presentation is 31.10.2019, 23:59

2. For this stage it is required just to roughly describe your application project idea.

3. The idea of the application project has to be presented in a written form in English language. Only PDF is allowed. Limit is 500 words, Times New Roman font, size 12, between lines space of 1.0, page normal margins of 1".

4. Send the idea description to the following email address: catalin.stan@marquardt-ro.com

5. You could combine the step of sending the idea presentation with the step of team registration (see Team Registration Rules), but this is not mandatory.

STAGE 2: DRAFT

1. Deadline for sending the draft is 29.11.2019, 23:59

2. For this stage it is required to detail your idea following your research done so far. The following are guidelines for you to detail:

- how you will integrate the Marquardt's kit in the system?

- have you considered alternative options for your system?

- have you considered the hardware/software resources for your system?

- how you will interface hardware and software?

- have you made a project budget estimation?

- what responsabilities has each team member?

- have you planned your activities?

3. The draft has to be presented in a written form in English language. Only PDF is allowed. Maximum limit is 4000 words, Times New Roman font, size 12, space between lines of 1.0, page normal margins of 1". Graphics/UML diagrams describing your system are encouraged to be used.

4. Send the draft document to the following email address: catalin.stan@marquardt-ro.com

5. Only 10 teams will be selected to advance to STAGE 3: PROTOTYPE.

6. At this stage of the competiton all teams will receive a feedback following the draft review. Feedback is provided via email latest 13.12.2019, 23:59.

STAGE 3: PROTOTYPE

1. Selected teams will be notified to receive Marquardt's kit latest on 20.12.2019, 23:59.

2. At this stage, teams are required to implement the design described in the draft and build a prototype. An intermediate status of the project implementation must be sent via email by the teams latest on 28.02.2020, 23:59. Use the following email address: catalin.stan@marquardt-ro.com

3. The intermediate status has to be presented in a written form in English language. Only PDF is allowed. Maximum limit is 5000 words, Times New Roman font, size 12, space between lines of 1.0, page normal margins of 1". Graphics/UML diagrams are encouraged to be used. This status is based on the previous draft, therefore an improvement in the system description is expected.

4. The intermediate status will be followed by a prototype review in a meeting with Marquardt Organizing Team. The meeting will be scheduled

in the week 02.03.2020-06.03.2020. Teams will be notified for details of the meeting.

5. Changes in design and implementation are admitted, by comparison with the draft version, but their impact must be evaluated and documented by the team. Changes will be subject to penalties, but their evaluation and documentation performed within the student team will be rewarded by the reviewers.

STAGE 4: FINAL

1. Deadline for final status is 08.05.2020, 23:59

2. At this stage, teams are required to approach the final status of their design and implementation. Between final status day and presentation day no changes in design and implementation are admitted as we expect teams to have a mature system.

3. The final status has to be presented in a written form in English language. Only PDF is allowed. Limit is 6000 words, Times New Roman font, size 12, space between lines of 1.0, page normal margins of 1". Graphics/UML diagrams are encouraged to be used. This status is based on the previous intermediate status, therefore an improvement in the system description and prototype implementation is expected. Use the following email address: catalin.stan@marquardt-ro.com

4. The final status will be followed by the final prototype presentation in a meeting with Marquardt Organizing Team. Prototype must be functional at this date. The meeting will be scheduled in the week 11.05.2020-15.05.2020. Teams will be notified for details of the meeting.

Contact

For questions to address, contact Catalin Stan:

catalin.stan@marquardt-ro.com

Annex 1: Marquardt kit description

Marquardt kit consists of the following parts:

A. 1x development board Xplained PRO ATmega324PB

B. 1x mini-USB cable

C. 1x DC motor

Annex 2: registration email template

Hello Marquardt Organizing Team,

We would like to register to the 2020 Student Design Competition. Following this email we will send you our project idea presentation.

Team name: *[complete here your team's name]*

Team member 1 info:

     Name: *[complete here his/her name]*

     Faculty: *[complete here the Faculty he/she is enrolled]*

     Year of study: *[complete here the year of study]*

     Phone number: *[complete here his/her phone number]*

     Email address: *[complete here his/her email address]*

     Experience with embedded systems: *[list and decribe here any embedded systems projects he/she made]*

Team member 2 info:

     Name: *[complete here his/her name]*

     Faculty: *[complete here the Faculty he/she is enrolled]*

     Year of study: *[complete here the year of study]*

     Phone number: *[complete here his/her phone number]*

     Email address: *[complete here his/her email address]*

     Experience with embedded systems: *[list and decribe here any embedded systems projects he/she made]*

Best regards,

[sender's name]

Annex 3: registration and project idea email template

Hello Marquardt Organizing Team,

We would like to register to the 2020 Student Design Competition.

Attached to this email you will find our project idea presentation.

Team name: *[complete here your team's name]*

Team member 1 info:

    Name: *[complete here his/her name]*

    Faculty: *[complete here the Faculty he/she is enrolled]*

    Year of study: *[complete here the year of study]*

    Phone number: *[complete here his/her phone number]*

    Email address: *[complete here his/her email address]*

    Experience with embedded systems: *[list and decribe here any embedded systems projects he/she made]*

Team member 2 info:

    Name: *[complete here his/her name]*

    Faculty: *[complete here the Faculty he/she is enrolled]*

    Year of study: *[complete here the year of study]*

    Phone number: *[complete here his/her phone number]*

    Email address: *[complete here his/her email address]*

    Experience with embedded systems: *[list and decribe here any embedded systems projects he/she made]*

Best regards,

[sender's name]

Annex 4: project status guidelines

The following are guidelines to organize your status document (draft/intermediate/final):

- First page: **Project name**, **Team and team members name**, **Status date**
- Second page: **Contents**
- Third page and subsequent pages:
    - **Overview:** Describe here your application at an overview level, like the practical context where the application is functioning, what problems it solves, etc.
    - **Application design**: Describe here your application more technically, in terms of hardware used, software used and how software is structured (e.g. modules, functions), hardware physical connections and other environment variables that it controls. Diagrams are appreciated.
    - **Design decisions**: Emphasize here the decisions you have made on your design. Provide rationals/reasons for those decisions as they will be appreciated.
    - **Risk and impact**: Identify here the risks of your decisions, or other kind of risks you think you will encounter during the project development; what is their impact on the application functionality, deadlines, budget. Describing the approach by which you think you will handle those risks is appreciated.
    - **Budget**: Consider here to estimate and analyse the amount of money you spent on buying parts, services for building up your system. The budget aspect is a sensitive one, therefore the reviewers will much appreciate its detailed consideration.
    - **Team roles**: Describe here your team members and their roles within the team, like name, personality, strong points, weak points, what he/she will do within the project (e.g. building the hardware or coding the software; you will be coding in-pair the same module or each of you will be coding a specific module), etc.
    - **Planning and schedule**: Describe here what project activities you should perform and what resources you should use (planning). Add a timeframe (schedule) your team takes to build the project. We will appreciate the realistic identification of the time periods by which your team will work to complete the project.
- Last pages: **Annexes**, where you should add, at description level or reference, anything you think it is relevant for your project.