

Altera-UTM & MMU 2006 INNOVATIVE PROJECT COMPETITION

Guidelines and Information for the Competition

Altera UTM Participants shall read this following Guidelines and Information.

Guidelines to propose an innovative project

The idea

We can use one of the below ways to generate new idea.

- To modify an existing thing for better performance (more functions, better efficiency, lower operating cost, simpler operation, etc)
- To modify an existing thing for a new application (or to adapt an old idea for a new application)
- To introduce a new thing to replace the existing thing for the same application (or to find an alternative for the same application)
- To introduce a new thing for a new application

The realization

Some considerations are important to realize an idea.

- Theoretical and practical knowledge and skills (design, construction, measurement, testing, analysis, etc.)
- Amount of work, time and cost
- Necessary facilities (tools, equipment, instruments, etc. that are available in the lab)

It is difficult to know the exact qualities/quantities for the first two considerations but we can roughly estimate the total based on our abilities and experiences. These estimations could be done with a proposal.

The Proposal

A proposal describes the realization of an idea through a project that will be implemented. It can help us to prepare the required theoretical and practical background to implement the project. Generally, the proposal can give certain degree of success of a project.

In the next section, the required proposal format given in the Rules and Regulations sheets are explained.

Objectives

The objectives are related to the project being proposed.

Innovation in the project (refer to Appendix C)

It must be related to improvement, creation or invention (new application, new way, new method, new solution, better performance, more durable, more reliable, more precise, more useful, easier to be used, lower cost, etc.). It must be specific (not general) and written in short, e.g. single button operation of....

Overview of the project

It is a short introduction of a proposed project. Usually, block diagrams or short sentences are suitable tools to show the overview of a project. They may contain many things as mentioned in the next few sections below.

Theoretical design considerations and analysis

We need only to consider and analyze the major parts that show the possibility of success of a project and the performance of its product. The suggested design and analysis should be within or close to group members' abilities. Normally, each block diagram in the overview section will be explained in short and clear.

Measure and test methods

We need to mention on how to measure and test the performance of a project product. The required instruments, equipment and/or software (available in your faculty) should also be mentioned.

Project planning/schedule

Project planning/schedule is important as it predicts the amount of work and time required for a project. Project groups need to consider the time required for mid-trimester tests and final exams. Nevertheless, good time management groups can implement their projects along with their academic activities.

Graphical or tabulated presentation is a useful tool to show project planning/schedule, e.g. Gantt chart (like a calendar: activity title at the left, week number at the top and horizontal bars at each activity row to show from when to when the activity to be performed).

List of components or parts

It is a list of major or specific components or parts (not resistors, capacitors, LEDs and other common types of components).

Cost estimation

It can be estimated from the suspected expensive components/parts. Other common components like resistors, capacitors etc can be estimated in a sum.

Altera Nios Board

In this competition, the Altera Nios board must be used as the main platform.

Summary of proposal

The summary of proposal for evaluation by Altera judges shall be done as the following format. It is normally done after the proposal revision by the project coordinators.

Front page:

- Titles of project
- Names of Project Leader and group members
- Objectives
- Innovation in the project

Following pages:

- Overview of the project which consists of core and additional features (add short descriptions for each functional block)

Appendix A: Using the lab facilities

- Students can use the lab facilities when there is no lab session in progress. Project Lab I, Project Lab II and PCB workshop are normally the places for students to implement their projects. Other undergraduate labs can also be used if specific instruments or equipment are required.
- Students are allowed to borrow certain lab facilities.
- Students must follow all lab regulations as mentioned in the “Lab facilities home page”.

Appendix B: Purchasing items and claiming petty cash

- Altera will sponsor RM10,000 to UTM in which UTM will decide on the distribution of the money for promotional activities or project costs.
- All items are purchased with own money first before submitting for petty cash claim.
- Receipts of purchased items are necessary for petty cash claim.
- An item that costs more than RM100.00 is not encouraged. However, if it needs to be used in your project, please consult the coordinator first.
- Procedure for petty cash claim:
 - 1) Get petty cash claim form from the faculty office
 - 2) Fill in the form (make sure the sum in each claim form is not more than RM100.00)
 - 3) Paste receipts on A4 papers (single sided, allow using used paper)
 - 4) Get signature from the coordinator
 - 5) Submit to the faculty office for further processing
- Facilities, hand-tools, stationery, and others are not to be claimed (please refer to categories of items below)
- Do not under use a purchased item, especially the expensive one.
- Do not simply purchase an expensive or unnecessary item (Note: RS or Farnell items are more expensive than other suppliers' items, hence they should be the last options.).
- You may not need to use up all the RM500.00.
- All purchased items that have been claimed petty cash must be submitted to the project coordinator.
- A project group that does not submit a project report at the end of competition shall return back all the petty cash to the Altera funding account.

Categories of Items

In overall, items can be categorized into (i) facilities and non-consumable items, (ii) discrete components/parts and consumable items, and (iii) stationery and personal expenses. Please note that the categorization is based on the utilization, not the cost of an item.

(i) Facilities/non-consumable items (cannot be claimed)

- Hardware/hand tools – e.g. screw drivers, pliers, cutters, spanners, drill bits, etc.
- Small equipment/equipment/accessories – e.g. electrical and electronic testers, drills, power supplies/ adaptors, soldering iron, products in complete form, etc.
- Bread/test/prototyping board
- “Plug and play” items – e.g. camera/web camera/CCTV, computer peripherals, modem, development tools (use lab facilities) etc
- Software tools – any software

(ii) Discrete components/parts or consumable items (can be claimed)

- Electronic and electrical components – IC chips, resistors, capacitors, inductors, transformers, wires, cables etc (except Altera IC chips).
- Electrical and mechanical parts – motors, boxes, gears, etc.
- Stripboard and copper-clad boards (for making PCB)
- Stuffs for prototyping

(iii) Stationery and personal expenses (cannot be claimed)

- Diskette, paper, photocopying, writing tools, etc.
- Transportation, toll charges, web-homepage/telephone/hand-phone hosting charges etc.

NOTES: For items that are not under the above mentioned category or items that cost more than RM100.00, please check with your project coordinator before purchased.

Appendix C: Innovation

Meaning of “innovate”

- *Dictionary.msn.com:* In mid-16th century. From Latin innovat-, from innovare "to renew," from novus "new". Transitive and intransitive verb: **try out new ideas: to introduce a new way of doing something or a new device.**
- *Yourdictionary.com:* Etymology: In 1548, Latin innovatus, past participle of innovare, from in- + novus, **new -- more at NEW.** Transitive senses: 1: **to introduce as or as if new**, 2 archaic: **to effect a change in.** Intransitive senses: **to make changes: do something in a new way.**

Why we need INNOVATION?

It has no doubt that innovation changes our lifestyle. Innovation makes things simpler and smarter either in consumer or industrial applications.

Keys and quotes for innovation

- Innovation is introduction of new things (method, technique, device, etc) or improvement

on existing things.

- Innovation can be creation, invention or improvement (Note that discovery is a process of exploitation of the naturally existing things, e.g. discovery of electron)
 - "...innovation is the successful usage and exploitation of new ideas." *quoted from Symbiosis, page 28, Aug 2002; from "OneKey - Single key multiple access solution" report, page 2.*
 - - The products of innovations are very wide, ranging from very simple to very complex.
 - Inventive thought is undeniably a component of every innovation, although inventions in and of themselves do not always represent innovations in the true sense of the word.
 - Inventions are usually aimed at solving problems but there is no guarantee that they will create value and generate profits in the process.
 - Innovations are usually aimed at adding higher value to existing products, services or processes and creating higher value for people/customer. Examples of the values are low cost, simplicity, durability, reliability, precision, features and intelligence.
 - Continuous improvement can help to create higher value to existing products.
- (Quoted from Optics & Photonics News, Sept. 2002, page 22 & 23. The Optical Entrepreneur. What is Innovation? By Dean Faklis)*

Project Quality

The quality of an innovative project can be measured in terms of innovativeness, usefulness, performance and reliability. Innovation is the process of introducing something NEW. Innovativeness is the quality of producing NEW things or creativity. The product of an innovative project shall be able to apply to or solve the actual industrial or consumer application conditions or problems. The product will exhibit the quality of the project. Note that innovation is not necessarily related to high tech.

Appendix D: Types of products of the Altera-UTM Annual Innovative Projects

The products produced from the Altera-UTM Annual Innovative Project Competition can be categorized into 3 types. In this competition, we apply the number of prototyping parts or the percentage of prototyping in a product to determine the type of the product. Some projects are free from prototyping but some projects can not avoid from prototyping. Nevertheless, the percentage of completion of a product itself exhibits the difference.

Type 1: Real products

These are innovative products that can be immediately used by users with some additional product development. The product development can be packaging, durability or reliability tests and so on. This type of product is generally easier to be commercialized or marketed as compared with other types. They have a unique feature: a single unit/system without additional parts.

Type 2a: Partial prototype products

These are innovative products that some parts are real and some parts are prototypes. They normally can not be used immediately. Additional parts must be introduced before they can be used in practical applications. Prototyping examples: low voltage DC fans/motors/pumps as 240V AC fans/motors/pumps, a control system which controls few devices instead of the actual one which controls many devices, simulation of PSTN, WAP and others, etc.

Type 2b: Full prototype products

These are innovative products that all parts or most of the parts are prototypes. They cannot be used in real situations or applications. They are normally large-scale systems that require to be done all over again or systems that involve very high development cost.

Considerations before commercialization of a product

Some important points must be considered before developing a product into market.

Point 1: Marketing potential

First, it is related to the usefulness or application of product. Consumer items (home use, personal use, children use, public use, etc) have market value. Second, it is related to its competition with the existing products. Thus, products that are easy to use, relatively cheap price, worth to buy, etc are important for marketing competition.

Point 2: Development and production costs

Development costs involve the costs for improvement, packaging, durability or reliability tests, etc. Production cost is often related to easy to design, easy to produce, etc.

Note:

Some products require high technology, sophisticated design, etc. These products are not really suitable for the Altera-UTM competition projects. High cost, high skills and/or long period of R&D are normally involved. However, some groups may have abilities to realize these products.