

INSTITUTO TECNOLÓGICO DE COSTA RICA  
ÁREA ACADÉMICA DE INGENIERÍA EN COMPUTADORES  
PROYECTO DE DISEÑO EN INGENIERÍA EN COMPUTADORES



## **Progress report #3 for the project: Design of (ASIPs) for Approximate Computing**

Chair for Embedded Systems (CES)  
Karlsruhe Institute of Technology (KIT)  
Period: 19/03/2018 (week 7) - 06/04/2018 (week 8)

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# 1 Performed activities

1. **Familiarization with the software platform (ID 01):** The laboratory sessions were reviewed and mostly completed. An agreement was made, so the remaining parts of the laboratory script will not be finished, this is because they either require a device (which is not needed yet) or are repetitions of previous work (but with different conditions).
2. **Find appropriate error-tolerant applications (ID 02):** The possible approximate applications delivered to Jorge Castro were reviewed with him. The proposed applications are K-means and KNN, a third is yet to be confirmed (this is dependent on whether the first two approximated implementations produce correct output). The source code of the aforementioned applications (programmed in C) was analyzed, but compilation failed at the linking phase, some unexpected errors appeared as described in section 4.

## 2 Scope Changes

No scope changes have been made, however, because of the difficulties explained in section 4, scope changes are expected in the next report.

## 3 Earned Value analysis

Table 1 summarizes the gained value analysis.

Table 1: Earned Value

Activity ID	Activity	Budget	%Planned Value	PV	AC	%Completed work	EV	CPI	SPI	Initial planned date	Ending date	Initial real date	Real ending
01	Get to know the software platform	32	100%	32	34	100%	32	0.94	1	Week 1	Week 3	Week 1	Week 7
02	Find appropriate error-tolerant Applications	32	100%	32	20	85%	27.2	1.36	0.85	Week 4	Week 6	Week 4	-
04	Write Project Plan Document	8	100%	8	10	100%	8	0.8	1	Week 1	Week 2	Week 1	Week 3
05	Write Requirements Document	8	100%	8	6	100%	8	1.33	1	Week 2	Week 3	Week 2	Week 4
06	Write Design Document	8	100%	8	7	100%	8	1.14	1	Week 3	Week 4	Week 3	Week 5
	Total		100%	88	77	87.5%	83.2	1.08	0.95				

## 4 Difficulties Encountered

- The selected code for the K-means algorithm needed to be compiled with the CoSy compiler into assembly code. Several restrictions for the source code in the C language exist (for example, it cannot contain void functions or if-else structures), which were taken into account, but when compiling some errors appeared, after some testing additional limitations were discovered. Finally, the code was compiled but not assembled/linked because of an unknown error. An e-mail describing the error has already been sent and its response is still being waited on.
- Supervisor Jorge Castro was quite busy for the reported period, which delayed the possible approximate applications' selection and the analysis of the error presented with the CoSy compiler.

## 5 Hard Skills Required/Acquired

- Knowledge in the following software frameworks has been acquired: dlxsim and CoSy compiler.
- Further knowledge in the implementation of the K-means algorithm has been acquired.

## 6 Soft Skills Required/Acquired

The following soft skills have been exercised:

- Communication: Remote communication has been performed with Jorge Castro for the guidance of this project, and with Sajjad Hussain to request technical aid in the server.
- Self-Motivation: Given that there is no direct round-the-clock supervision, self-motivation has been key in working continuously with the CoSy compiler and the analysis of the possible approximate applications.

## 7 Lessons Learned

## References