Diploma Project
Academic Year 2023/2024

Project code: **202307**

Project Title (English):

"Running HPC Programs on a Cloud Computing Platform: A Case Study"

Project Title (Arabic):

"تشغيل برامج حسابية عالية الأداء على منصة الحوسبة السحابية: حالة دراسية"

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Project Objectives:
The aim of this project is to present an evaluation study of the usefulness of the cloud computing services for high performance computing tasks. The students should be able to set up and use a cloud computing platform. Then, they should use it to run an HPC program. Finally, they should analyze the performance of the program's execution on the cloud platform.

Project Outcomes:
Upon successful completion this project, the studies will be familiar with:
1. Build and manage a private cloud computing platform using open-source software such as OpenStack and Proxmox.
2. Instantiate a set of virtual machines and connect them together to perform a collaborative task using their shared resources.
3. Build a computing cluster using MPI or OpenMP
4. Run HPC parallel programming workloads.
5. Study performance and measure cost of program execution using profiling and dynamic analysis tools.
6. Compare performance of at least two cloud technologies under the same usage circumstances.
7. Know how to benchmark and evaluate a computing platform.