



UPO UNIVERSITÀ DEL PIEMONTE ORIENTALE
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EVENTI DiSIT

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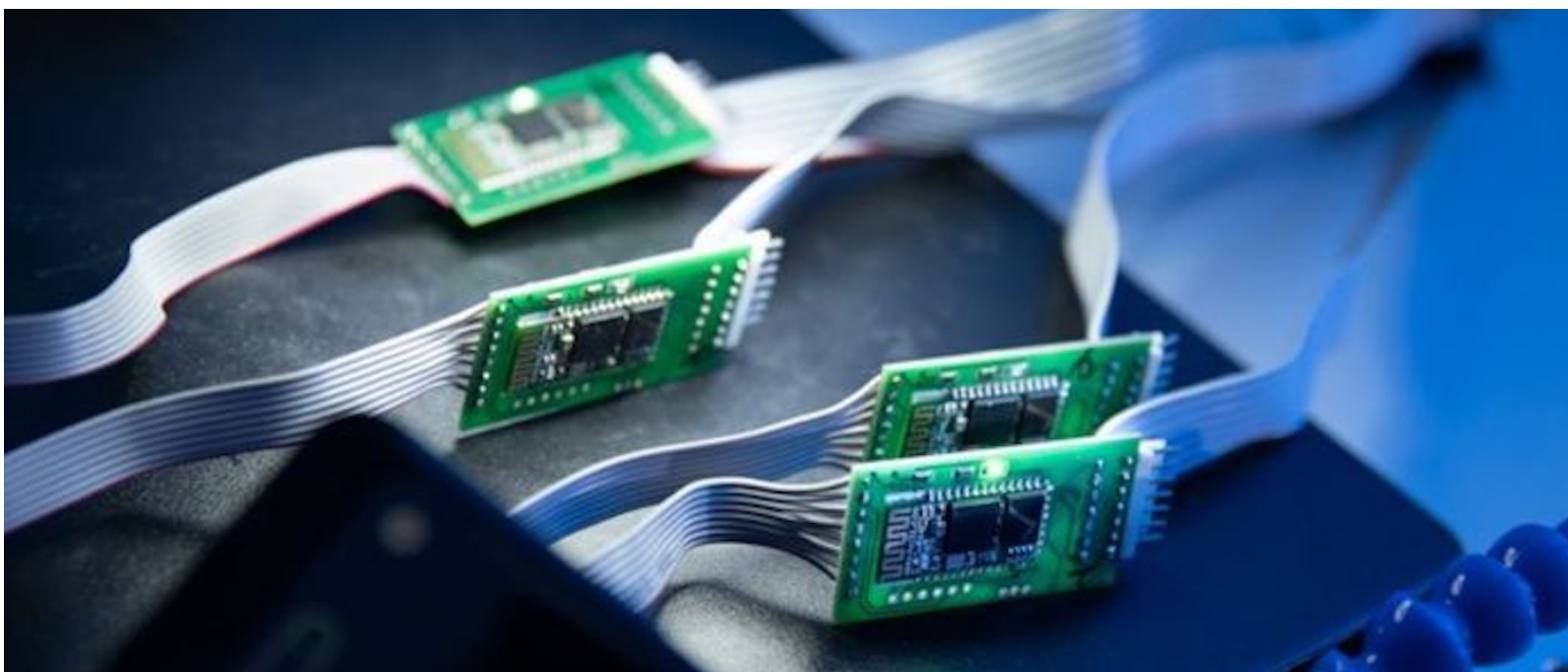
AULA C192

Task and Memory Mapping of Large Size Embedded Applications over NUMA architecture

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Multicore architectures provide the increased performance required by modern embedded real-time systems. Most platforms exhibit a non-uniform memory access (NUMA). In NUMA, memory banks with different access time can be explicitly addressed. Such an architecture, however, is challenging predictability given the significant impact of the allocation of variables on the execution times. At software level, real-world embedded applications (e.g. automotive) are composed by thousands of functions often communicating through shared variables stored in memory, with a variable access time because of NUMA. This paper addresses the mapping of complex embedded applications onto NUMA multicore architectures. The developed problem formulation offers a solution to the following problems: (i) allocating variables (called labels in the automotive context) over memories of different characteristics, (ii) mapping functionalities (called runnables) onto CPUs, (iii) creating OS tasks from runnables, and (iv) assigning priorities to tasks. Our developed implementation is capable to handle an application composed by 1K+ runnables, all sharing 10K+ labels and finds a solution in at most 3 minutes on a standard laptop, enabling interactive design space exploration.

EVENTO APERTO A:

Docenti, Borsisti, Assegnisti, Dottorandi

SEMINARIO IN LINGUA: ITALIANO

