**Run-Time Environments**

**What are activation records and what are they used for?**

ARs are run-time structures used to hold state regarding the execution of a procedure. They are used so run-time environments can manage execution of functions and procedures efficiently, keeping track of all necessary information for each active function call.

**What information does an AR capture?**

The Activation Records track the execution environment of a procedure or function. They capture, among others values, the return address and the caller’s ARP, so that when the currently-running function/procedure ends, it returns to the function/procedure that called it. It also captures the Access Link, which allows an executing environment to access non-local variables, for example, variables that are local to other active procedures (elsewhere on stack).

* parameters – space for parameters to the called/current routine
* register save area – saved register contents
* return value – if function, space for return value
* return address – address to resume caller
* access link – help with non-local access
* caller’s ARP – to restore caller’s ARP on a return
* local variables – space for local variables & variables (including spills)

**Where are ARs allocated and why?**

There are three options for places to allocate ARs.

For programming languages that allow for recursion, allocate it on a stack, as the activation and deactivation follows a LIFO order.

If the procedure ca noutlive its caller or it can return an object that can reference its execution state, the AR must be allocated in the heap.

It the case of there being no direct or mutual recursivity, the ARs can be allocated statically, which is the best for efficiency.

**In Object-Oriented Languages, what is the purpose of the trampoline function?**

When the self pointer of an extended class is off and needs to be adjusted, we call the trampoline function so it adjust the self pointer to be at its correct location, by adding an offset to the self pointer.