# Princeton University
# COS 217: Introduction to Programming Systems
# SPARC Subroutine Calling Conventions

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Recall:  Register i6 is the same as fp, and register o6 is the same as sp.

When subroutine f calls subroutine g...

In f:

   (1) Store actual parameters 1 to 6 in o0-o5.

   (2) Store actual parameters 7, 8, ... in memory locations o6/sp + 92, o6/sp + 96, ...

   (3) Execute "call g".

         Store register pc in o7.
            Note:  o7 thus stores the address of the call instruction.
         Jump to the instruction at label g.

   (4) But before executing the "jumped to" instruction, execute the delay instruction
       that follows the "call" instruction.

In g:

   (5) Execute "save %sp, -N, %sp".

         Compute the sum of -N and the current value of o6/sp.
         Slide the register window forward.
            Let the former o0-o7 registers be known as the i0-i7 registers.
               Note:  The former o6/sp is now known as i6/fp.
                  Thus i6/fp marks the previous top of the stack.
               Note:  The former o7 is now known as i7.
                  Thus g must eventually return based upon the value in i7.
            Create a new set of l0-l7 and o0-o7 registers.
            [Save oldest register window in stack if necessary.]
         Store the sum (computed above) in o6/sp.
         Note:  Thus a new stack frame is pushed onto the stack.

   (6) Use formal parameters in i0-i5 and i6/fp + 92, i6/fp + 96, ... to compute
       return value(s).

   (7) Store return values in i0-i5.

   (8) Execute "ret".

         Jump to i7 + 8
            Jump to the instruction after the delay instruction after the call
            instruction.

   (9) But before executing the "jumped to" instruction, execute the delay instruction
       that follows the "ret" instruction, that is, "restore".

         Slide the register window backward.
            Restore the old set of l0-l7 and i0-i7 registers.
               Note:  The i6/fp register is restored to its previous state.
            Let the former i0-i7 registers be known as o0-o7.
               Note:  The former i6/fp is now known as o6/sp.
               Note:  The former i7 is now known as o7.
            [Load current register window from stack if necessary.]
         Note:  Thus a stack frame is popped from the stack.

In f:

   (10) Retrieve g's return values from o0-o5.
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