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<pre> /** * length - counts the number of characters in a string * @param x0: pointer to the string to count * @param x1: maximum number of characters to count * @return x0: number of characters counted, including null terminator * * This function counts the number of characters in a string pointed to by x0, u * to a maximum of x1 characters. The count includes the null terminator. If the * string is longer than x1 characters, the function stops counting at x1 * characters. * * Registers used: x0, x1, x2, x3, w3 * Registers saved: x19-x30, lr */ .text .global length // Entry point for the 'length' subroutine length: // Point to the first byte of the string to count mov x7, x0 // Initialize the counter to zero mov x2, #0 // Top of the loop to count characters top: // Load the next byte of the string and update the pointer ldrb w1, [x7], #1 // Check if the byte is the null terminator cmp w1, #0 // If the byte is the null terminator, jump to the bottom of the loop b.eq bottom // Increment the counter by one add x2, x2, #1 // Jump back to the top of the loop b top // Bottom of the loop to return the length bottom: // Return the length of the string, including the null terminator mov x0, x2 ret lr // Entry point for the 'substring' subroutine sstr: // Save the necessary registers on the stack stp x0, x1, [sp, #-16]! // Compute the length of the substring sub x0, x2, x1 // Save the length and the original string pointer on the stack stp x2, x0, [sp, #-16]! // Call 'malloc' to allocate memory for the substring </pre>		

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<pre> bl malloc // Restore the length and the original string pointer from the stack ldp x2, x5, [sp], #16 // Restore the return address and the start index of the substring from the stack ldp x4, x1, [sp], #16 // Save the pointer to the substring on the stack str x0, [sp, #-16]! // End of the loop to copy characters from the original string to the substring end: // Check if we've copied the desired number of characters cmp x5, #0 // If we've copied all the characters, return from the subroutine b.eq return // Load the next byte from the original string and store it in the substring ldrb w6, [x4], #1 strb w6, [x0], #1 // Decrement the counter and jump back to the top of the loop sub x5, x5, #1 b end // Return from the 'substring' subroutine return: // Restore the pointer to the substring from the stack ldr x0, [sp], #16 // Return the pointer to the substring ret lr </pre>		