

E02

The program first redefines the signal handler for the SIGALRM signal through the `sigaction()` function, then it initializes a semaphore `s`. Two threads are created and the main thread joins them.

The first thread uses the `timespec` struct and the `nanosleep` function to sleep a random number of milliseconds between 1 and 5, then it calls the `wait_with_timeout` function with parameters `s` and `tmax`. In the function, a SIGALRM signal is generated through the `alarm()` function and a `sem_wait` is performed on the semaphore.

The signal handler simply clears a global variable called `timeout` and calls `sem_post`. In this way, the thread is able to understand whether the `sem_wait` function returned by means of the signal or of a call to `sem_post` by thread `t2`.