



# B4 - Unix System Programming

B-PSU-401

## philosophers

Rice-eating Philosophers





# philosophers

binary name: philo  
group size: 2  
repository name: PSU\_philosopher\_\$ACADEMICYEAR  
repository rights: ramassage-tek  
language: C  
compilation: via Makefile, including re, clean and fclean rules



- Your repository must contain the totality of your source files, but no useless files (binary, temp files, obj files,...).
- All the bonus files (including a potential specific Makefile) should be in a directory named *bonus*.
- Error messages have to be written on the error output, and the program should then exit with the 84 error code (0 if there is no error).



Authorized Functions: standard C library and POSIX Threads Library.  
Unauthorized Functions: signal, sigaction.

A group of philosophers are dedicating themselves to a new project: dictating a group of rules about sharing natural resources to prevent world famine.

Before making these rules public, they want to test them in a simulator.

You've been hired to supervise this simulator, so that the philosophers could finally be able to show the whole world their infinite wisdom.

A huge responsibility rests on your shoulders: you must prove that your new friends have solved the famine problem.

In order to avoid the stress that the risk of this mission carries, you'll work in teams of two.

The simulator must respond to the following requirements:

- $N$  philosophers are around one table ( $N$  is defined on the command line)
- Each philosopher has one rice bowl in front of him
- There is a chopstick to the left of each bowl
- A philosopher can only use a chopstick if it is to the left or right of his bowls
- A philosopher goes through three steps:
  - **eat** with two chopsticks. One left and one right.
  - **rest**, does not use either chopstick, even if one is available.



- **think**, uses one and only one chopstick.

There are a few more rules to guarantee better digestion.

It is really important for them to be healthy and to assimilate the rice's nutrients (that's the real solution to ending famine...) but you have to keep it a secret!

- A philosopher who thinks must eat before resting (obviously, to get his energy back).
- After resting, a philosopher can either eat or think.
- The **think** and **eat** states must have a time limit (to be determined by you).
- A chopstick cannot be used by two philosophers at the same time. For hygienic reasons.

Thus, you have to create this simulator and define a few limits (execution time of actions, resource usage quota, program execution time,...)

Obviously, each resource can only be used by one person at any given time.

Otherwise, you might create a spatiotemporal disaster, the likes of which has never been seen.



In order to achieve this mission, courage, strength, self-sacrifice and man pages will be your best friends!

```
Terminal
~/B-PSU-401> ./philo --help
USAGE
  ./philo -p nbr_p -e nbr_e

DESCRIPTION
  -p nbr_p  number of philosophers
  -e nbr_e  maximum number times a philosopher eats before exiting the program
```



You **MUST** use the given library to monitor the project., which means you must not print anything on the standard output.  
Only the referred library is allowed to print a final report.