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OS Memory

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Objectives

- Implementing the buddy memory allocation technique.
- Best usage of algorithms, and data structures.

Platform *Linux*

Language *C*



Requirement

You are required to edit the *Scheduler* (in code file *scheduler.c*) from the “OS Scheduler” assignment (we may call it the *core.c* from now on) to include memory allocation capabilities using the buddy memory allocation technique. It should allocate memory space for processes as they enter the system and free it as they leave so that it can be re-used by later processes.

You may make the following assumptions,

- The total memory size is 1024 bytes.
- Each process size is less than or equal 256 bytes.
- Assume single uni-core CPU.
- The memory allocated for a process as it enters the system is constant over the time it spends in the system.

Input

You will need to modify the the *Process Generator* (in code file *process_generator.c*) to accept an extra process information; *memsize*.

<i>processes.txt</i> example				
#id	arrival	runtime	priority	memsize
1	1	6	5	200
2	3	3	3	170

- Comments are added as lines beginning with `#` and should be ignored.
- Each non-comment line represents a process.
- Fields are separated with *one tab character* `\t`.
- You can assume that processes are sorted by their arrival time. *Take care that 2 or more processes may arrive at the same time.*



Output

A new output file *memory.log* should be generated for the memory information.

memory.log example

```
#At time x allocated y bytes for process z from i to j
At time 1 allocated 200 bytes for process 1 from 0 to 255
At time 3 allocated 200 bytes for process 2 from 256 to 383
At time 6 freed 200 bytes from process 2 from 256 to 383
At time 10 freed 200 bytes from process 2 from 256 to 383
```

- Comments are added as lines beginning with `#` and should be ignored.
- Make sure both *allocated* and *freed* memory information are logged.
- You need to stick to the given format because files are compared automatically.

Guidelines

- Read the document carefully at least once.
- Your program must not crash.
- You can use any IDE (Eclipse, Code::Blocks, NetBeans, KDevelop, CodeLite, etc.) you want of course, though it would be a good experience to use make files and standalone compilers and debuggers if you have time for that
- Spend a good time in design and it will make your life much easier in implementation.
- The code should be clearly commented and the variables names should be indicative.

Deliverables

You should deliver the modified code from the “OS Scheduler” assignment along with a modified version from the report that includes any necessary information about the memory allocation system described in this assignment.