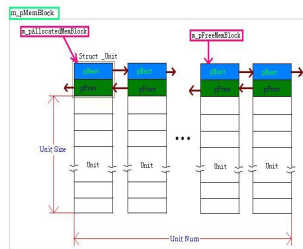


Problem Statement: The problem entails designing and implementing a memory management API to facilitate users in efficiently utilizing system memory. This API should enable seamless allocation and deallocation of memory while optimizing resource utilization. Additionally, thorough testing using appropriate data structures is essential to validate the functionality and robustness of the API.

Motivation:

- To enable users to easily access and store relevant memory management parameters and compare it with future runs to test memory efficiency.
- To develop functions to handle create, deletion and manipulation of memory pools to enable access of memory minimizing overhead.



Methodology

IMPLEMENTING FUNCTIONS

We are implementing various api functions for retrieving the memory parameters for the programs by parsing the proc file system directly from the linux kernel

SCRAPING MEMORY PARAMETERS

We scrape memory parameters from the api calls for various sorting and dynamic program algorithms which vary in their space complexity which would thereby mean that their memory usage statistics would differ.

STORING IN A DAT FILE

We are then storing these memory parameters for the algorithms in a DAT file for several runs of the different algorithms we have implemented beforehand.

GUI

We then parse the parameters for the algorithms stored in the DAT file and present it to the user using a friendly graphical user interface for the user's analysis.

Results:

- Memory pools were successfully created.
- Memory data of a process was successfully scraped and recorded for comparison
- Comparison was made between memory pool scheme and regular scheme and the advantages of the memory pool scheme were demonstrated.

```
FREE:
0x60d2b235f6a0-0 0x60d2b235fd60-216 0x60d2b23600c0-324 0x60d2b2360420-432
OCCUPIED:
0x60d2b235fa00-108
```

```
FREE:
0x60d2b235f6a0-0 0x60d2b23600c0-324 0x60d2b2360420-432
OCCUPIED:
0x60d2b235fa00-108 0x60d2b235fd60-216
```

```
normal time: 80905
pool time: 79344
```

References:

Manish PandeyYoung Woo Kwon: Optimizing Memory Allocation in a Serverless Architecture through Function Scheduling
Ben Kenwright: Fast Efficient Fixed-Size Memory Pool: No Loops and No Overhead

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