

Kernel Memory Allocation

Spoken Tutorial Project

<https://spoken-tutorial.org>

National Mission on Education through ICT

<http://sakshat.ac.in>

Mayuri Panchakshari

IIT Bombay

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Learning Objective



Learning Objective

- Dynamically allocate the kernel memory using **kmalloc()** function



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- Dynamically allocate the kernel memory using **kmalloc()** function
- **kfree()** function to free the memory allocated by **kmalloc()**



System Requirements



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- **VirtualBox 5.2**



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- **Ubuntu Linux 18.04 LTS
Operating System**



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- **Linux kernel version 5.0.0-31
generic**



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- **gedit text editor**



Prerequisites



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- C programming language



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- C programming language
- Basics of Linux kernel



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- C programming language
- Basics of Linux kernel

If not, then go through the C/C++ and Linux spoken tutorials on this <https://spoken-tutorial.org>



Kernel Memory Allocation



Kernel Memory Allocation

- **Linux handles memory allocation by creating a set of memory objects of fixed sizes**



Kernel Memory Allocation

- **Linux handles memory allocation by creating a set of memory objects of fixed sizes**
- **It will dynamically allocate portions of memory to programs at their request**



Kernel Memory Allocation

- When the memory is no longer needed, we have to free it for reuse



Kernel Memory Allocation Functions



Kernel Memory Allocation Functions

- **kmalloc()** and **vmalloc()** functions dynamically allocates the kernel memory



Kernel Memory Allocation Functions

- **kmalloc()** and **vmalloc()** functions dynamically allocates the kernel memory
- **kmalloc()** is similar to the **malloc** function in C programs



Kernel Memory Allocation Functions

- **kmalloc()** allocates contiguous physical memory and virtual memory



Kernel Memory Allocation Functions

- **kmalloc()** allocates contiguous physical memory and virtual memory
- **vmalloc()** allocates contiguous virtual memory but not the physical memory



Code files



Code files

- The files used in this tutorial are available in the **Code Files** link on this tutorial page



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- Please download and extract them



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- Make a copy and then use them while practising



Summary

- Dynamically allocate the kernel memory using **kmalloc()** function
- **kfree()** function to free the memory allocated by **kmalloc()**



Assignment

- 1 Open the `simple_driver.c` file
- 2 Allocate the memory space using `kmalloc` in the driver as per your choice
- 3 Store a different data to the kernel buffer



Assignment (cont.)

- 4 Load the driver and then execute the user program
- 5 See the output using **dmesg** command and then unload the driver



About the Spoken Tutorial Project

- Watch the video available at https://spoken-tutorial.org/What_is_a_Spoken_Tutorial
- It summarises the Spoken Tutorial Project
- If you do not have good bandwidth, you can download and watch it



Spoken Tutorial Workshop

The Spoken Tutorial Project Team

- Conducts workshops using spoken tutorials
- Gives certificates on passing online tests
- For more details, please write to contact@spoken-tutorial.org



Forum questions

- **Questions in THIS Spoken Tutorial?**
- **Visit**
<https://forums.spoken-tutorial.org/>
- **Choose the minute and second where you have the question**
- **Explain your question briefly**
- **The Spoken Tutorial project will ensure an answer**

You will have to register to ask questions



Forum to specific questions

- Questions not related to the Spoken Tutorial?
- Do you have general / technical questions on the Embedded Linux Device Driver?
- Please visit the FOSSEE Forum
<https://forums.fossee.in/>
- Choose the Software and post your question



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THANK YOU!

For more Information, visit our website
<https://fossee.in/>

