**የትረስትድ ኮምፒውቲንግ ምርምር ቡድን**

**የ2014 ዓ.ም እቅድ**

1. **መግቢያ**

# የትረስትድ ኮምፒውቲንግ የምርምር ማእከልተልእኮ አለም የደረሰባቸውን ደህንነቱ የተረጋገጠ Trustworthy Systems ላይ ያሉ እውቀቶችን ባለቤት ከመሆንና ከመጠቀም ጀምሮ ሎጂክን እና ሒሳብን የመጠቀም ሳይንሳዊ መንገድ በመከተል የክሪቲካል ሲስተሞቻችንን ደህንነት የሚያረጋግጡ ትረስትዎርዚ ኮምፒውቲንግ ፕላትፎርሞችን መፍጠርና በዘርፉ አለማቀፍ ተወዳዳሪ የፈጠራ ባለቤትነትን ማረጋገጥ ነው።

1. **የእቅድ መነሻ**

በትረስትድ ኮምፒዩቲንግ ምርምር ቡድን መነሻ ናቸው ተብለው የሚታሰቡ አለም አቀፍ ምርምሮችና ትግበራዎች ውስጥ የተወሰኑት

* The seL4 Microkernel
* Linux Kernel labs
* OS development
* Writing a Simple Operating System from Scratch by Nick Blundell

1. **የትኩረት መስክ**

የቴክኖሎጂ እና እውቀት ባለቤትነት

ግብ 1

* መሰረታዊ የኦፕሬቲንግ ሲስተም ሃሳቦችን መረዳት

የሚጠበቅ ውጤት:

* [User vs Kernel](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#user-vs-kernel)
* [Typical operating system architecture](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#typical-operating-system-architecture)
* [Monolithic kernel](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#monolithic-kernel)
* [Micro kernel](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#micro-kernel)
* [Micro-kernels vs monolithic kernels](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#micro-kernels-vs-monolithic-kernels)
* [Address space](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#address-space)
* [User and kernel sharing the virtual address space](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#user-and-kernel-sharing-the-virtual-address-space)
* [Execution contexts](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#execution-contexts)
* [Multi-tasking](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#multi-tasking)
* [Preemptive kernel](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#preemptive-kernel)
* [Pageable kernel memory](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#pageable-kernel-memory)
* [Kernel stack](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#kernel-stack)
* [Portability](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#portability)
* [Asymmetric MultiProcessing (ASMP)](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#asymmetric-multiprocessing-asmp)
* [Symmetric MultiProcessing (SMP)](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#symmetric-multiprocessing-smp) Advanced concept
* [Linux development model](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#linux-development-model)
* [Linux source code layout](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#linux-source-code-layout)
* [Linux kernel architecture](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#linux-kernel-architecture)
  + - [arch](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#arch)
    - [Device drivers](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#device-drivers)
    - [Process management](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#process-management)
    - [Memory management](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#memory-management)
    - [Block I/O management](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#block-i-o-management)
    - [Virtual Filesystem Switch](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#virtual-filesystem-switch)
    - [Networking stack](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#networking-stack)
      * [Linux Security Modules](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#linux-security-modules)

መለኪያ

* ግልፅና የተብራራ ዶክመንት ማዘጋጀት

ዒላማ

* ኦፕሬቲንግ ሲስተም ፅንሰ ሃሳብን መረዳት

ግብ 2

* መሰረታዊ የኦፕሬቲንግ ሲስተም የአሰራር ሂደትን ማወቅ

የሚጠበቅ ውጤት:

* [Linux system calls implementation](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec2-syscalls.html#linux-system-calls-implementation)
* [System call table](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec2-syscalls.html#system-call-table)
* [System call parameters handling](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec2-syscalls.html#system-call-parameters-handling)
* [Virtual Dynamic Shared Object (VDSO)](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec2-syscalls.html#virtual-dynamic-shared-object-vdso)
* [Processes and threads](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec3-processes.html#processes-and-threads)
* [Overview of process resources](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec3-processes.html#overview-of-process-resources)
* [struct task\_struct](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec3-processes.html#struct-task-struct)
* [Inspecting task\_struct](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec3-processes.html#inspecting-task-struct)
* [Threads](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec3-processes.html#threads)
* [The clone system call](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec3-processes.html#the-clone-system-call)
* [Namespaces and "containers"](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec3-processes.html#namespaces-and-containers)
* [Accessing the current process](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec3-processes.html#accessing-the-current-process)

መለኪያ

* ግልፅና የተብራራ ዶክመንት ማዘጋጀት

ዒላማ

* ሲስተም ኮል ሃሳብን መረዳት
* ፕሮሰስ ሃሳብን መረዳት

ግብ 3

* seL4 ላይ ጥናት ማካሄድ

የሚጠበቅ ውጤት

* seL4 ላይ ጥናት ማካሄድ
* seL4 የተመረጠበትን ምክንያት ማስቀመጥ
* የትረስትድ ኮምፒውቲንግ ቡድን አካሄድን ከseL4 አንፃር መቅረፅ

መለኪያ

* ግልፅና የተብራራ ዶክመንት ማዘጋጀት

ዒላማ

* seL4ን መረዳት
* seL4ን እንዴት አድርገን መጠቀም እንደምንችል መረጃ ማከማቸት

1. **ስኮር ካርድ**

የመጀመሪያው ሩብ ዓመት ስኮር ካርድ

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| የትኩረት መስክ | ዕይታ | ግቦች | የግቦች ክብደት | መለኪያ | የመለኪያ ክብደት | መነሻ | የአመት ኢላማ | ዋና ዋና ተግባራት |
| ቴክኖሎጂ | ተልዕኮ | መሰረታዊ  የኦፕሬቲንግ  ሲስተም  ሃሳቦችን  መረዳት | 100 | ግልፅና የተብራራ ዶክመንት ማዘጋጀት | 100 | 10 | 100 | * [User vs Kernel](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#user-vs-kernel) * [Typical operating system architecture](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#typical-operating-system-architecture) * [Monolithic kernel](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#monolithic-kernel) * [Micro kernel](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#micro-kernel) * [Micro-kernels vs monolithic kernels](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#micro-kernels-vs-monolithic-kernels) * [Address space](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#address-space) * [User and kernel sharing the virtual address space](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#user-and-kernel-sharing-the-virtual-address-space) * [Execution contexts](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#execution-contexts) |

የሁለተኛው ሩብ ዓመት ስኮር ካርድ

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| የትኩረት መስክ | ዕይታ | ግቦች | የግቦች ክብደት | መለኪያ | የመለኪያ ክብደት | መነሻ | የአመት ኢላማ | ዋና ዋና ተግባራት |
| ቴክኖሎጂ | ተልዕኮ | መሰረታዊ  የኦፕሬቲንግ  ሲስተም  ሃሳቦችን  መረዳት | 100 | ግልፅና የተብራራ ዶክመንት ማዘጋጀት | 100 | 30 | 100 | * [Multi-tasking](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#multi-tasking) * [Preemptive kernel](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#preemptive-kernel) * [Pageable kernel memory](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#pageable-kernel-memory) * [Kernel stack](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#kernel-stack) * [Portability](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#portability) * [Asymmetric MultiProcessing (ASMP)](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#asymmetric-multiprocessing-asmp) * [Symmetric MultiProcessing (SMP)](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#symmetric-multiprocessing-smp) Advanced concept * [Linux development model](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#linux-development-model) |

የሶስተኛው ሩብ ዓመት ስኮር ካርድ

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| የትኩረት መስክ | ዕይታ | ግቦች | የግቦች ክብደት | መለኪያ | የመለኪያ ክብደት | መነሻ | የአመት ኢላማ | ዋና ዋና ተግባራት |
| ቴክኖሎጂ | ተልዕኮ | መሰረታዊ  የኦፕሬቲንግ  ሲስተም  ሃሳቦችን  መረዳት | 100 | ግልፅና የተብራራ ዶክመንት ማዘጋጀት | 100 | 60 | 100 | * [Linux source code layout](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#linux-source-code-layout) * [Linux kernel architecture](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#linux-kernel-architecture)   + - [arch](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#arch)     - [Device drivers](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#device-drivers)     - [Process management](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#process-management)     - [Memory management](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#memory-management)     - [Block I/O management](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#block-i-o-management)     - [Virtual Filesystem Switch](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#virtual-filesystem-switch)     - [Networking stack](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#networking-stack)       * [Linux Security Modules](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec1-intro.html#linux-security-modules) |

የአራተኛው ሩብ ዓመት ስኮር ካርድ

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| የትኩረት መስክ | ዕይታ | ግቦች | የግቦች ክብደት | መለኪያ | የመለኪያ ክብደት | መነሻ | የአመት ኢላማ | ዋና ዋና ተግባራት |
| ቴክኖሎጂ | ተልዕኮ | መሰረታዊ  የኦፕሬቲንግ  ሲስተም  ሃሳቦችን  መረዳት | 10 | ግልፅና የተብራራ ዶክመንት ማዘጋጀት | 100 | 90 | 100 | * [Linux system calls implementation](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec2-syscalls.html#linux-system-calls-implementation) * [System call table](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec2-syscalls.html#system-call-table) * [System call parameters handling](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec2-syscalls.html#system-call-parameters-handling) * [Virtual Dynamic Shared Object (VDSO)](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec2-syscalls.html#virtual-dynamic-shared-object-vdso) * [Processes and threads](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec3-processes.html#processes-and-threads) * [Overview of process resources](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec3-processes.html#overview-of-process-resources) * [struct task\_struct](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec3-processes.html#struct-task-struct) * [Inspecting task\_struct](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec3-processes.html#inspecting-task-struct) * [Threads](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec3-processes.html#threads) * [The clone system call](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec3-processes.html#the-clone-system-call) * [Namespaces and "containers"](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec3-processes.html#namespaces-and-containers) * [Accessing the current process](https://linux-kernel-labs.github.io/refs/heads/master/so2/lec3-processes.html#accessing-the-current-process) |
| - |
| መሰረታዊ የኦፕሬቲንግ ሲስተም የአሰራር ሂደትን ማወቅ | 90 |

ከላይ የተጠቀሱት ስራዎች ካለቁ ተጨማሪ እቅድ

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| የትኩረት መስክ | ዕይታ | ግብ | የግቦች ክብደት | መለኪያ | የመለኪያ ክብደት | መነሻ | የአመት ኢላማ | ዋና ዋና ተግባራት |
| ቴክኖሎጂ | ተልዕኮ | seL4 ላይ ጥናት ማካሄድ | 100 | ግልፅና የተብራራ ዶክመንት ማዘጋጀት | 100 | 0 | 10 | * seL4 ላይ ጥናት ማካሄድ * seL4 የተመረጠበትን ምክንያት ማስቀመጥ * የትረስትድ ኮምፒውቲንግ ቡድን አካሄድን ከseL4 አንፃር መቅረፅ |

1. **በእቅድ አፈጻጸም ወቅት ሊያጋጥሙ የሚችሉ ተግዳሮቶች እና የመፍትሄ አቅጣጫዎች**

ተግዳሮቶች:

* ለምርምር ስራዎች የሚያስፈልጉ ላብራቶሪዎች አለመኖር
* የሰራተኛው የስራ ተነሳሽነት መውረድ (ከአሰራር ሂደት ጋር በተገናኘ)
* የሰራተኛ አባላት ቁጥር ማነስ

የመፍትሔ አቅጣጫዎች :

* የስራ ከባቢን ምቹ ማደረግ
* የሚያስፈልጉ ላብራቶሪዎች በሚፈለጉበት ቦታ ማዘጋጅት