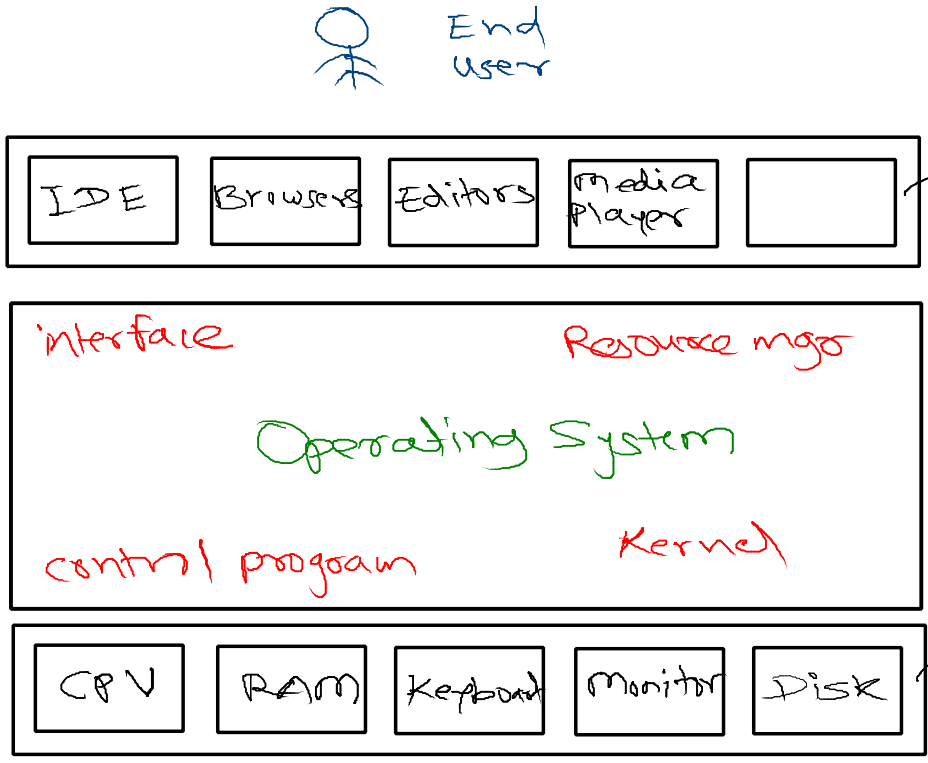


- interface bet^n end user and computer hardware
- interface bet^n applications/programs and computer hardware
- control program which controls execution of all other programs
- resource manager who is managing all hardware resources (limited)
- CD/DVD/ISO

Core OS (Kernel) + Application softwares + System Utilities

Functions of OS (Kernel)

1. Process Management
2. CPU scheduling
3. Memory Management
4. File and IO Management
5. Hardware Abstraction

} Compulsory

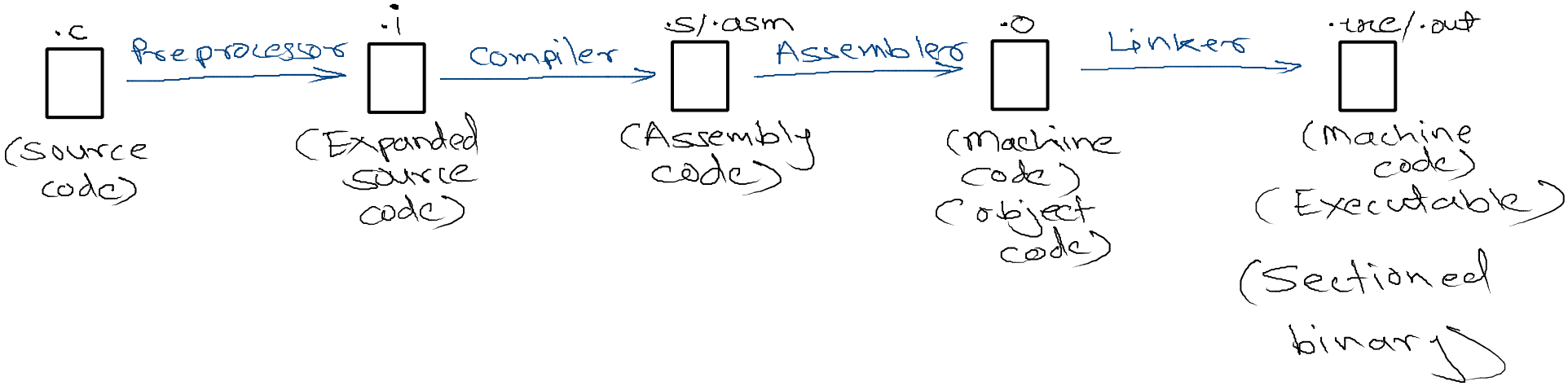
6. User Interfacing
7. Security and protection
8. Networking

} optional

Process Management

Program - set of instructions to machine

Toolchain
1. Preprocessor
2. Compiler
3. Assembler
4. Linker
5. Debuger
6. Utilities



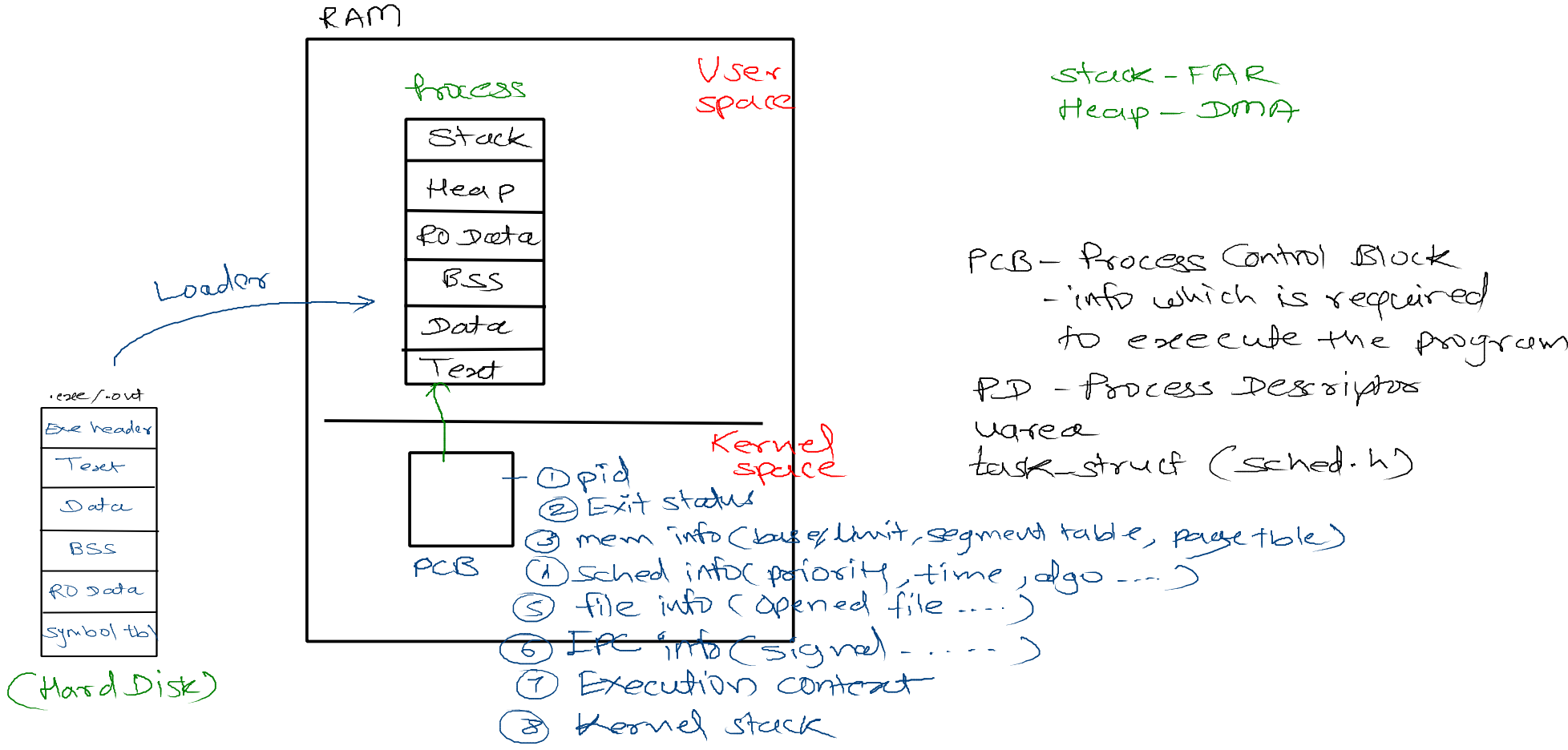
1. Exe header
   - Magic number
     - identify to file format
     - size - 2/4 bytes (first)
       - .exe — Portable Executable (PE) (MZ)
       - .out — Executable Linkable Format (ELF) (ELF)
   - info about executable type (CUI/GUI/Library applⁿ)
   - info about remaining sections (start addr, size...)
   - addr of entry point function (mainc))
2. Text (code)
   - machine instructions
3. Data
   - static/global initialized variables

```
int arr[5];
int arr1[5]={0};
```

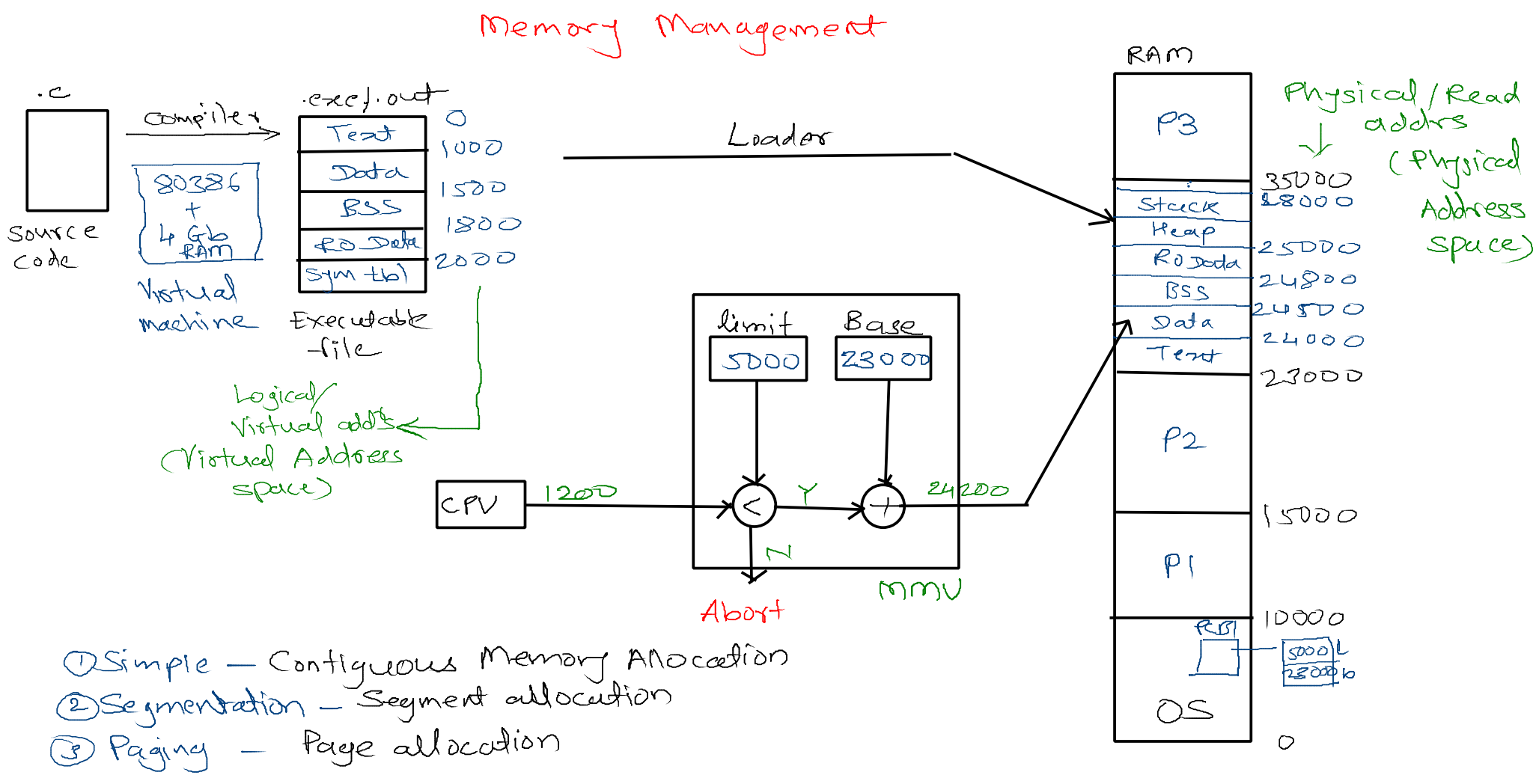
4. BSS (Block started by Symbol)
   - static/global uninitialized variables
5. RO Data
   - read only data, string constants

```
char *str = "Sunbeam";
pf(str);
str[0] = 'S';
```

6. Symbol Table
   - info about symbols
     - symbols
       - Variables (name, type, size, section, addr)
       - functions (name, return type, no. of arg, addr...)


RAM
User space
process
Stack
Heap
RO Data
BSS
Data
Text
Loader
.exe/.out
Exe header
Text
Data
BSS
RO Data
symbol tbl
(Hard Disk)
Kernel space
PCB
1 pid
2 Exit status
3 mem info (base & limit, segment table, page table)
4 Sched info (priority, time, algo ...)
5 file info (opened file ....)
6 IPC info (signal .....)
7 Execution context
8 Kernel stack
stack - FAR
Heap - DMA
PCB - Process Control Block
- info which is required to execute the program
PD - Process Descriptor
u area
task_struct (sched.h)

Memory Management



1. Simple — Contiguous Memory Allocation
2. Segmentation — Segment allocation
3. Paging — Page allocation