

Devices and Tasks

- desktops
- laptops
- tablets
- smartphones
- music players
- e-book readers
- game consoles
- navigation devices
- surf the Internet
- send / receive e-mail
- listen to music
- read books
- prepare documents
- play games
- find your way

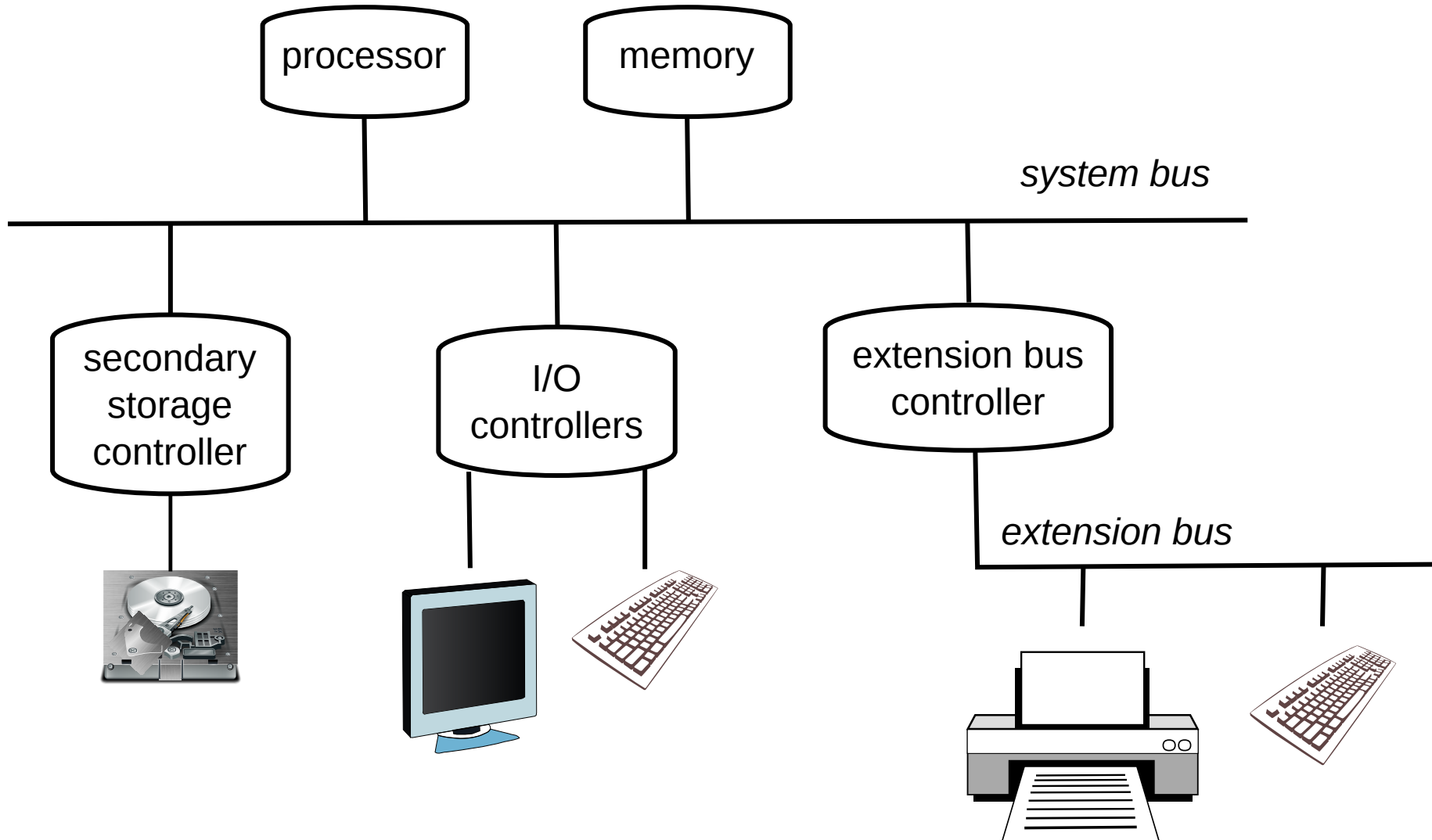
Computer

- a device that processes information
- it can be used for different purposes
- depending on the program running on it
- a device that processes information
under the control of a changeable program

Components

- physical parts: hardware
- programs: software

Architecture



Processor

- **processor** runs the programs
- also called: Central Processing Unit - **CPU**

Memory

- **memory** contains running programs and data
- also called: Random Access Memory - **RAM**
- contents not persistent

Secondary Storage

- for persistence: secondary storage
- e.g. hard disks
- accessed via secondary storage controllers

System Bus

- components connected through a system bus
- transfer program and data between components
- when running a program: load
- secondary storage → memory
- to make changes permanent: save
- memory → secondary storage

Input/Output

- transfer data from/to outside world: I/O
- typical example: user interaction
- output: monitors
- input: keyboards, mice
- input/output: touchscreens

Peripheral Devices

- some devices are useful but not essential
- e.g. printers, webcams
- system bus gets extended
- current extension technology: USB

Software Categories

- office: word processors, spreadsheets, calendars
- graphics: image manipulation, drawing, painting
- multimedia: audio/video players, editors
- network: e-mail, browsing, messaging

Software Categories (cont'd)

- games
- science: statistics, visualization, optimization
- software development: editors, debuggers, IDEs
- utilities: compression, encryption, backup

Operating System

- which component starts a program?
- **operating system** (O/S)
- O/S is itself software
- sits between hardware and applications
- manages resources

Multitasking

- run multiple programs at the same time
- physically not possible if only one CPU
- **time sharing**: quickly switch between programs

Resource Management

- make sure programs don't interfere with each other's resources
- memory, devices, ...

Programming Interface

- O/S makes it easier to develop applications
- hides details of hardware

Popular O/Ss

- Unix: family of operating systems
- many variants: Linux, MacOS X, AIX, FreeBSD
- Linux distributions: Ubuntu, Fedora, Debian
- Windows
- mobile: iOS, Android (Linux)