# 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

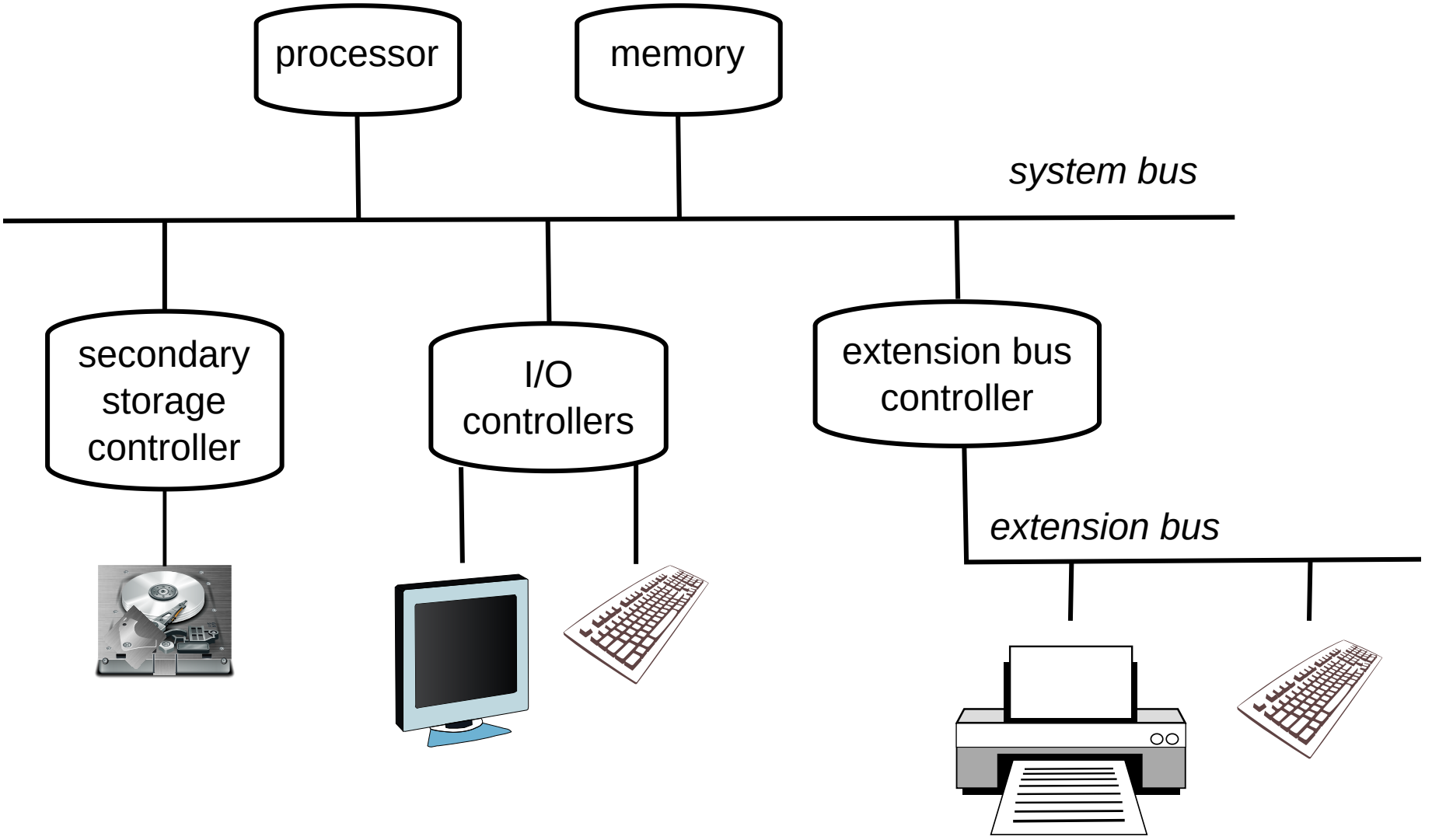
- it can be used for different purposes
- depending on the program running on it

- 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)