مبانی برنامه نویسی به زبان سی

۱۵ مهر ۱۳۹۹

جلسه اول

ملکی مجد

طرح کلی این جلسه:

- معرفی درس
- یاداوری برای دانشجویان
- کتاب درس
- مرور برخی مفاهیم
  - کامپیوتر – قسمت های تشکیل دهنده آن – زبان برنامه نویسی – نرم افزار های رایج
- زبان برنامه نویسی
- دیدن یک کُد ساده

معرفی درس

- malekimajd@iust.ac.ir
- Room 307
- Course pages
  - LMS
  - Telegram
  - quera.ir
- References:
  - Book!
  - Google
  - Prof. and TAs

- نمره دهی
  - تمرین ها: ۷ نمره
  - امتحان های عملی و میان ترم و امتحان نهایی: ۸ نمره
  - نمره کلاسی: ۲ نمره
    (شامل فعالیت کلاسی، تمرین کلاسی و کلاس حل تمرین)
  - پروژه: ۳ نمره

❖تقلب قابل قبول نیست. (هر گونه کپی برداری از کد اینترنت، هم کلاسی، کلاس های ترم پیش)
یا اینکه کسی برام کد بنویسه! ازتون سوال میشه و تسلط به برنامه ای که نوشتین چک میشه

به عنوان دانشجو:

- در گروه تلگرام و کانال تلگرام عضو هستم؟
  - (اگر به دلیلی در تلگرام نیستم حتما به استاد درس اطلاع بدهم: از طریق ایمیل)
- در سایت کویرا و به طور خاص صفحه درس عضو هستم؟
  - برای ارسال جواب تمرین ها استفاده می شود

- نرم افزار برای برنامه نویسی به زبان سی دارم؟ (بعدا C++)
  - راهنمایی برای نصب نرم افزار در کانال درس هست، کمک دستیار درس (آقای کنگاوری) آماده راهنمایی و حل مشکلات دانشجویان هستند.

- اگر تا حالا اصلا کد نزدم و (یا) روند کلاس برام تند هست؟(ممکنه چند جلسه طول بکشد تا بفهمم)
  - با استاد در میان بزارم

- اگر سطحم خیلی جلوتر هست:
  - بعد از مبحث حلقه ها اگر باز هم حس کردم کلاس برام تکراری و غیر مفید هست، با استاد در میان بزارم.

- دارم با کلاس جلو میام و بعد از وقت مناسبی که خود گذاشتم، باز هم اشکالاتی دارم،
  - نگران نباشم، استاد و کمک دستیارها همیشه برای پاسخگویی در دسترس هستند (مثلا تلگرام).

کتاب درس

- C How to Program 6e (Deitel 2010)
  - You can download from LMS!

- All of its example programs may be downloaded from the website `www.deitel.com/books/chtp6/`.

What is a Computer?

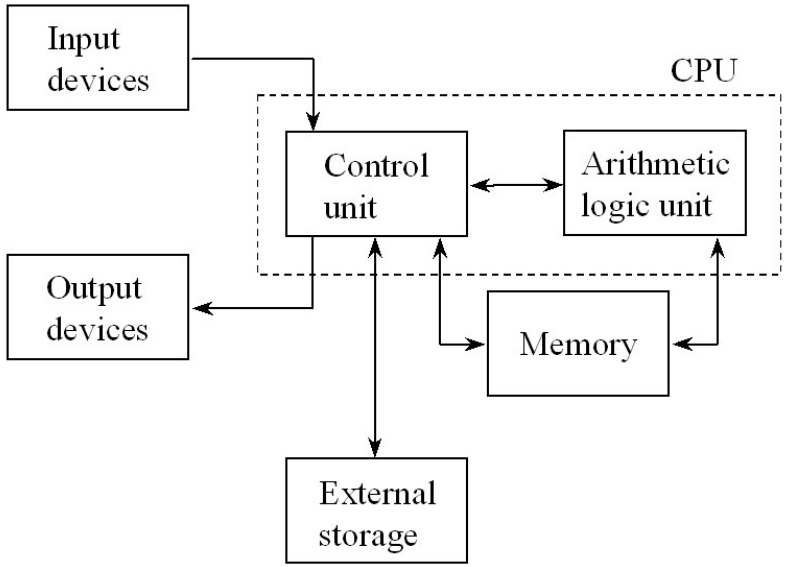
- Wikipedia's Definition:
  - A **computer** is a programmable machine that receives input, stores and automatically manipulates data, and provides output in a useful format.
  - A computer does not need to be electric, nor even have a processor, nor RAM, nor even hard disk. The minimal definition of a computer is anything that transforms information in a purposeful way.
  - The first electronic computers were developed in the mid-20th century (1940–1945).
  - Originally, they were the size of a large room, consuming as much power as several hundred modern personal computers (PCs).

What is a Computer? …

- Computer
  - Device capable of performing computations and making logical decisions.
  - Computers process data under the control of sets of instructions called computer programs
- Hardware
  - Various devices comprising a computer
  - Keyboard, screen, mouse, disks, memory, CD-ROM, and processing units
- Software
  - Programs that run on a computer

Computer Organization

- Six units in every computer:
  - Input unit (e.g. keyboard, mouse, microphone, disk drive)
  - Output unit (e.g. monitor, status indicator lights, speakers, disk drive)
  - Memory unit
  - Arithmetic and logic unit (ALU)
  - Central processing unit (CPU)
  - Secondary storage unit



Computer Organization
memory

- **The memory unit - or random access memory (RAM)**
  - stores instructions and/or data
  - Memory is divided into an array of "boxes" each containing a ***byte*** of information.
    - A *byte* consists of 8 *bits*.
    - A *bit* (binary digit) is either 0 (OFF) or 1 (ON).
    - The memory unit also serves as a storage for intermediate and final results of arithmetic operations.
- **Secondary storage unit**
  - Cheap and high-capacity storage
  - Stores inactive programs

Computer Organization
CPU

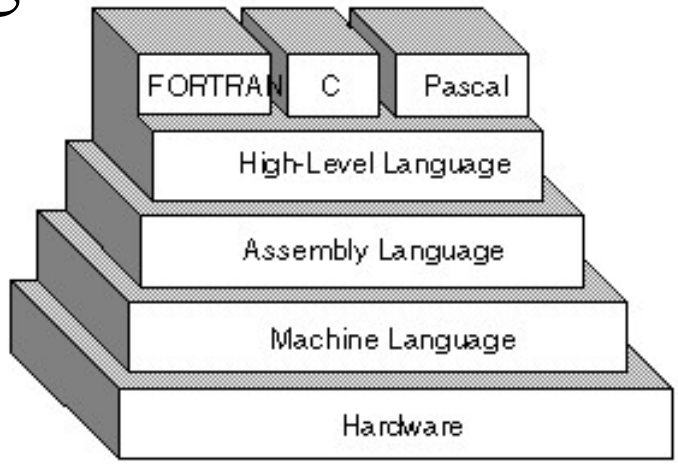
- **a central processing unit (CPU)** consists of
  - an *arithmetic/logic unit (ALU)* where math and logic operations are performed,
  - a *control unit* which directs most operations by providing timing and control signals,
  - and *registers* that provide short-term data storage and management facilities.
- **an arithmetic/logic unit (ALU)**
  - The type of operation that the ALU needs to perform is determined by signals from the control unit.
  - The data can come either from the input unit, from the memory unit.
  - Results of the operation can either be transferred back to the memory unit or directly to the output unit.
- **control unit**
  - Contains logic and timing circuits that generate the appropriate signals necessary to execute each instruction in a program
  - It ***fetch*es** an instruction from memory by sending an address and a read command to the memory unit.
  - After decoding this instruction, the control unit transmits the appropriate signals to the other units in order to *execute* the specified operation.
  - This sequence of fetch and execute is repeated by the control unit until the computer is either powered off or reset.

Programming Language

- A *programming language* is an artificial language designed to express computations that can be performed by a machine, particularly a computer.
- Programming languages can be used to create programs that control the behavior of a machine, to express algorithms precisely, or as a mode of human communication.
- Many programming languages have some form of written specification of their syntax (form) and semantics (meaning). Some languages are defined by a specification document. For example, the **C** programming language is specified by an ISO Standard. Other languages, such as Perl, have a dominant implementation that is used as a reference.

Evolution of Programming Language

Programming Languages:



- First Generation: *Machine languages*
  - Strings of numbers giving machine specific instructions
  - Example:

```
1300042774
1400593419
1200274027
```

Computer only understands machine language instructions.

- Second Generation: Assembly languages
  - English-like abbreviations representing elementary computer operations (translated via assemblers)
  - Example:

```
LOAD    BASEPAY
ADD     OVERPAY
STORE   GROSSPAY
```

- Third Generation : High-level languages
  - Codes similar to everyday English
  - Use mathematical notations (translated via compilers)
  - Example: grossPay **`= basePay + overPay`**

Common Software

- Operating System
- Assemblers
- Compilers
- Interpreters

C Programming language

- C is a **general-purpose**, **procedural** computer programming language supporting **structured** programming, lexical variable scope, and recursion, with a static type system.

A simple code!

Write code

Compile it

Run it

See the result ☺

Standard library
Comment
Main body
Next session we talk more about programming!