

COS-10004 (Computer Systems)

Name: Dave Nguyen (Nguyen Quang Anh).

ID: 104697710.

Theory

Q1.1:

ROM is a sort of memory that stands for "Read Only Memory" and is commonly used in electronics such as computers. Once produced, data contained on ROM was unable to be removed or changed. ROM is appropriate for systems whereby the programming does not need to be altered.

Q1.2:

RAM is an abbreviation for "Random Access Memory": a sort of memory in computers that may store working data and be read and updated in any sequence. ROM, on the other hand, can only store unchangeable data.

Q1.3:

Static RAM:

- Release more heat.**
- Use for cache.**
- Structure like D Flipflop.**
- Store information until power removed.**
- Faster, larger area of silicon per byte.**
- More power consumption.**

Dynamics RAM:

- Store information if the contents are refreshed frequently.**
- Use for main memory.**
- Build from single capacitor.**
- Less power consumption.**

- Release less heat.
- Slower, Smaller area of silicon per byte.

Q2:

8 589 934 592 bits are needed.

Q3:

The "Von Neumann Architecture" is a type of computer system based on the concept of stored programmed computers, in which both programming data and instruction data are stored in the same memory.

Harvard Architecture is a digital computer architecture based on the principle of distinct memory along with distinct networks for command and data. It was created primarily to address the technical difficulties of Von Neumann Architecture.

Harvard traditionally employs multiple memory addresses for instructions and data, while Von maintains the same actual memory address. Furthermore, Von requires two cycles, but Harvard just requires one. Von Neumann's architecture is more straightforward than Harvard architecture.

Q4:

Cache memory, often called cache, is a buffer between the central processing unit (CPU) and main memory. Furthermore, it regularly utilizes instructions and data for faster processing.

Cache memory is used to store programmed instructions often used by software during general operations. As a result, quick access is required to keep the programmed running well.

Q5:

A programmed interruption is a signal provided by a computer or a connected device instructing the computer's operating system to halt what it is doing and determine what to do next.

There are 4 types of interrupts, which is:

- **Software Interrupt.**
- **Hardware Interrupt.**
- **Level-triggered interruptions.**
- **System Implementation.**

Q5.1:

The interrupt driver will poll every device on a computer to determine which device sent out the request. Polled interrupt is a slow data transfer mechanism that requires a lengthy time to determine whether the hardware on a machine is prepared.

Q6:

Stack memory is a memory technology that permits system memory to be utilized as a first-in and last-out buffer for transitory data storage. The stack memory is controlled by a register known as the Stack Pointer. When a stack action is performed, the stack pointer immediately changes and displays the present stack memory position.

Q6.1:

The stack is critical in retaining the state of the CPU before it is stopped.

Interrupt handlers can nest. As a result, a stack is a useful data structure for storing addresses in the right order.

Q6.2:

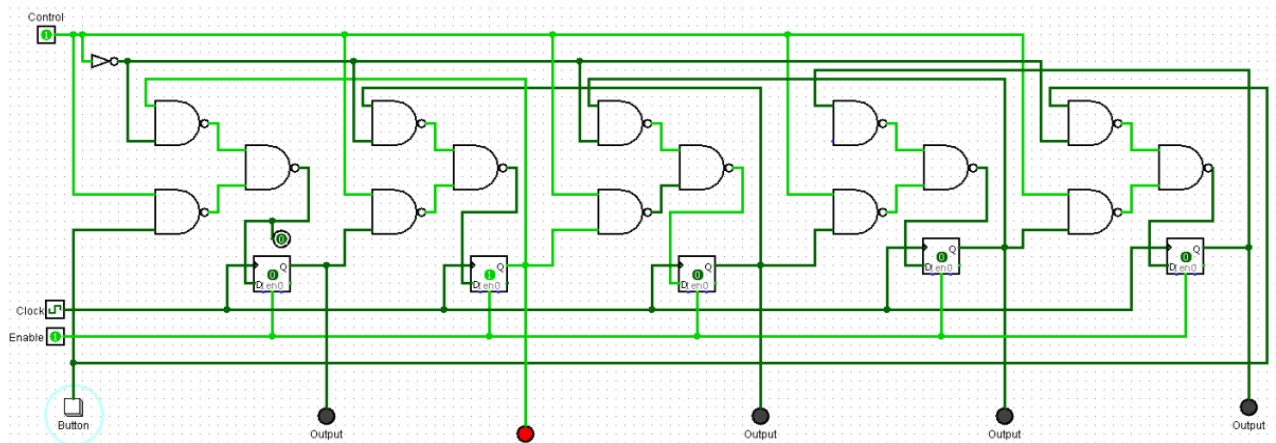
There are 4 operations of Stacks:

- **Peek: It allowed you to view the topmost stack element without having to delete it.**
- **Swap: In this operation, the first element becomes the second and the second element becomes the top, reversing the positions of the stack's two top elements.**

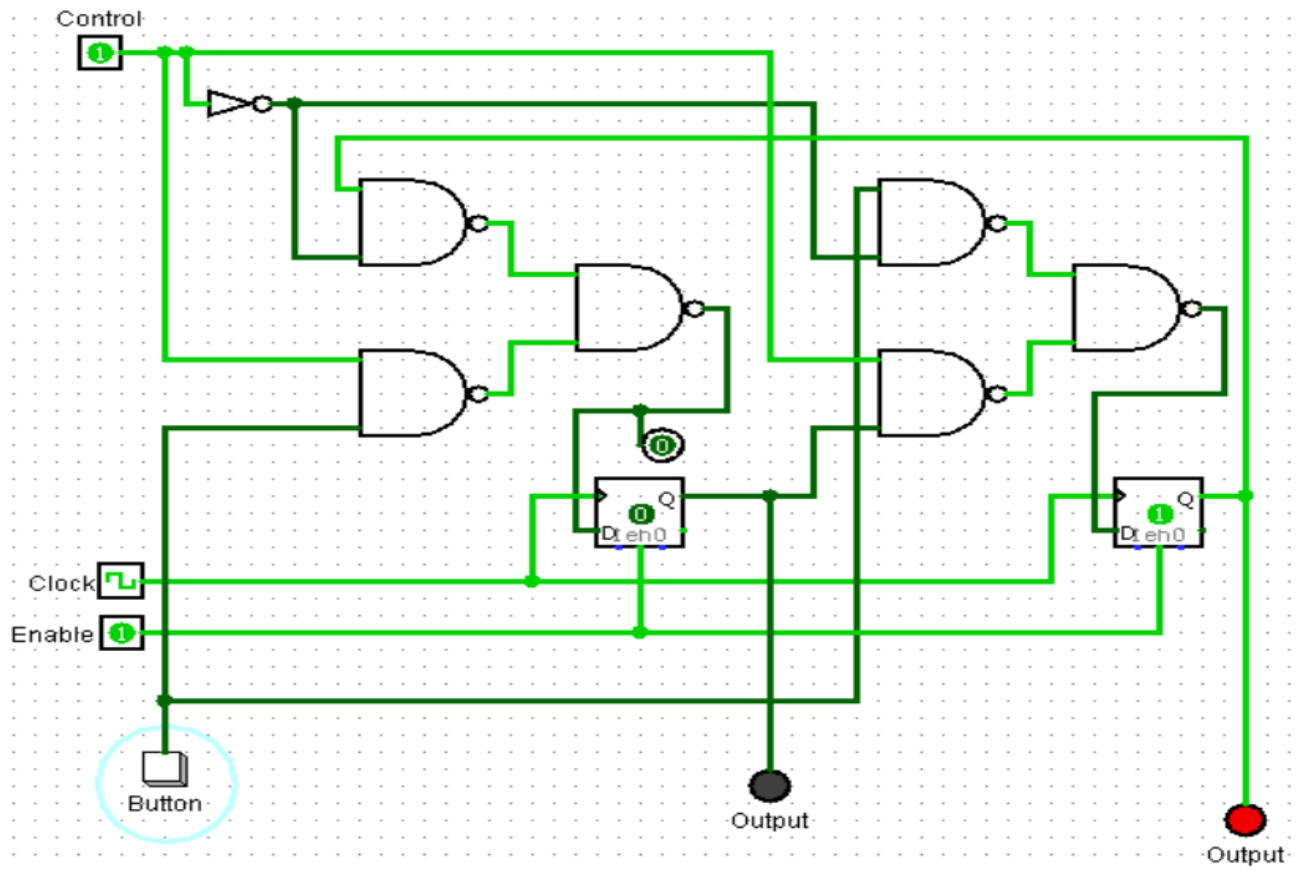
- **Duplicate:** This operation allows you to re-stack the top item after copying its value into a variable, resulting in a duplicate of the original element.
- **Rotate:** This option indicates the number of components in a stack that are rotated consecutively.

Practical

Q8/9/10:



Q11:



Q12:

