Chapter 4

Understanding of Stack Organization

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Objectives

After studying this chapter, you will be able to understand

- Concept of stack organization.

- Types of stacks.

- Implementation of the stacks.

- Insertion and deletion operation in the stack.

- Application of stack in arithmetic expression.

1.   Introduction

In computer organization stack is a storage structure that is used to store the temporary data during the computations. It is based on the principle Last-In, First-Out (LIFO) i.e. the last item stored is the first item to be retrieved. The main characteristics of a stack that all the insertions and deletions operations occur at the same end called "top" of the stack. Stack uses a register named, stack pointer (SP) for storing the address of the stack top. Depending upon the type of storage used, stack is of two types: register stack and memory stack. The stack is a very important component for program execution and other main application areas of the stack is to evaluate the arithmetic expression, managing function calls, temporary data storage and memory management. This chapter describes the organization of stack, type of stacks, various operations performed on the stacks and the application area of stack.

2.   Stack Organization

Computer is an electronic device. Along with Central Processing Unit (CPU) it has memory as a main component. Computer memory is used to store the data. The memory unit is further divided into 3 main areas i.e. Operating System area, user area and stack area.
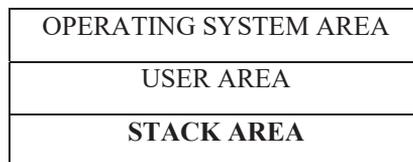
OPERATING SYSTEM AREA
USER AREA
STACK AREA

Figure 1.1 Memory Areas

The stack area is used to store the temporary data of mathematical computations and it can also be used to store the various states of the computer registers whenever there is a switching