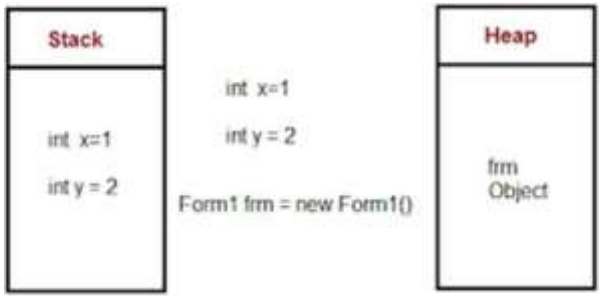
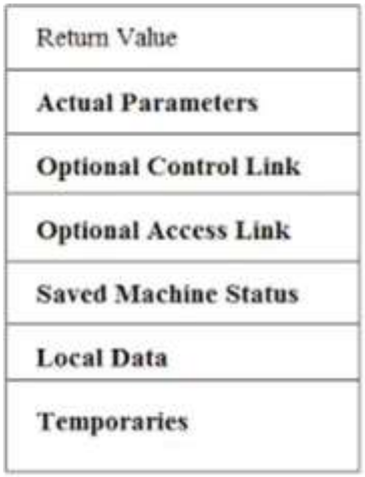
SNS COLLEGE OF TECHNOLOGY

(Autonomous)

COIMBATORE-35

Storage allocation Strategies





Return Value

Actual Parameters

Optional Control Link

Optional Access Link

Saved Machine Status

Local Data

Temporaries

Activation record

Storage Allocation

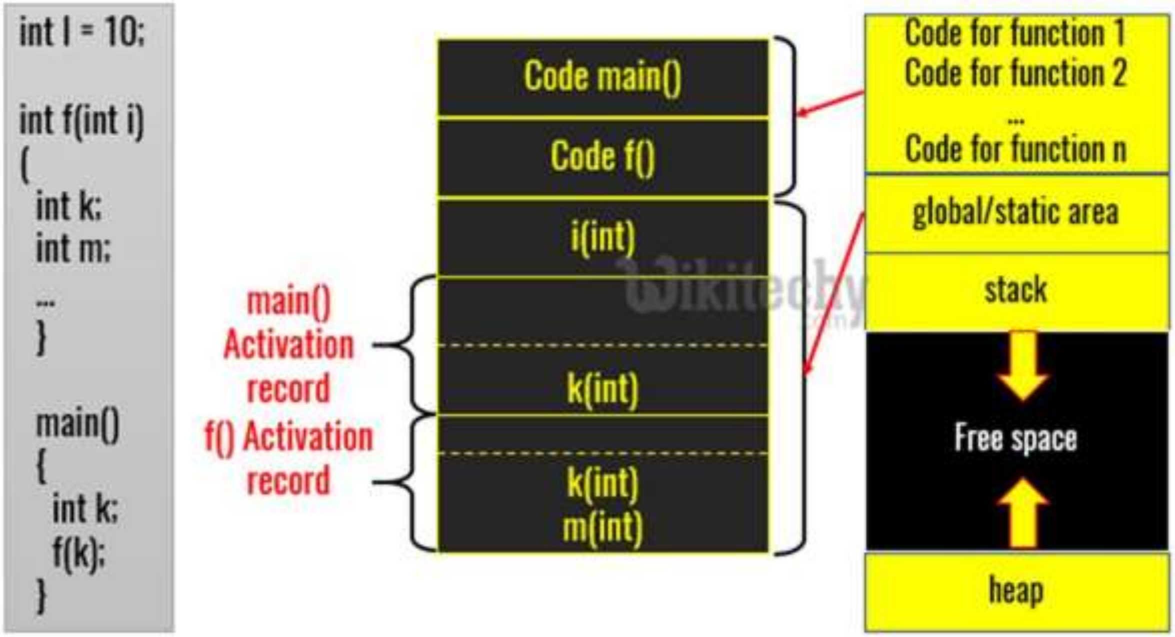
- **Storage Allocation**
- The different ways to allocate memory are:
- Static storage allocation
- Stack storage allocation
- Heap storage allocation

Static storage allocation

- In static allocation, names are bound to storage locations.
- If memory is created at compile time then the memory will be created in static area and only once.
- Static allocation supports the dynamic data structure that means memory is created only at compile time and deallocated after program completion.
- The drawback with static storage allocation is that the size and position of data objects should be known at compile time.
- Another drawback is restriction of the recursion procedure.

19CS301/ATCD-Unit 3/Storage allocation strategies /B.Vinodhini,M.Kavitha & V.Savitha

Static storage allocation



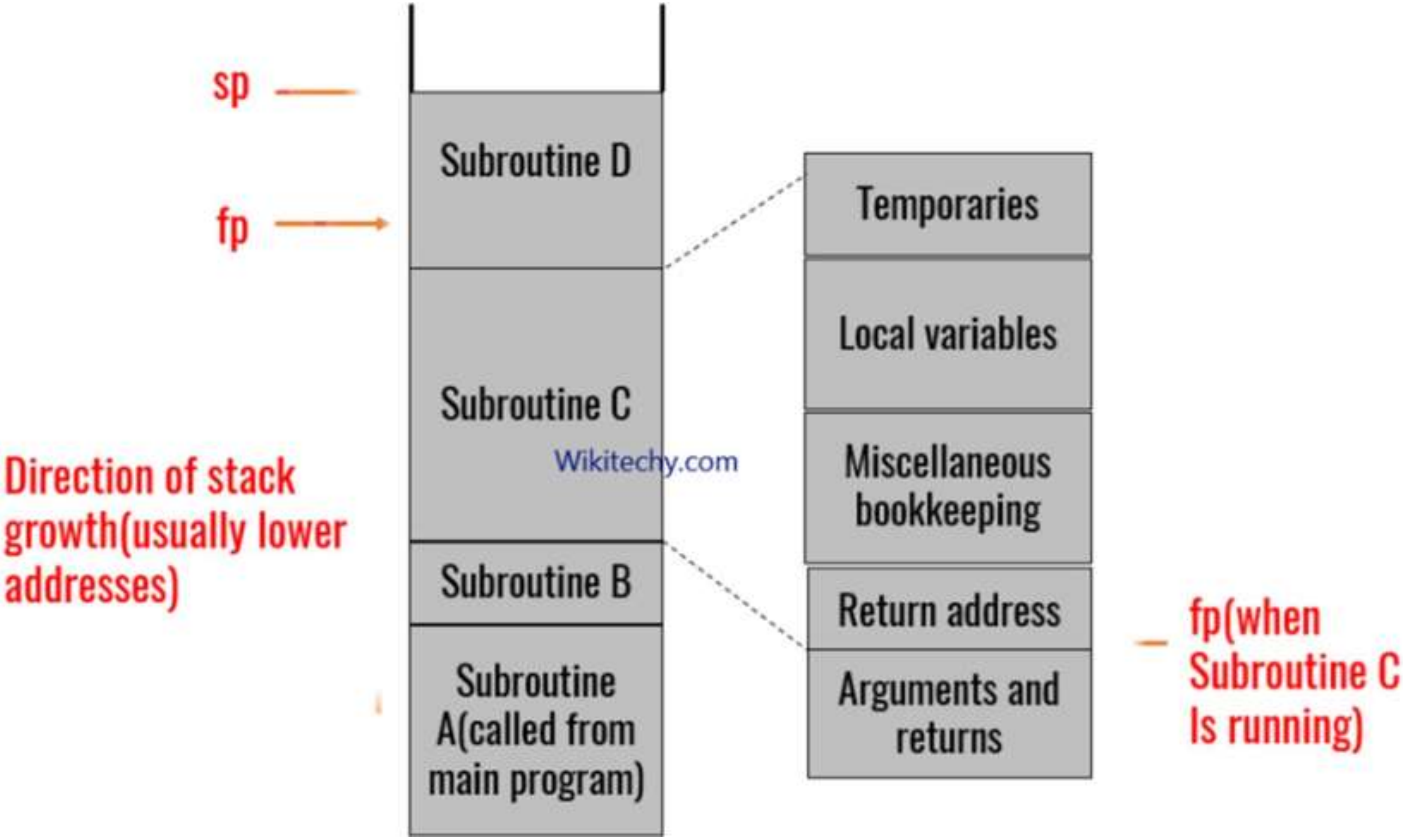
```
int I = 10;

int f(int i)
{
  int k;
  int m;
  ...
}

  main()
  {
   int k;
   f(k);
  }
```

Static Allocation

Stack storage allocation

- In stack storage allocation, storage is organized as a stack.
- An activation record is pushed into the stack when activation begins and it is popped when the activation end.
- Activation record contains the locals so that they are bound to fresh storage in each activation record. The value of locals is deleted when the activation ends.
- It works on the basis of last-in-first-out (LIFO) and this allocation supports the recursion process.

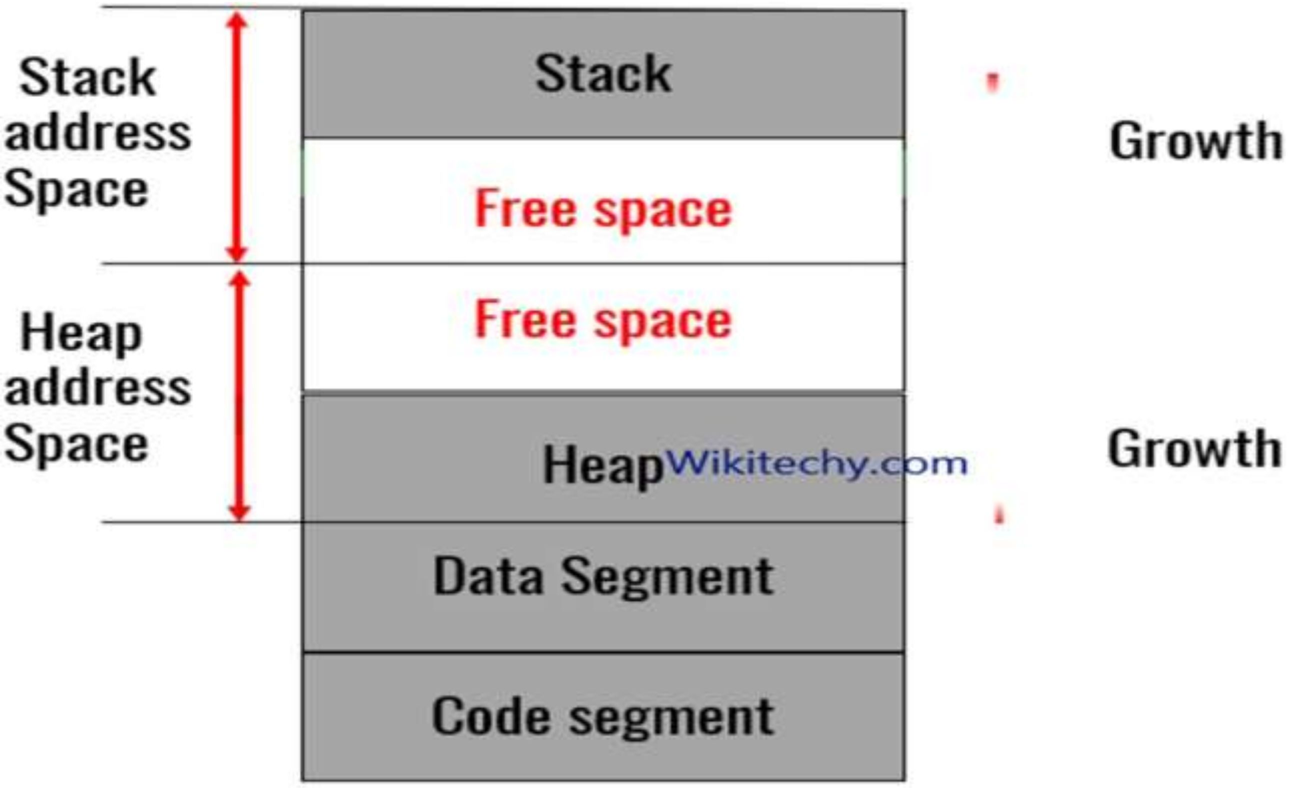
Stack storage allocation


sp
fp
Subroutine D
Subroutine C
Wikitechy.com
Subroutine B
Subroutine A(called from main program)
Direction of stack growth(usually lower addresses)
Temporaries
Local variables
Miscellaneous bookkeeping
Return address
Arguments and returns
fp(when Subroutine C Is running)

Heap allocation

- Heap allocation is the most flexible allocation scheme.
- Allocation and de allocation of memory can be done at any time and at any place depending upon the user's requirement.
- Heap allocation is used to allocate memory to the variables dynamically and when the variables are no more used then claim it back.
- Heap storage allocation supports the recursion process.

Heap allocation



Heap Allocation

Summarization