

Storage Organisation

1.

Procedure

— declaration that associates an identifier with a statement

Activation tree

Root —

functions are children

subdivision of runtime memory

Compile time → code → memory location for code
 ↓
 static data

Run time → stack



free memory



Run time Heap — ex. malloc

enter main()

enter readArray()

leave readArray()

enter qsort(1, 9)

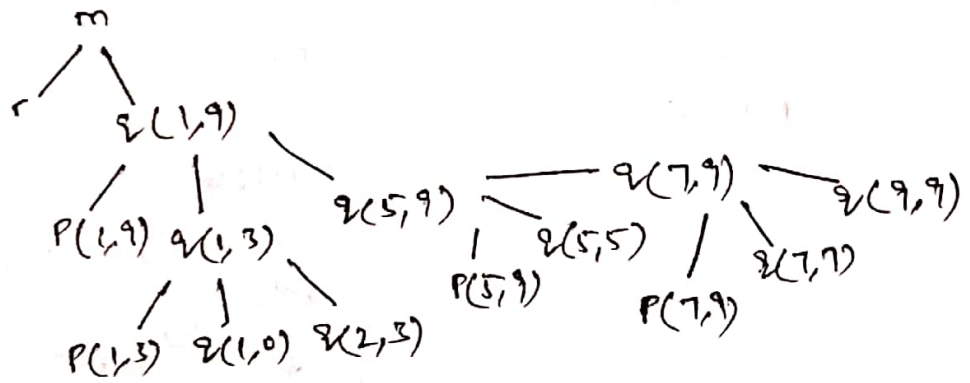
enter part(1, 9)

leave part(1, 9)

leave qsort

leave main

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→
flow

Example - Quick Sort Activation Tree

↳ helps us to know which all functions are active and also the control flow

```

void output(int n, int x) {
    printf("The value of %d! is %d\n", n, x);
}

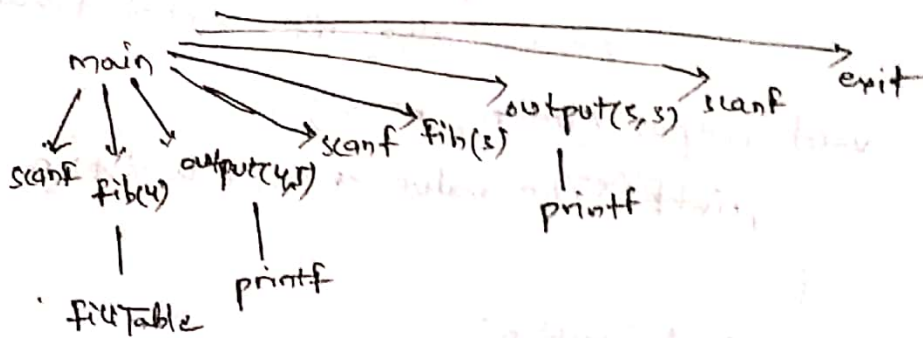
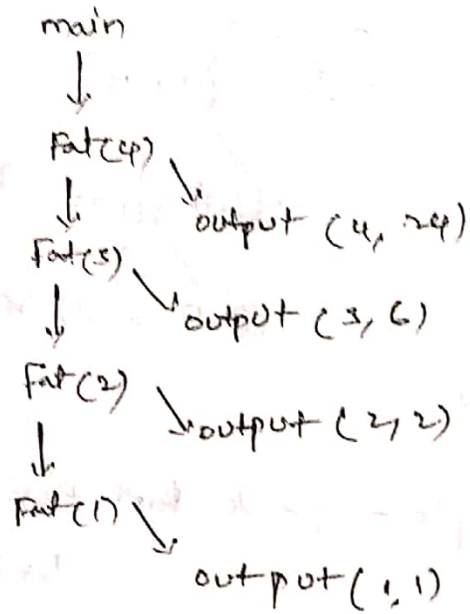
int fat(int n)
{
    int x;
    if (n > 1)
        x = n * fat(n-1);
    else
        x = 1;
    output(n, x);
    return x;
}

void main() {
    fat(4);
}
  
```

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Activation
tree
fat(4)



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4. Control stack

- keep track of live procedure activation
- flow of control in program corresponds to DF depth first traversal of Act tree

push — activation begins

pop — when act ends

activation record

control link — pointer
that points to
activation record of caller

access link — points to non local
data
(maybe in other act record)

Actual parameters
Return value
control link
Access link
Saved Machine status
Local data
temporaries

SMS — holds info about machine
status before procedure call

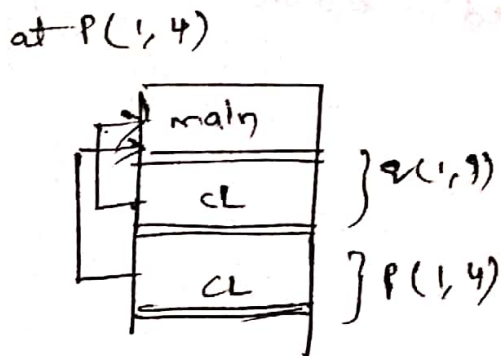
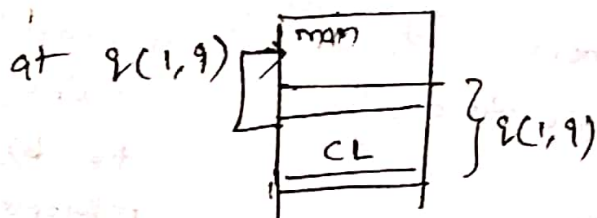
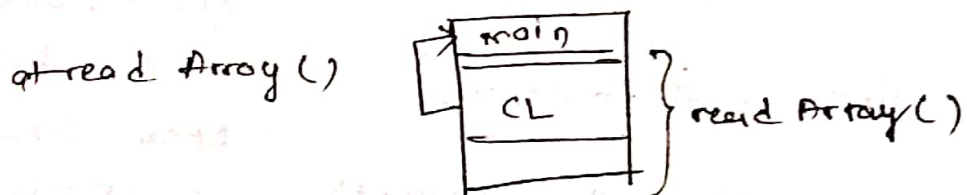
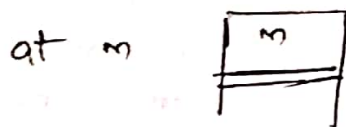
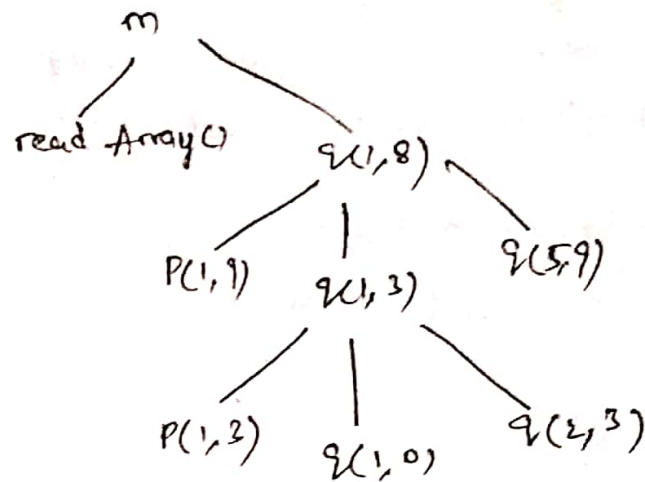
local data temporaries —
temporary values used in evaluation

returned
value — value
to be
returned.

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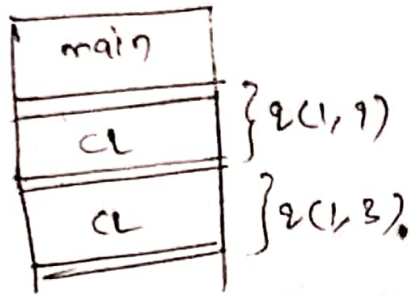
5.

Activation Record - Q9, Quicksort

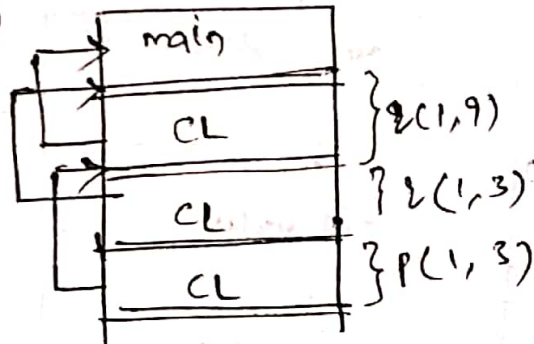


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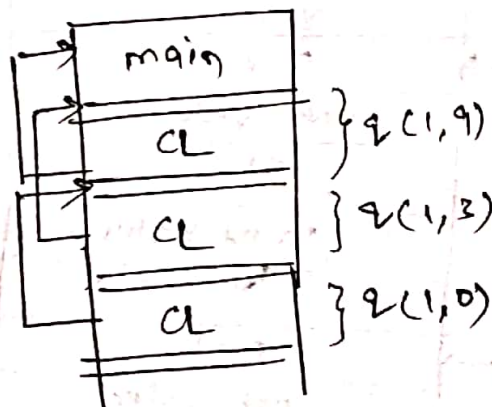
6. at $q(1,3)$



at $p(1,3)$



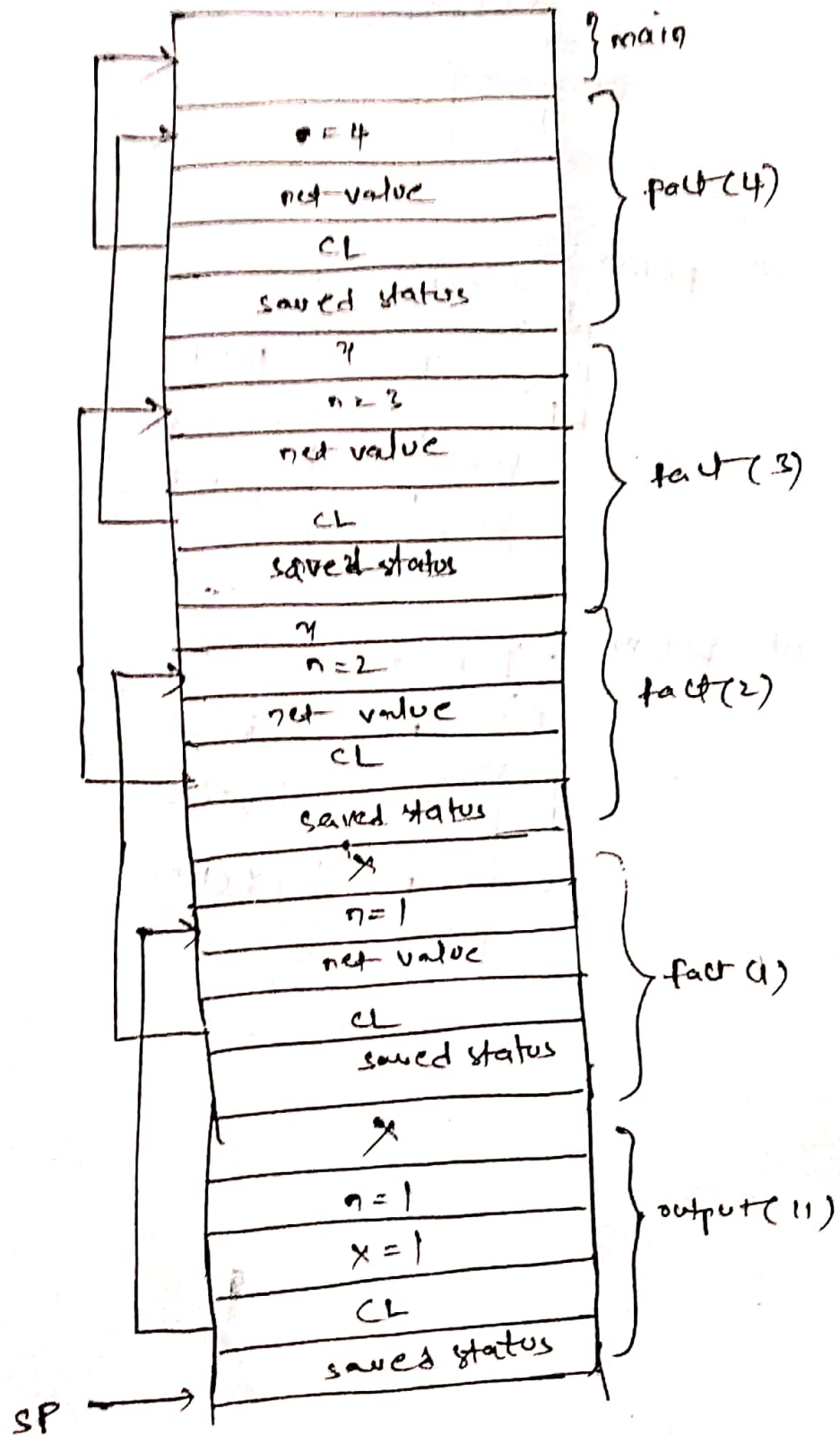
at $q(1,0)$



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7.

Activation Record egr



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