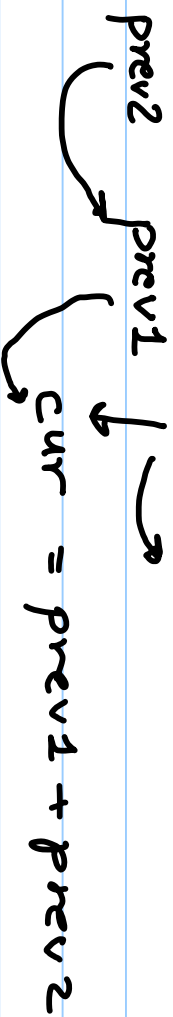


Mins 1

1. value	0	1	1	2	3	5	8	13	21	
index	1	2	3	4	5	6	7	8	9	...



prev1 = cur;
prev2 = prev1

2_3

$2'$

2^1

2^2

\cdot

2^{n-1}

2^n

```

int prev1 = 1;
int prev2 = 0;
int cur = 0;
for (int i = 1; i <= n; i++)
{

```

```

    if (i == 1) cur = 0;
    else if (i == 2) { cur = 1
        cur = 1 cur = 1;
    }

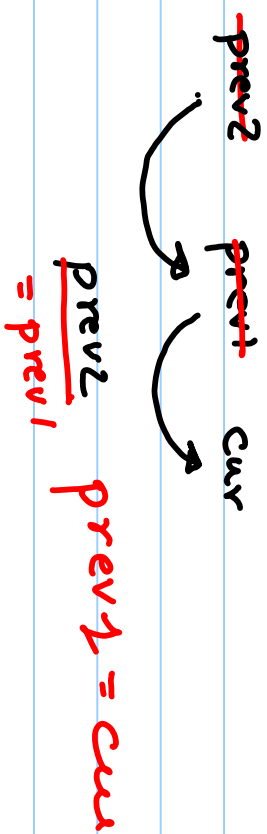
```

```

        cur = prev1 + prev2;
        prev2 = prev1;
        prev1 = cur;
    }
    cout << " " << cur;
}

```

f	0	1	1	2	...
	1	2	3	...	

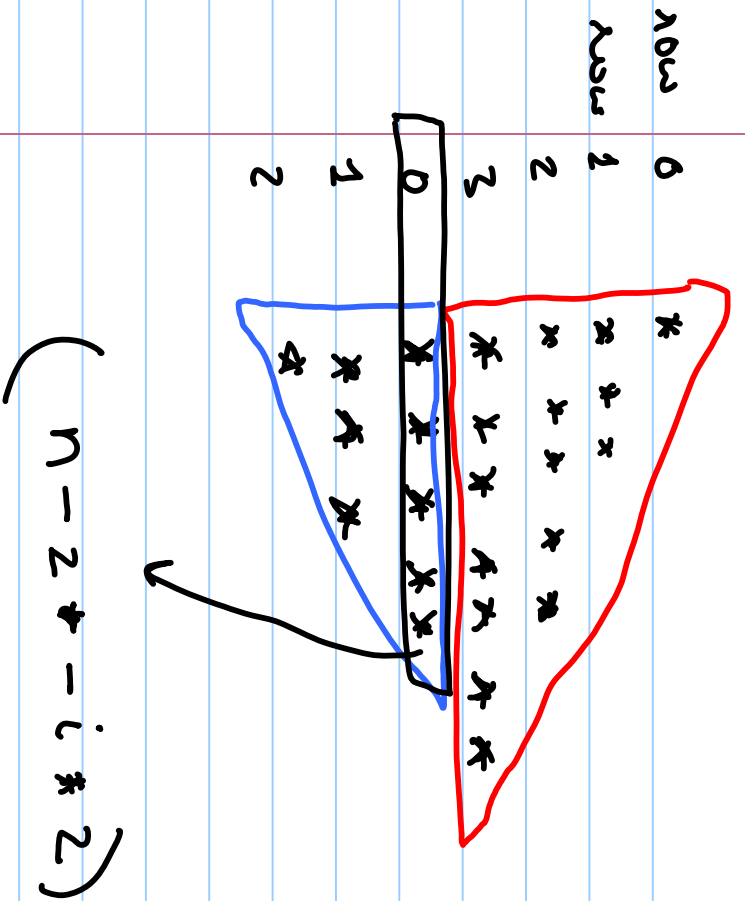


2. Sum of digits

```
int sumDigits ( int n ) {  
    int sum = 0;  
    while ( n != 0 )  
    {  
        int q = n / 10;  
        int r = n % 10;  
        n = q;  
        sum = sum + r;  
    }  
    return sum;  
}
```

}

$$n = 7$$



$\frac{n+1}{2}$ rows

$\frac{n-2}{2}$ rows

```

for (int i = 0; i < (n+1)/2; i++)
{
    for (int j = 0; j < 2*i+1; j++)
    {
        cout << "x";
    }
    cout << endl;
}

```

```
for (int i=0; i < (n-1)/2; i++)  
{  
    for (int j=0; j < n-2-i*2; j++)  
    {  
        cout << " * ";  
    }  
    cout << endl;  
}
```

4.

```
int i = 10;  
for (int i = 0; i < 1; j--)
```

```
    {  
        int j = i++;  
        cout << j << " ";  
    }
```

i = 0

i < j

j = 0, i = 2

j-- (9)


```
int j = 10;
int i = 0;
```

```
{ while (i < j)
```

```
    int j2 = i++;
    cout << j2;
    j++;
}
```

```
{ while (i < j)
```

```
    int x = 0;
if (x < 1)
{ while (x < 1)
    int j = i++;
    cout << j;
    x++;
    j++;
}
```

5.

Function and Strings

{ type name (type name, type name, ...)

}

name (value, value, ..., value);

```

void
Print Greeting ( String myname, int n )
{
    for (int i=0; i<n; i++) {
        cout << "Hi " << myname << endl;
    }
}

```

```

Print Greeting ("abc", 3);
Hi abc
Hi abc
Hi abc

```

```
int sumDigits ( int n )  
    cout << "hello" ;
```

```
    return _____ ;
```

```
    cout << "The sum of digits of " << 123 << " is "  
    << sumDigits 123  
    << endl ;
```

The sum of digits of 123 is hello

Declaration order

for
bar
main

Forward declaration
bar decl;
for
bar
main

function prototypes

int bar (int n); // forward declaration.

```
int foo (int n)
```

```
{
```

```
    return 2 * bar (n+1);
```

```
}
```

```
int bar (int n)
```

```
{
```

```
    return n+3;
```

```
}
```

```
int main() {
```

```
    const int
```

```
}
```

```
    foo(1) + bar(2) << endl;
```

```
;
```

Pass by value

```
void swap(int a, int b)
```

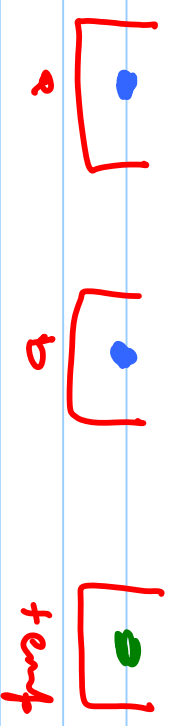
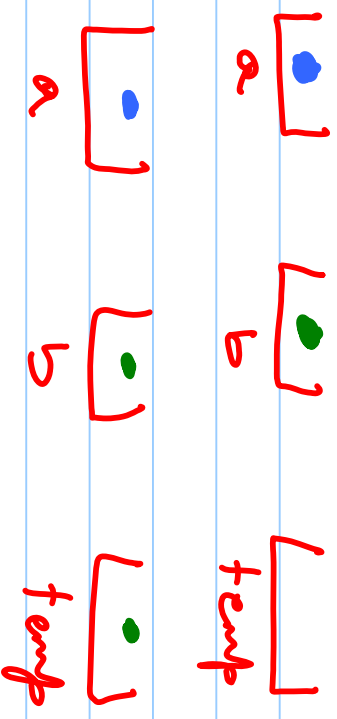
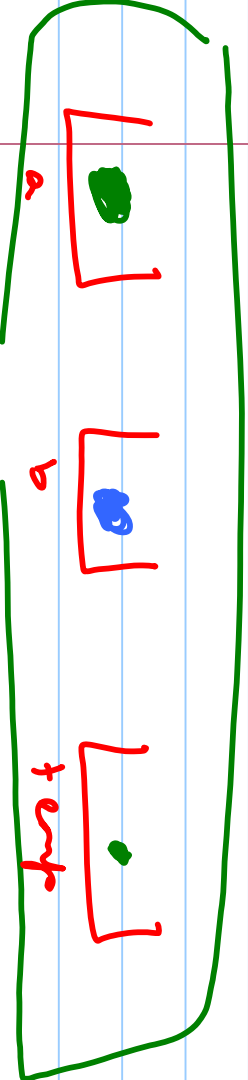
```
{  
    int temp = b;
```

```
    b = a;
```

```
    a = temp;
```

```
}
```

find step




```
int mai()  
{
```

```
    int x = 17;
```

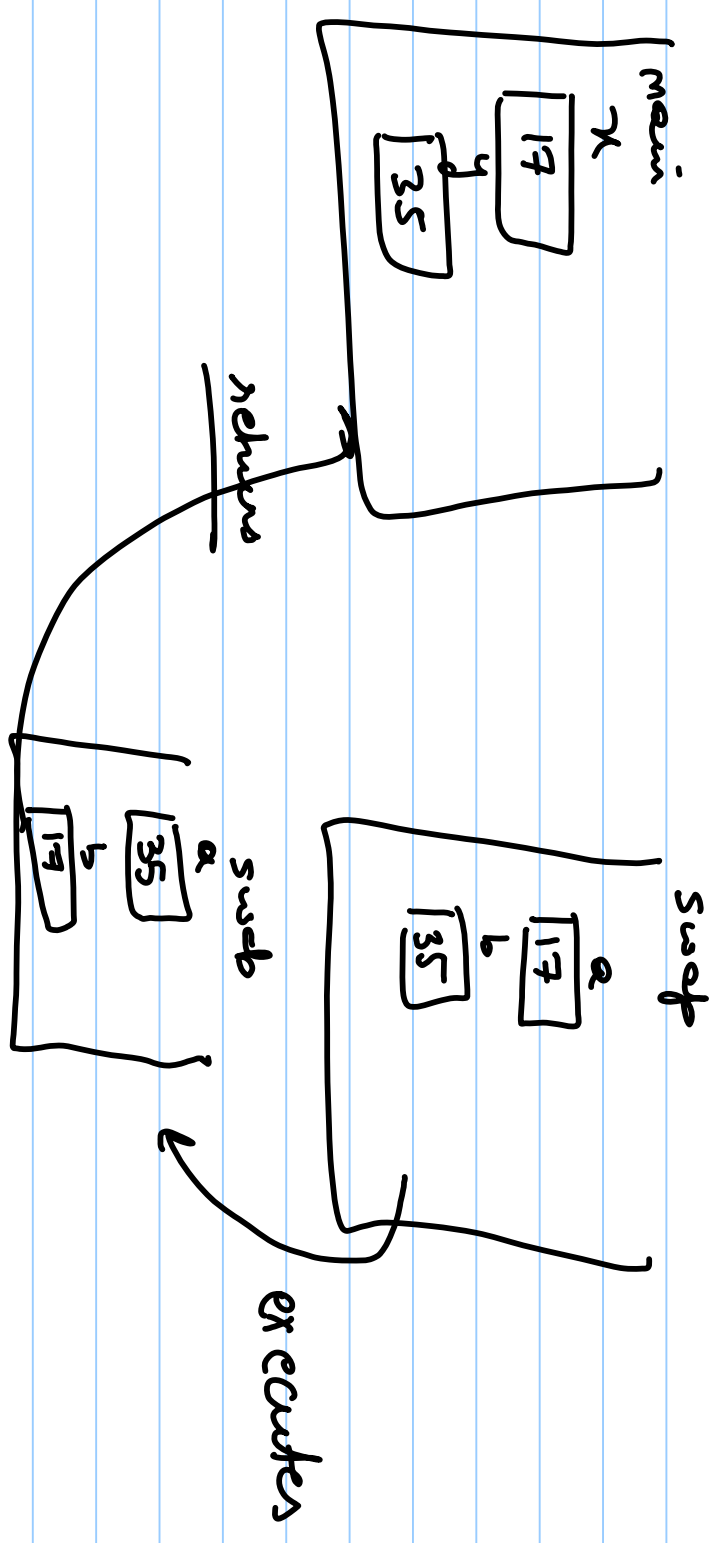
```
    int y = 35;
```

```
    swap(x, y);
```

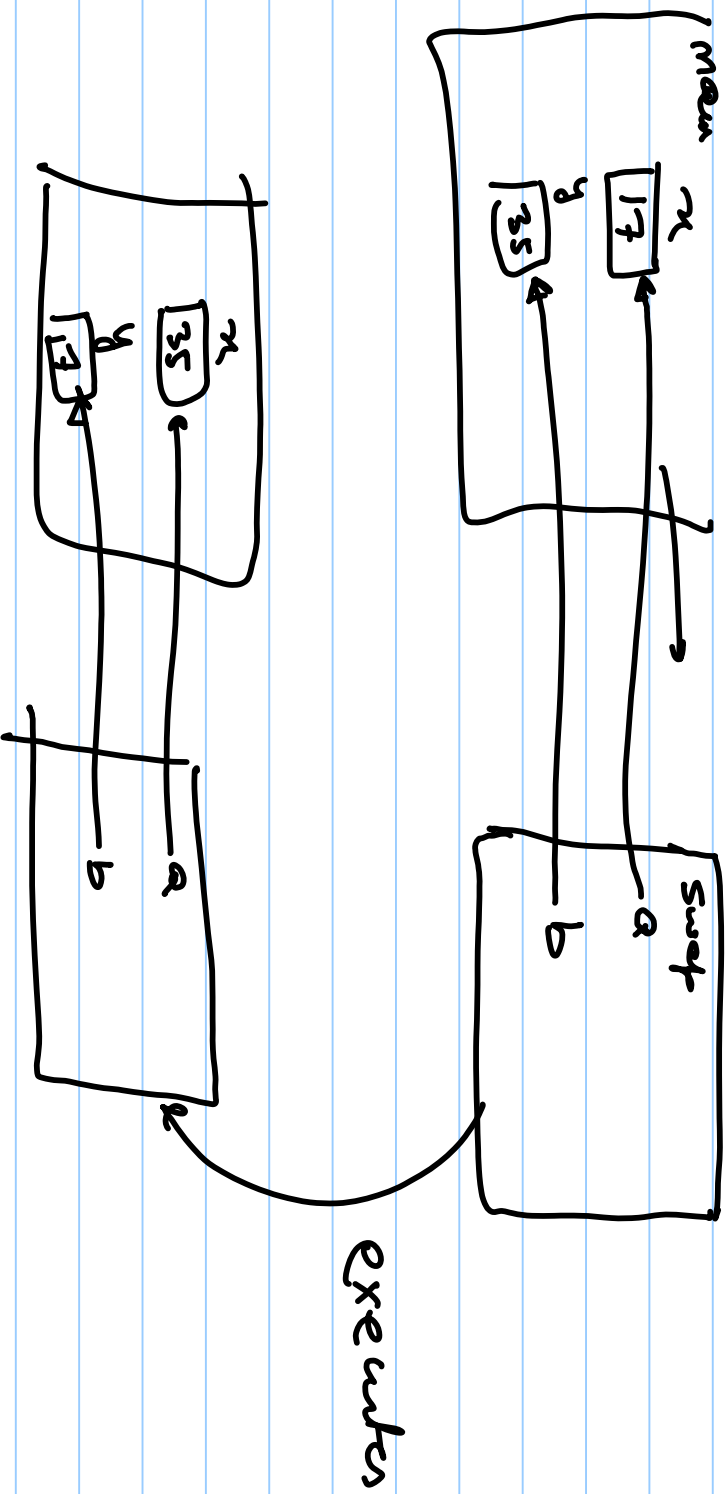
```
    cout << x << " " << y << endl;  
    return 0;
```

```
}
```

Pass by value



Pass by reference



&

```
void swap (int &a, int &b)
{
    int temp = a;
    a = b;
    b = temp;
}
```

swap(x, y);

Pass by reference

- modifying a parameter ~~variables~~ will affect the variable passed in

- The ampersand & operator is used only in the declaration, not in the call.

- Can't pass in non-variables; won't work
 swap(x, y); ✓
 swap(2, 3); ✗
 swap(x+1, y-2); ✗
 swap(x++, y--); ?

```
void addFive (int &x)  
{
```

```
    x = x + 5;
```

```
}
```

```
int main()  
{
```

```
    int x = 10;
```

```
    addFive(x);
```

```
    cout << x << endl; // 15
```

```
}
```