Lecture 1 b

Recursion

Finding even numbers using recursion

```
void findEven(int i){
      if(i > 10) return ;
      if( i%2 == 0) cout << i <<endl;
         findEven(++i);
}

int main( ){
      findEven(0);
      return 0;
}
```

Factorial Iteratively

```
int factorial(int n){
  int result = 1;
  for(int i = 1; i <= n; ++i){result = result * i;}

  return result;
}

int main(){
  cout << factorial(0) << endl;
  return 0;
}
```

Factorial Recursively

```
int factorial(int n){
  if(n<=1)return n;

  else{return n*factorial(n-1);}
}

int main(){
  cout << factorial(0) << endl;
  return 0;
}
```

Finding fibonacci iteratively

```
int fib(int n){
  if(n == 0)return 0;
  int fib1 = 0; int fib2 = 1; int result;

  for(int i = 1; i < n; ++i){
    result = fib1 + fib2;
    fib1 = fib2;
    fib2 = result;
  }
  return result;
}...
```

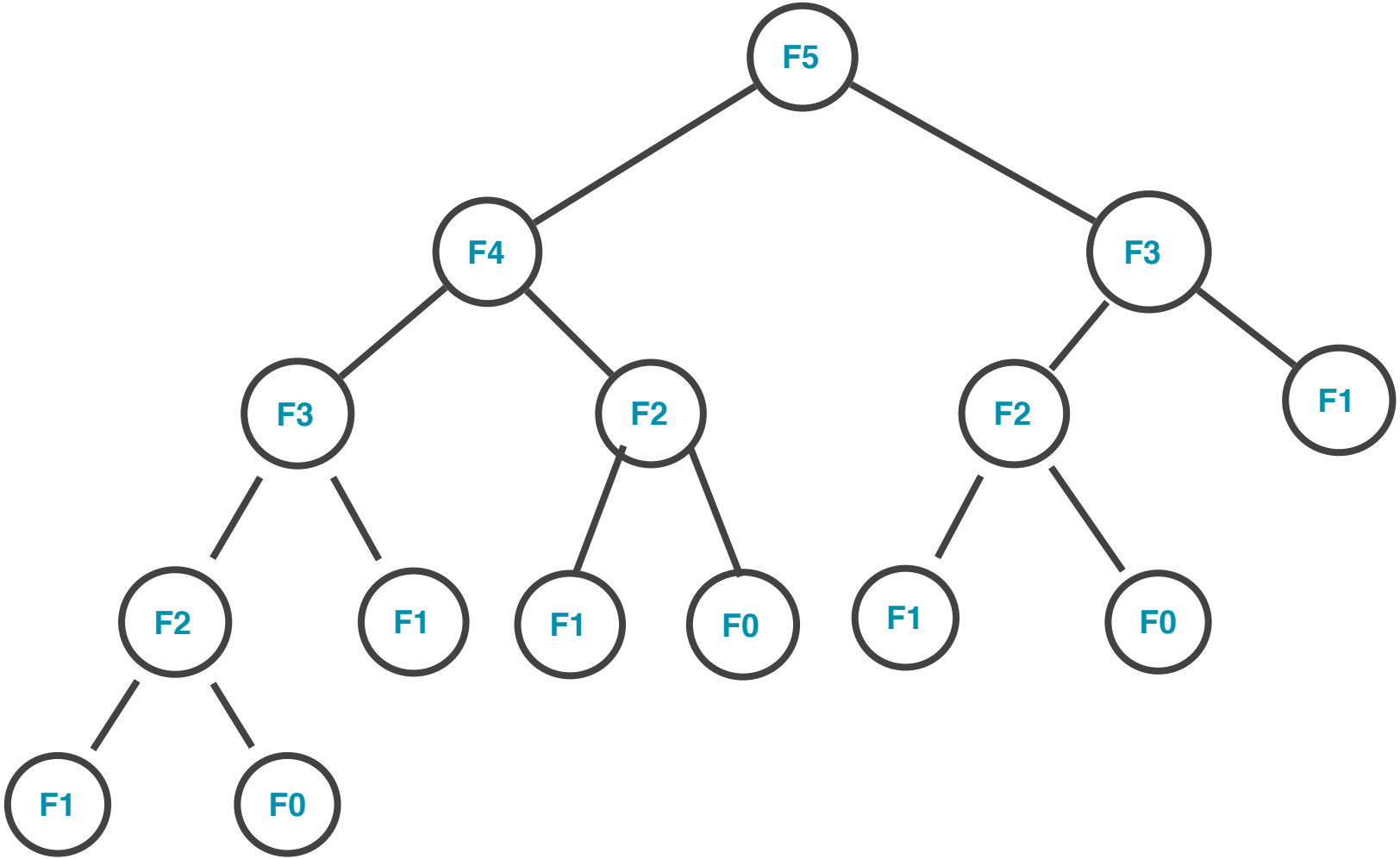
Finding fibonacci iteratively

```
...
int main(){
  cout << fib(6) <<endl;
  return 0;
}
```

Finding fibonacci numbers using recursion

```
int fib(int n){
  if(n<=1)return n;
  return fib(n-1)+ fib(n-2);
}

int main(){
  cout<<fib(6)<<endl;
  return 0;
}
```


F5
F4
F3
F3
F2
F2
F1
F2
F1
F1
F0
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F1
F0

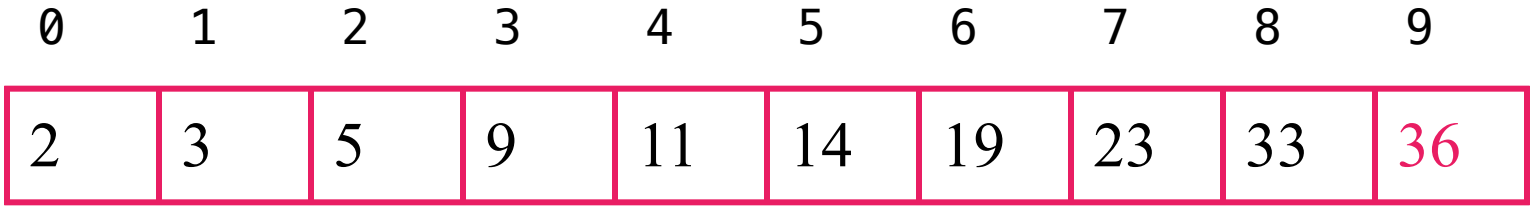
Finding prime numbers using recursion

```
void findPrime(int i){

    if(i > 10) return;

    bool isPrime = true;
    for(int j = 2;j < i ;++j){
       if(i%j == 0){isPrime = false;}}

    if(isPrime) cout<<i<<"is prime"<<endl;
    else cout<<i<<"is not prime"<<endl;

    findPrime(++i);
}...
```

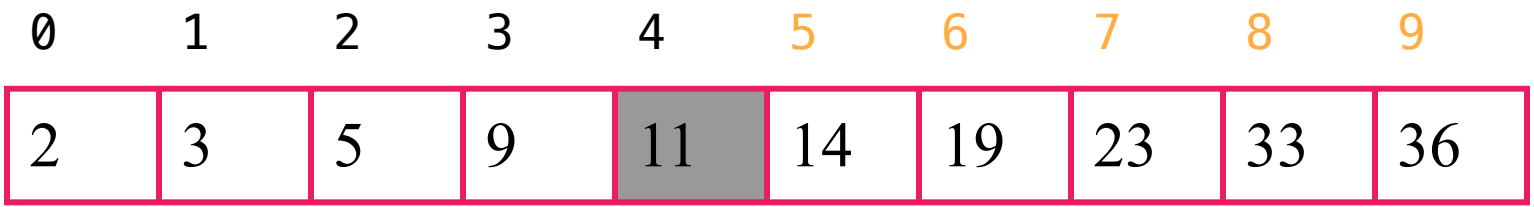
Finding prime numbers using recursion

```
…
int main( )
{
      findPrime(0);
      return 0;
}
```

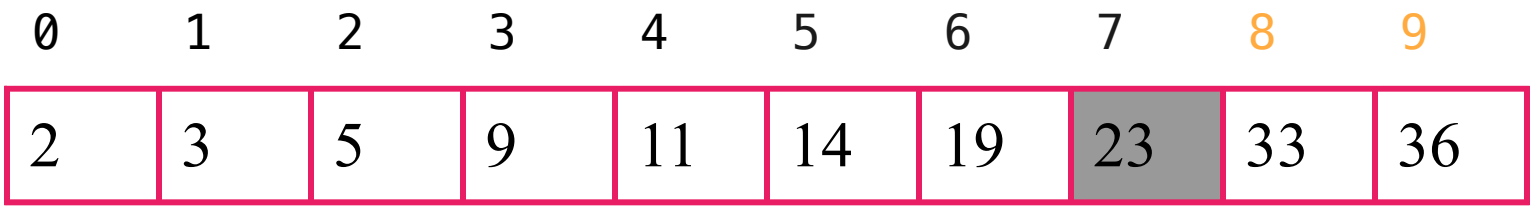
Binary Search(Find 36)



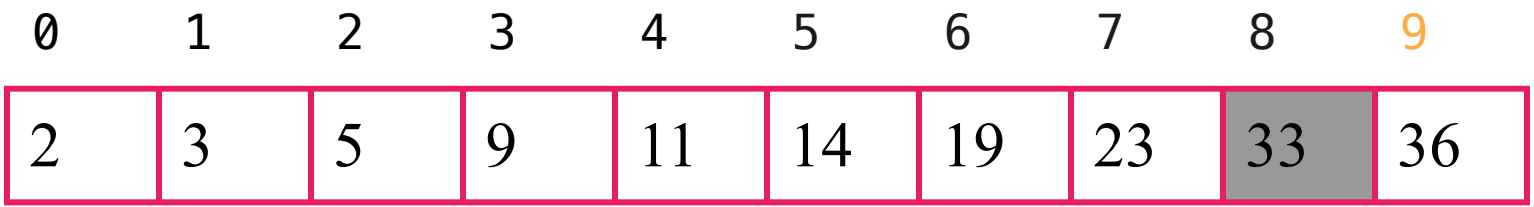
Binary Search(Find 36)



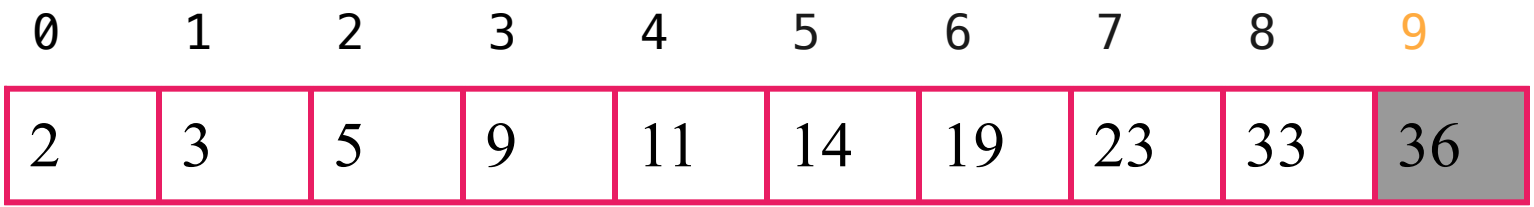
Binary Search(Find 36)



Binary Search(Find 36)



Binary Search(Find 36)



Binary Search

```
bool binarysearch(int key,int array[], int low, int high){

  if(low > high) return false;

  int mid = (low + high)/2;

  if(key == array[mid]) return true;

  if(key > array[mid])return binarysearch(key,array,mid+1,high);

  else return binarysearch(key,array,low,mid-1);
}...
```

Binary Search

```
...
int main(){
  //sorted array
  int array[10] = {1,3,4,6,7,9,12,34,89,100};

  cout<<binarysearch(6,array,0,9)<<endl;
  return 0;

}
```

Power recursively

```
int power(int x, int y){
  if(y == 0)return 1;
  else return x * power(x,--y);
}
```

Power recursively

```
int power(int x, int y){
  if(y == 0)return 1;
  else return x * power(x,--y);
}
```