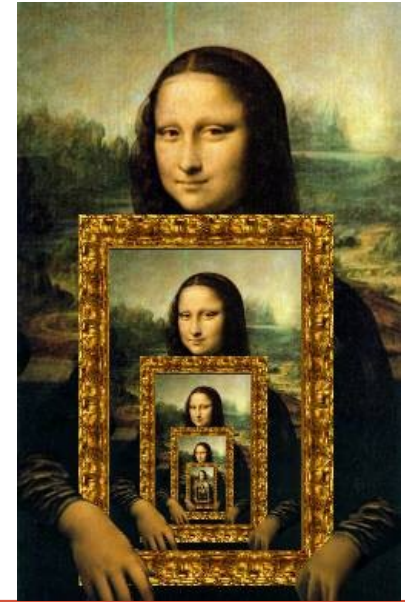


# RECURSION



---

## Problem Solving with Computers-I

<https://ucsb-cs16-wi17.github.io/>

C++

```
#include <iostream>
using namespace std;

int main(){
    cout<<"Hola Facebook!";
    return 0;
}
```



# Announcements

- Please register your clickers on Gauchospace
- I will be away next class, Thursday: 03-09. Please watch the video on C strings by my colleague Michelle Craig: [https://c-programming.onlinelearning.utoronto.ca/Strings\\_and\\_Files.shtml](https://c-programming.onlinelearning.utoronto.ca/Strings_and_Files.shtml)
- HW 13 and 14 are due next week on Tuesday!

# Review: Iterating through sequences

|      |     |     |     |     |     |     |     |
|------|-----|-----|-----|-----|-----|-----|-----|
| name | 'B' | 'o' | 'n' | 'd' | '0' | '0' | '7' |
|------|-----|-----|-----|-----|-----|-----|-----|

```
void printElements(char *arr, int len){  
    for(int i =0; i< len; i++)  
        cout<<arr[i];  
    cout<<endl;  
}
```

```
int main(){  
    char name[]={ 'B', 'o', 'n', 'd', '0', '0', '7' };  
    printElements(name, 7);  
}
```

# Recursion

|      |     |     |     |     |     |     |     |
|------|-----|-----|-----|-----|-----|-----|-----|
| name | 'B' | 'o' | 'n' | 'd' | '0' | '0' | '7' |
|------|-----|-----|-----|-----|-----|-----|-----|

```
void printElementsRecursive(char *arr, int len){  
  
}  
int main(){  
    char name[]={ 'B', 'o', 'n', 'd', '0', '0', '7' };  
    printElementsRecursive(name, 7);  
}
```

# Print Backwards

name 

|     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|
| \B' | \o' | \n' | \d' | \0' | \0' | \7' |
|-----|-----|-----|-----|-----|-----|-----|

```
void printElementsBackwards(char *arr, int len){
```

```
    if(len<=0){
```

```
        _____(1)_____
```

```
        return;
```

```
    }
```

```
    _____(2)_____
```

```
    _____(3)_____
```

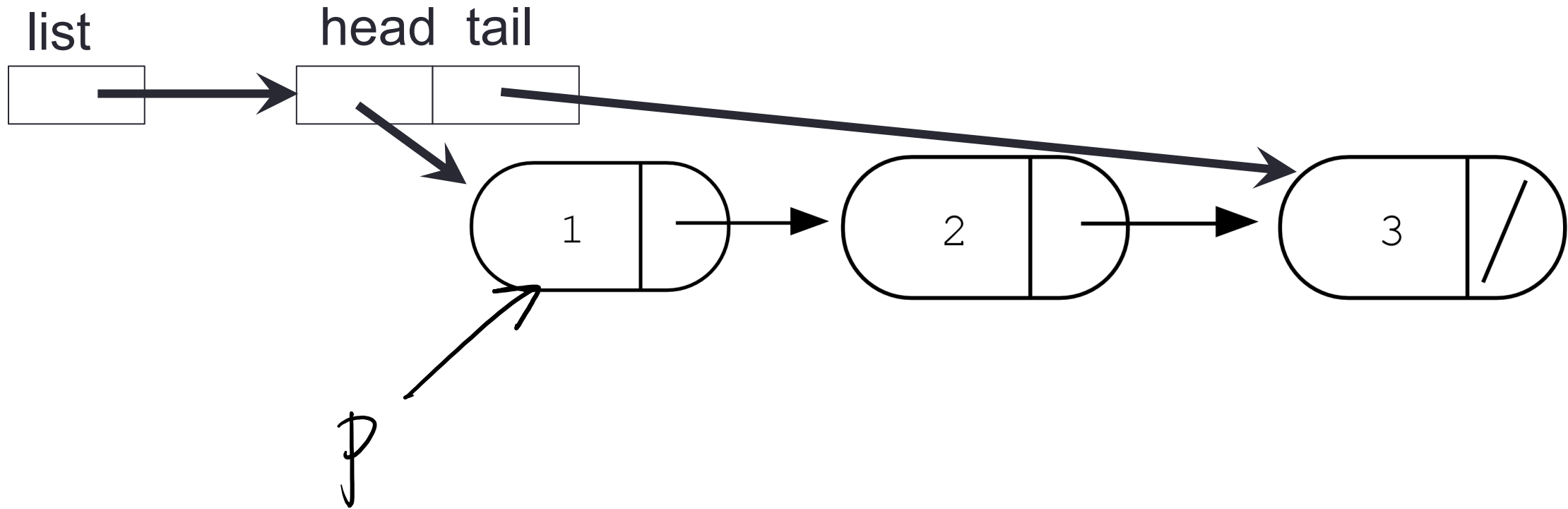
```
}
```

Choose the correct order of statements

|    | (1)         | (2)         | (3)         |
|----|-------------|-------------|-------------|
| A. | cout<<endl; | cout<<*arr; | Print*      |
| B. | ;           | cout<<*arr; | Print*      |
| C. | ;           | Print*      | cout<<*arr; |
| D. | cout<<*arr; | Print*      | cout<<endl; |

Print=>printElementsBackwards(arr+1, len-1);

# Printing elements of a list (iteratively, recursively, backwards)



# Under the hood of recursion

name 

|     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|
| 'B' | 'o' | 'n' | 'd' | '0' | '0' | '7' |
|-----|-----|-----|-----|-----|-----|-----|

```
void printElementsBackwards(char *arr, int len){  
    if(len<=0){ //Base case  
        return;  
    }  
    printElementsBackwards(arr+1, len-1);  
}
```

# Next time

- Wrap up and review