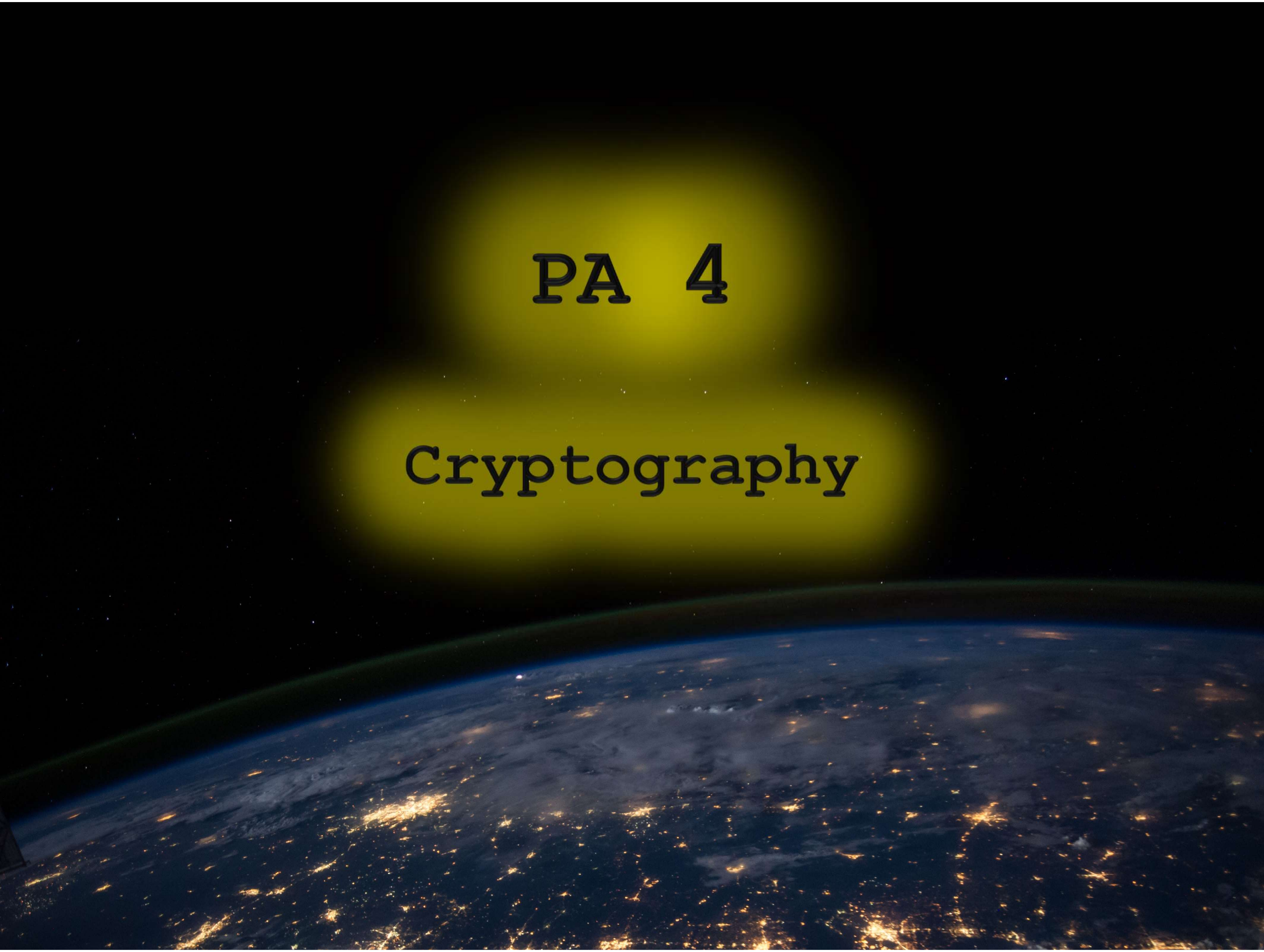
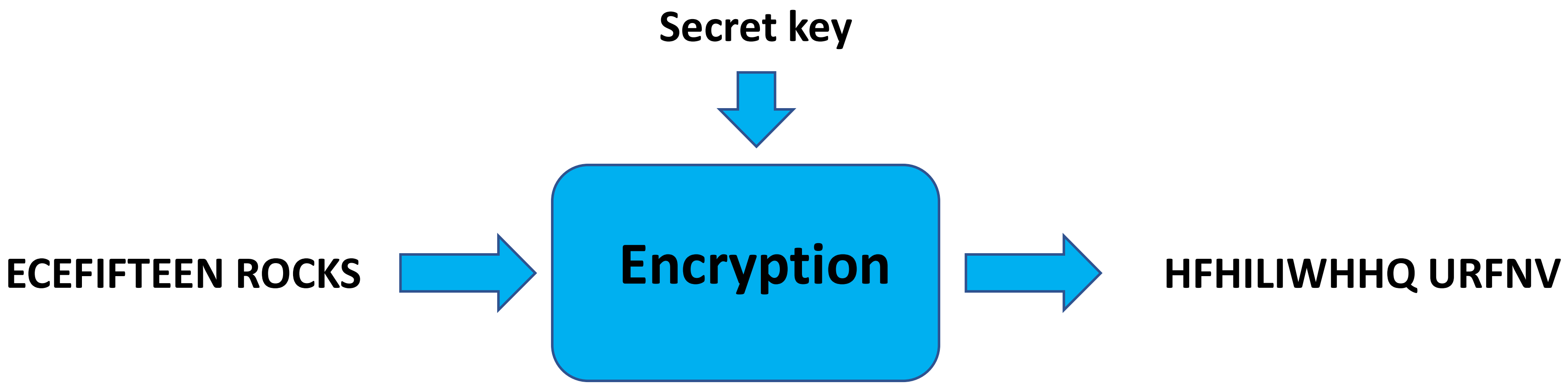
PA 4

Cryptography



PA 4 - Cryptography

DISCUSSION



Secret key

ECEFIFTEEN ROCKS

Encryption

HFHILIWHHQ URFNV

A

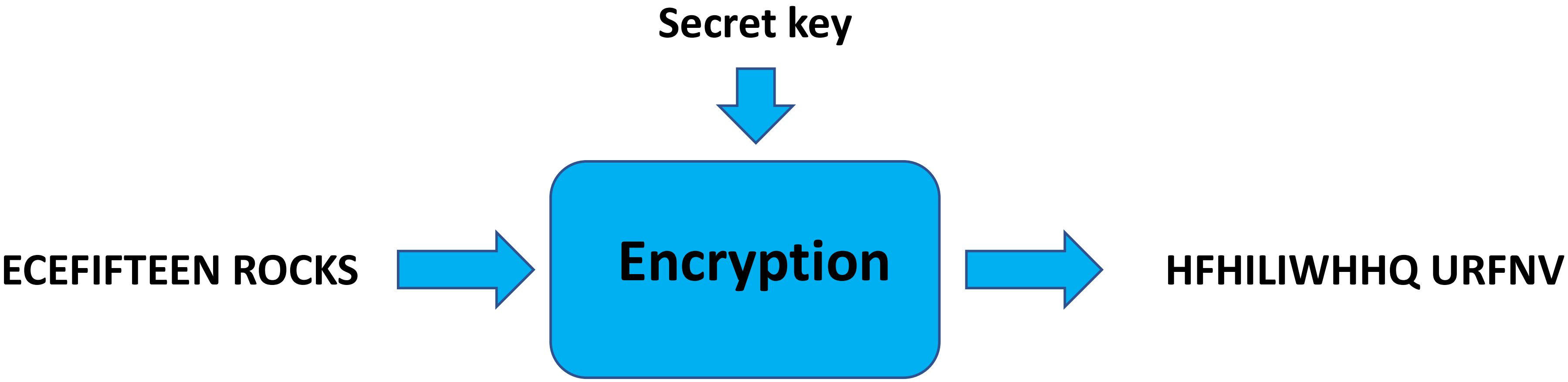
↕

D

Secret key: 3

PA 4 - Cryptography

DISCUSSION

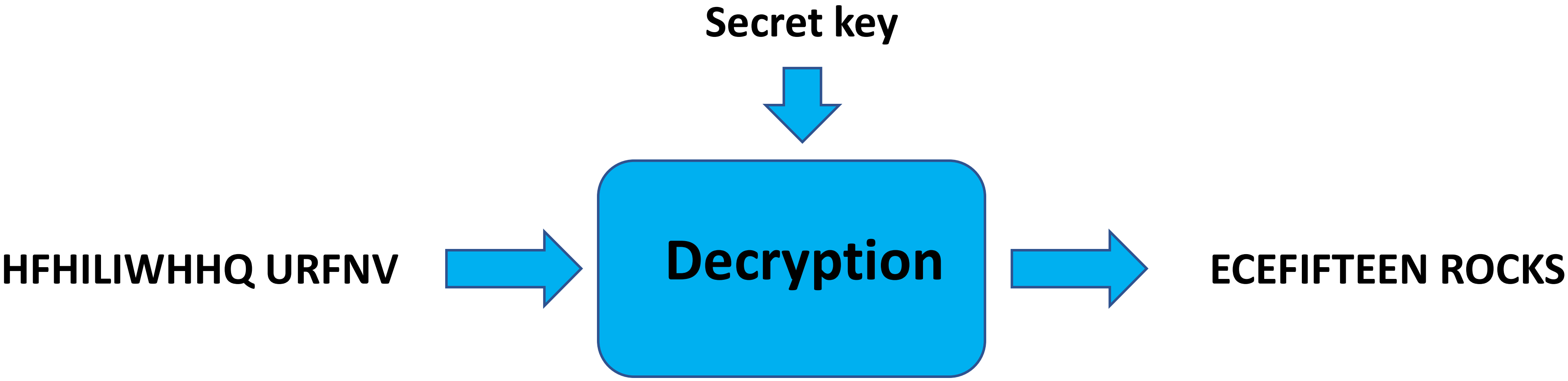


Secret key

ECEFIFTEEN ROCKS

Encryption

HFHILIWHHQ URFNV



Secret key

HFHILIWHHQ URFNV

Decryption

ECEFIFTEEN ROCKS

PA 4 - Cryptography

DISCUSSION

Substitution cipher

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	
↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕
M	G		A	Y	S	H	C	N	T	B	F	L	W	E	X	I	Z	U	P	J	V	D	K	O	Q	R

Enigma cipher

PA 4 - Cryptography

DISCUSSION

```
int x;
char word[] = ″ABCDE″;

x = index_of_char(word, 2, ‘D’);

printf(″%d″, x);
```

string

shift to the left

character

1

Understand how `char_at_index()` is implemented in the starter code!

A	**B**	**C**	**D**	**E**	**\0**
0	1	2	3	4	5

Original data array

C	**D**	**E**	**A**	**B**	**\0**
0	1	2	3	4	5

Data shifted by two (to the left)

PA 4 - Cryptography

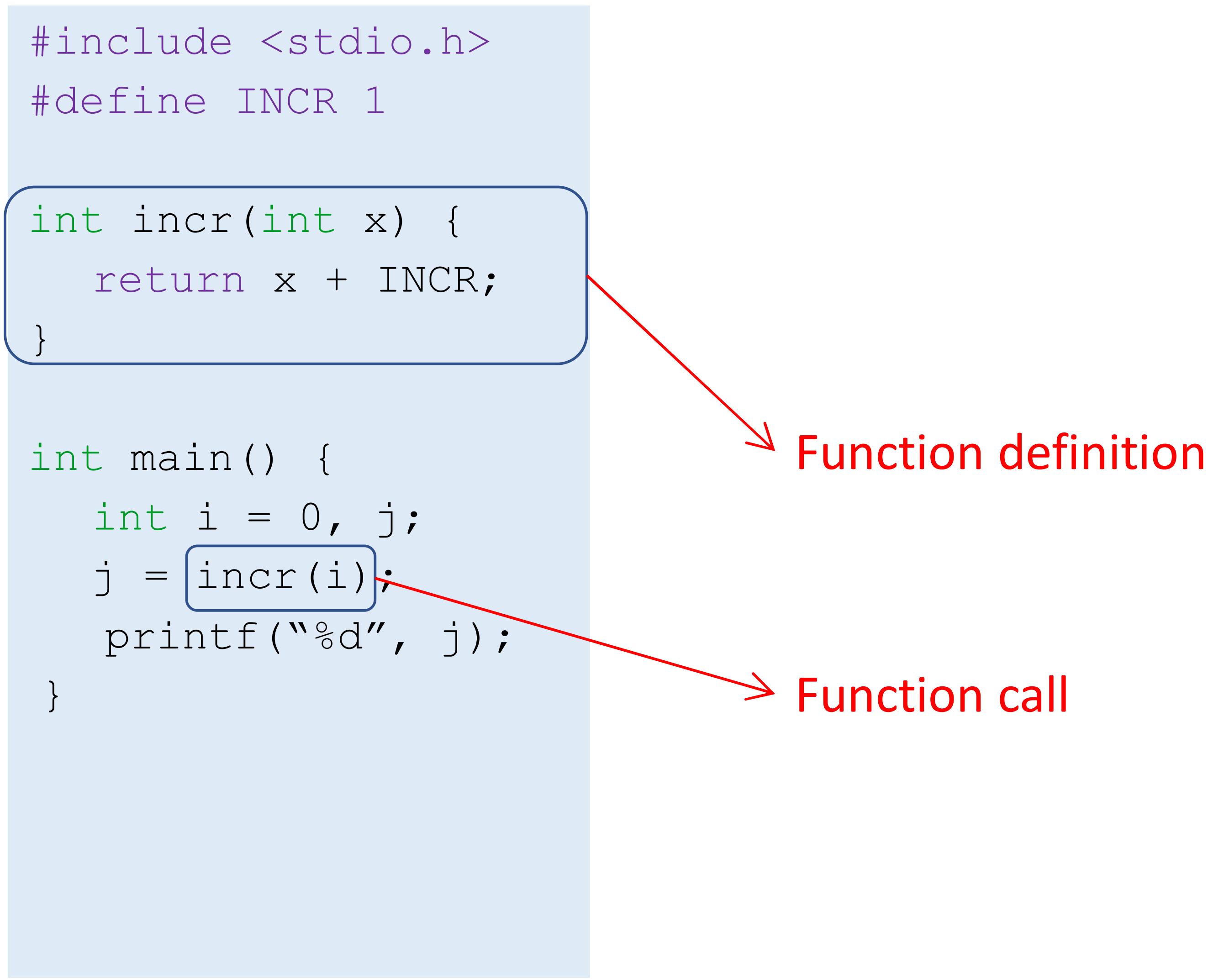
DISCUSSION

- Tasks
  - Two helper functions: `string_length()`, `index_of_char()`
  - Substitution cipher - encryption
  - Enigma cipher - encryption
  - Extra credit:
    - Substitution cipher – decryption
    - Enigma cipher - decryption

Make sure to leverage `char_at_index()` and `index_of_char()`

DISCUSSION

file1.c



```
#include <stdio.h>
#define INCR 1

int incr(int x) {
   return x + INCR;
}

int main() {
   int i = 0, j;
   j = incr(i);
   printf(“%d”, j);
 }
```

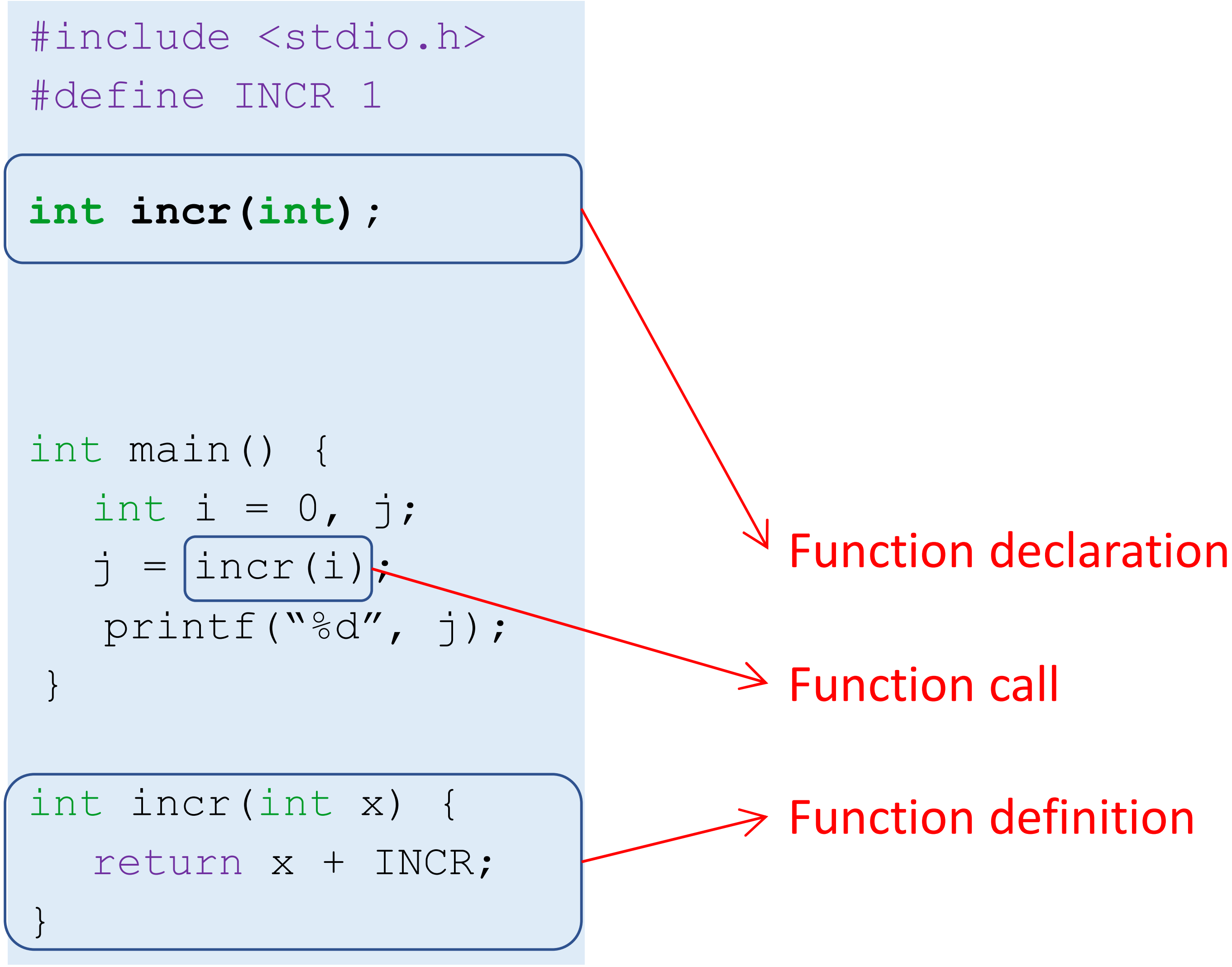
Function definition

Function call

See also: Chapter 9.1. Function Declaration,
Appendix C. Compiling Code

DISCUSSION

file1.c



```
#include <stdio.h>
#define INCR 1

int incr(int);



int main() {
   int i = 0, j;
   j = incr(i);
    printf(“%d”, j);
 }

int incr(int x) {
   return x + INCR;
}
```

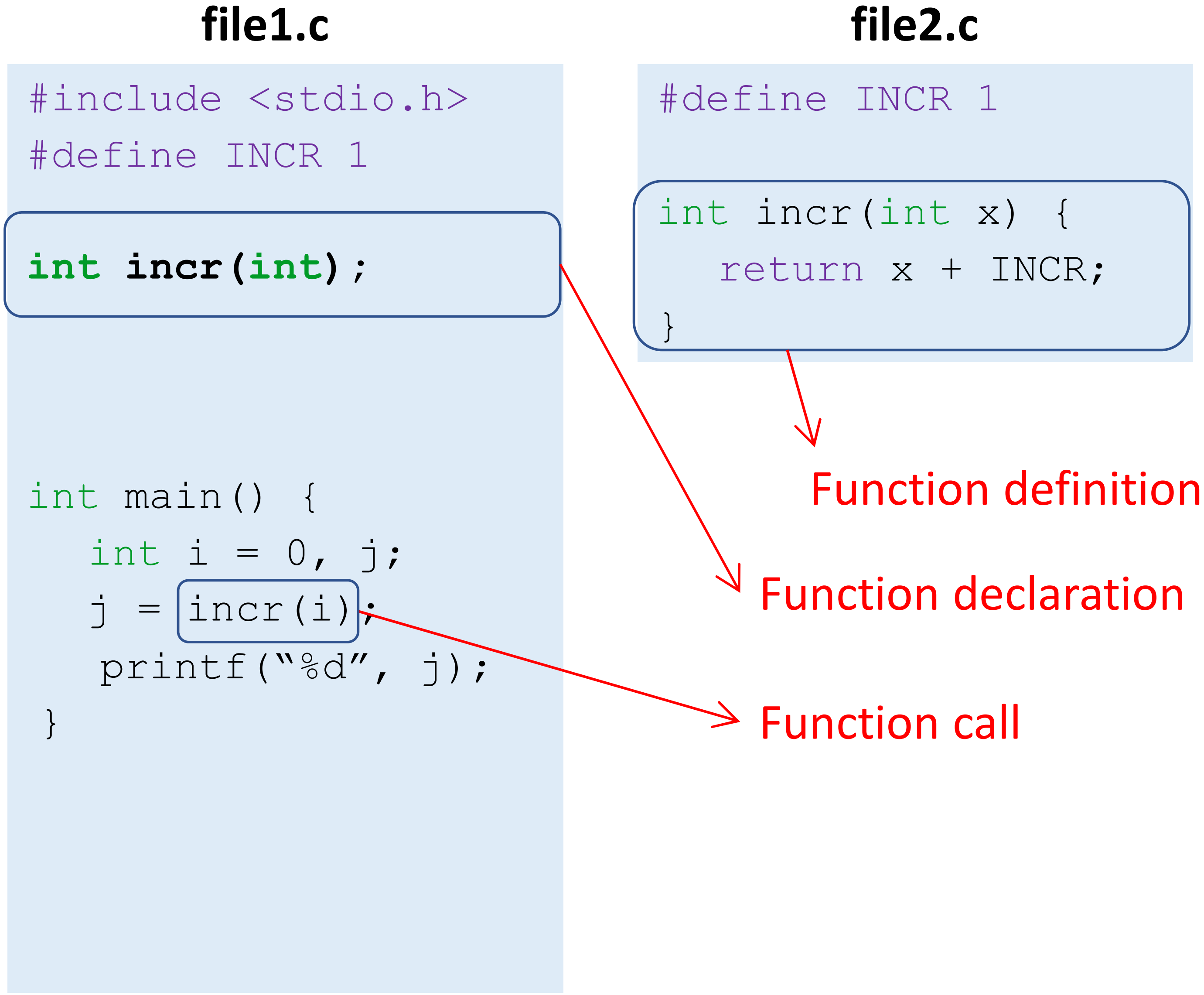
Function declaration

Function call

Function definition

See also: Chapter 9.1. Function Declaration,
Appendix C. Compiling Code

DISCUSSION



file1.c

```c
#include <stdio.h>
#define INCR 1

int incr(int);



int main() {
   int i = 0, j;
   j = incr(i);
   printf(“%d”, j);
}
```

file2.c

```c
#define INCR 1

int incr(int x) {
   return x + INCR;
}
```

Function definition

Function declaration

Function call

See also: Chapter 9.1. Function Declaration,
Appendix C. Compiling Code

DISCUSSION

file1.c

```c
#include <stdio.h>
#define INCR 1

int incr(int);



int main() {
   int i = 0, j;
   j = incr(i);
    printf(“%d”, j);
 }
```

file2.c

```c
#define INCR 1

int incr(int x) {
   return x + INCR;
}
```

See also: Chapter 9.1. Function Declaration,
Appendix C. Compiling Code

DISCUSSION

file1.c

```
#include <stdio.h>
#include “file2.h”




int main() {
   int i = 0, j;
   j = incr(i);
   printf(“%d”, j);
}
```

file2.c

```
#include “file2.h”

int incr(int x) {
   return x + INCR;
}
```

file2.h

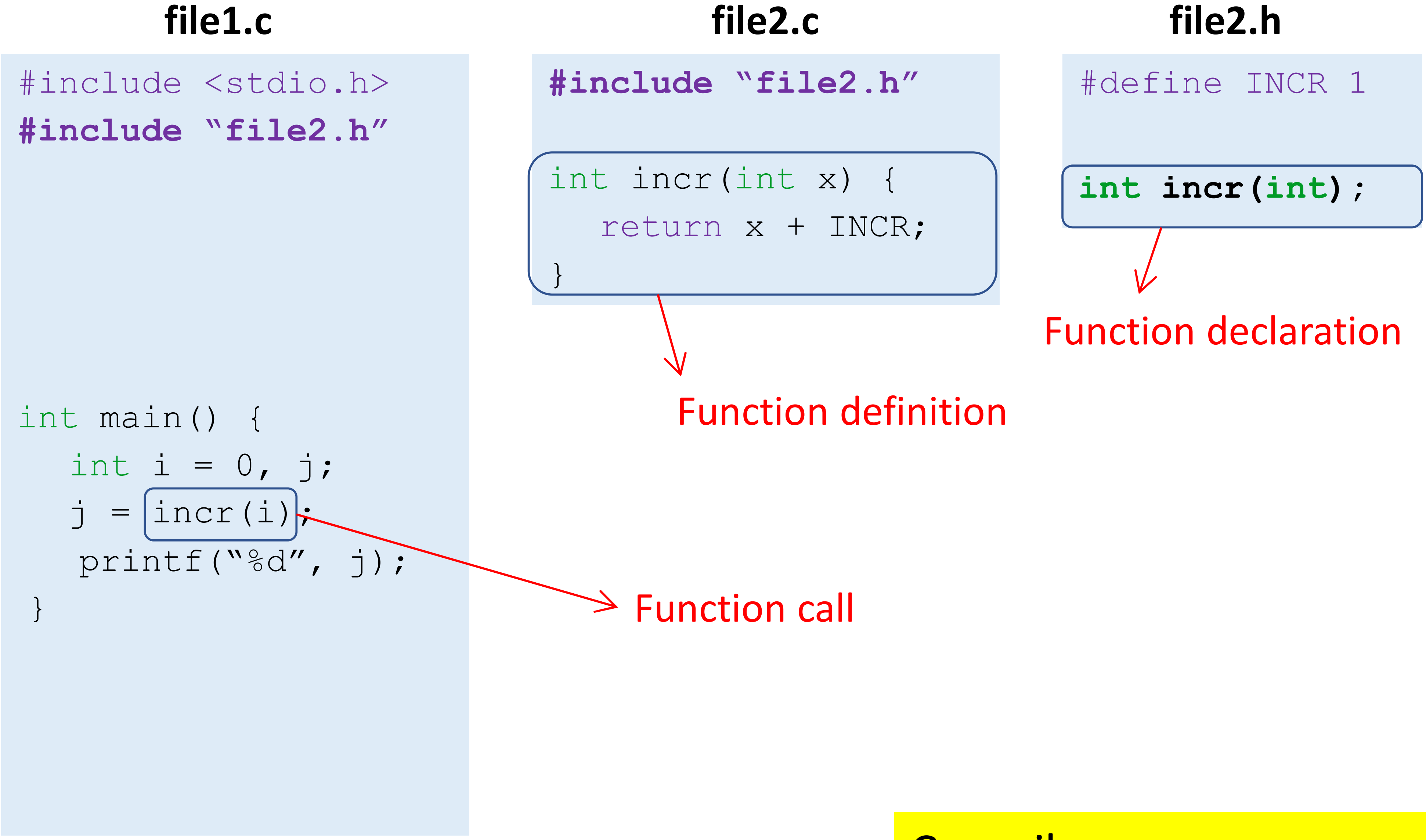
```
#define INCR 1

int incr(int);
```

.h header file

See also: Chapter 9.1. Function Declaration,
Appendix C. Compiling Code

DISCUSSION



file1.c

```
#include <stdio.h>
#include “file2.h”



int main() {
   int i = 0, j;
   j = incr(i);
   printf(“%d”, j);
}
```

file2.c

```
#include “file2.h”

int incr(int x) {
   return x + INCR;
}
```

file2.h

```
#define INCR 1

int incr(int);
```

Function declaration

Function definition

Function call

See also: Chapter 9.1. Function Declaration,
Appendix C. Compiling Code

Compile:

```
gcc file1.c file2.c -o run
```

DISCUSSION

encrypt.c

```c
#include <stdio.h>
#include “ciphers.h”

int main() {
  char input[256];
  char output[256];

 // Call functions
}
```

Testing

ciphers.c

```c
#include “ciphers.h”

// Function definitions
// string_length
// index_of_char
// cipher_substitution
// cipher_enigma
```

The code you need to submit

ciphers.h

```c
#define ENCRYPT 1
#define DECRYPT 0

// Function
// declarations
```

Need to complete, but not submit

See also: Chapter 9.1. Function Declaration, Appendix C. Compiling Code

Compile:

```
gcc encrypt.c ciphers.c -o crypto
```