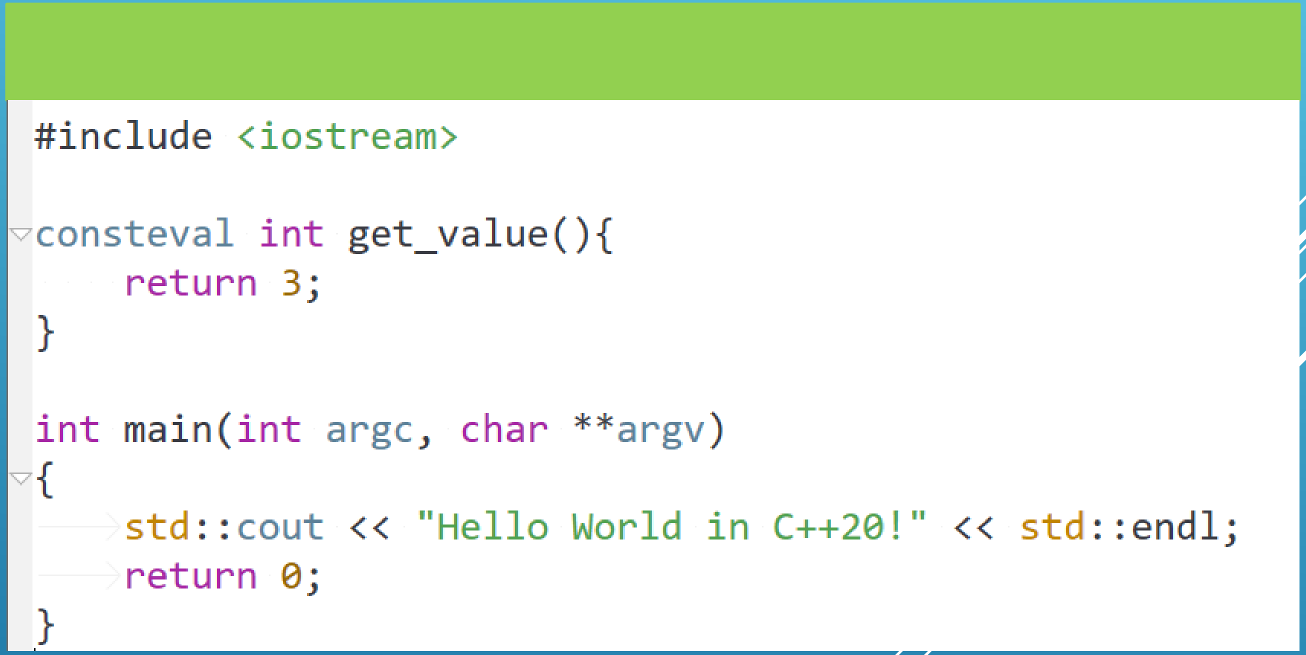
Slides

Section 3 : Diving In

C++ Project template



```
#include <iostream>

consteval int get_value(){
    return 3;
}

int main(int argc, char **argv)
{
    std::cout << "Hello World in C++20!" << std::endl;
    return 0;
}
```

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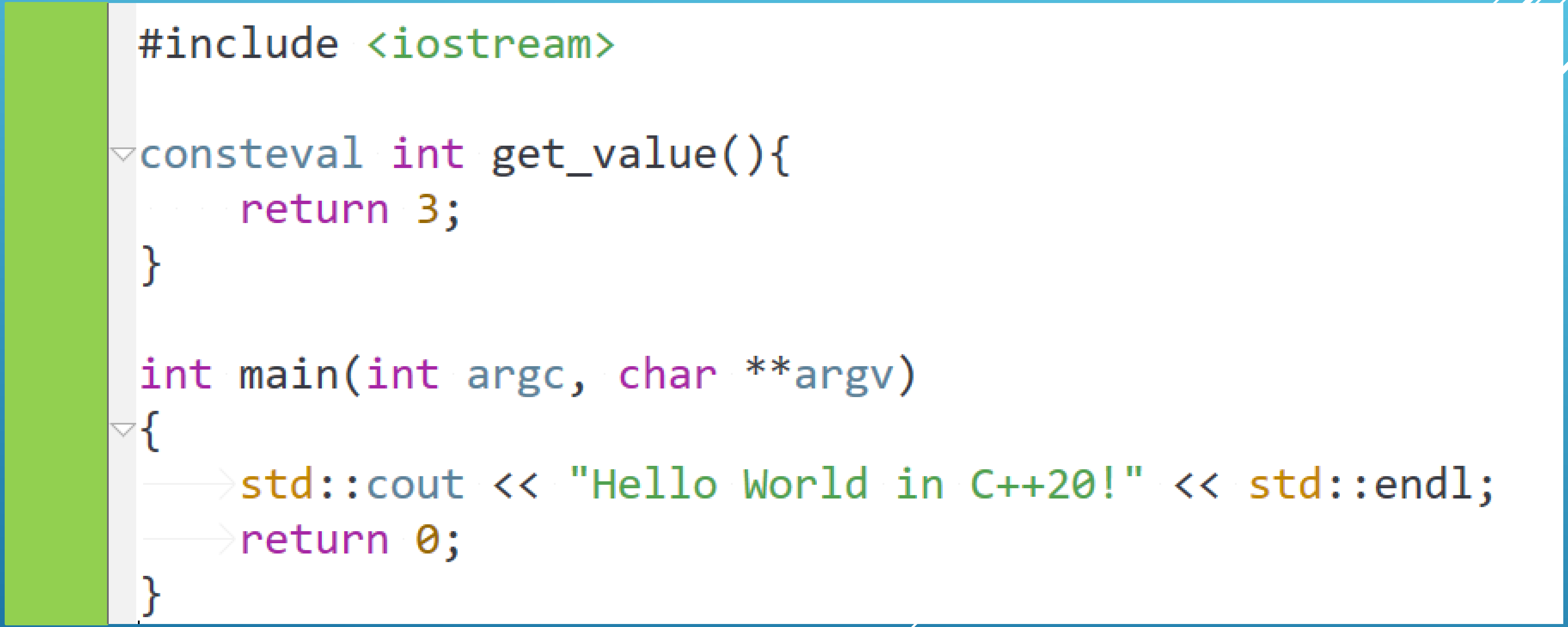
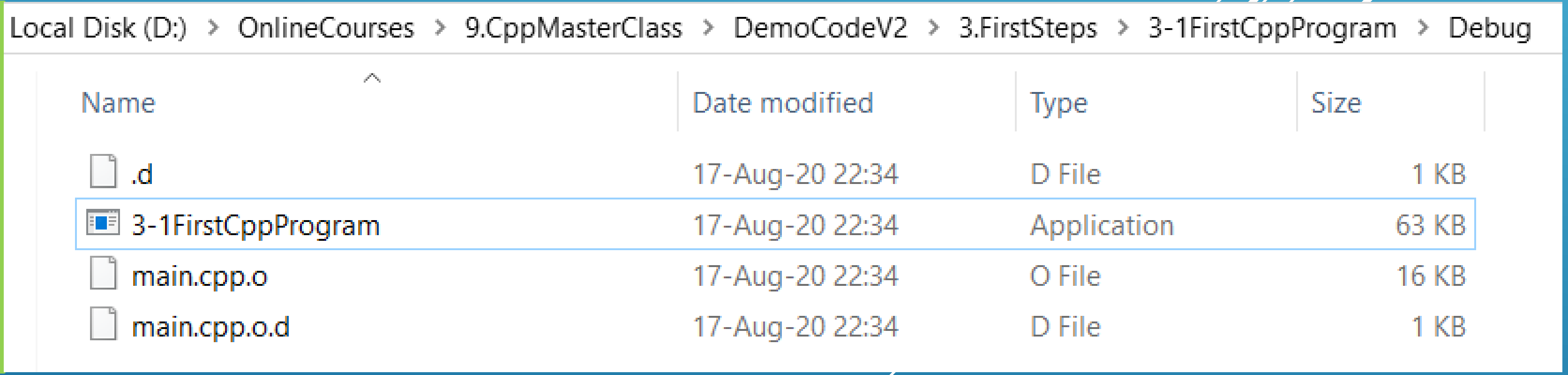
Your First C++ Program



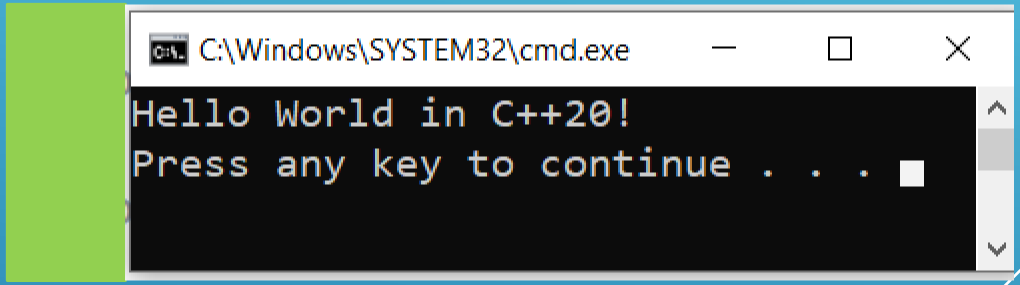
```
#include <iostream>

consteval int get_value(){
    return 3;
}

int main(int argc, char **argv)
{
    std::cout << "Hello World in C++20!" << std::endl;
    return 0;
}
```

Build output : Your Program



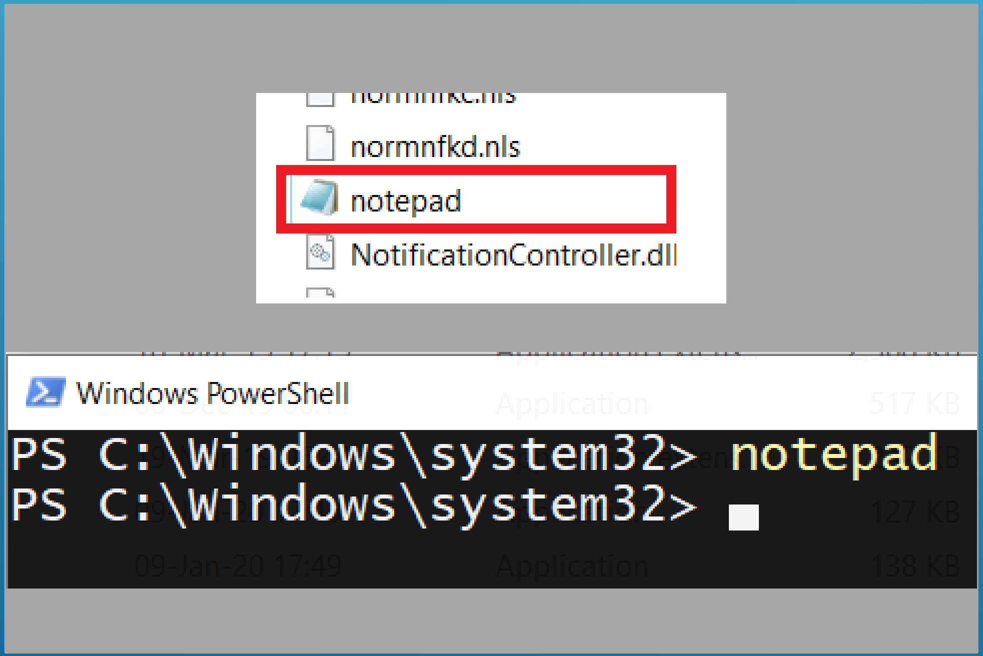
Local Disk (D:) > OnlineCourses > 9.CppMasterClass > DemoCodeV2 > 3.FirstSteps > 3-1FirstCppProgram > Debug

Name	Date modified	Type	Size
.d	17-Aug-20 22:34	D File	1 KB
3-1FirstCppProgram	17-Aug-20 22:34	Application	63 KB
main.cpp.o	17-Aug-20 22:34	O File	16 KB
main.cpp.o.d	17-Aug-20 22:34	D File	1 KB

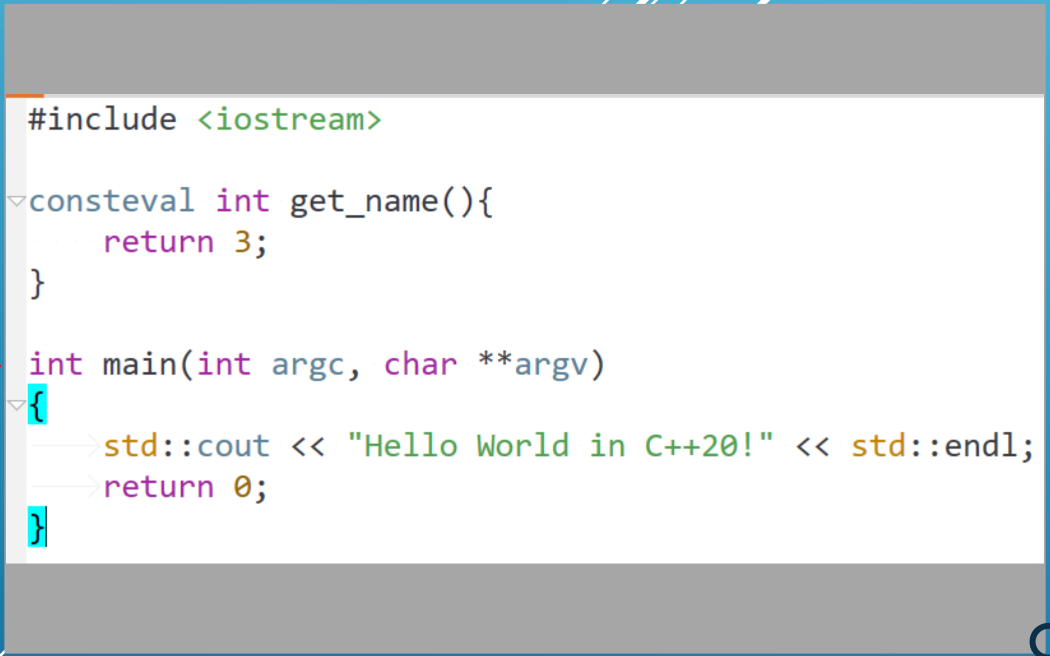

C:\Windows\SYSTEM32\cmd.exe

```
Hello World in C++20!
Press any key to continue . . .
```

Entry Point



```
PS C:\Windows\system32> notepad
PS C:\Windows\system32>
```



```
#include <iostream>

consteval int get_name(){
    return 3;
}

int main(int argc, char **argv)
{
    std::cout << "Hello World in C++20!" << std::endl;
    return 0;
}
```

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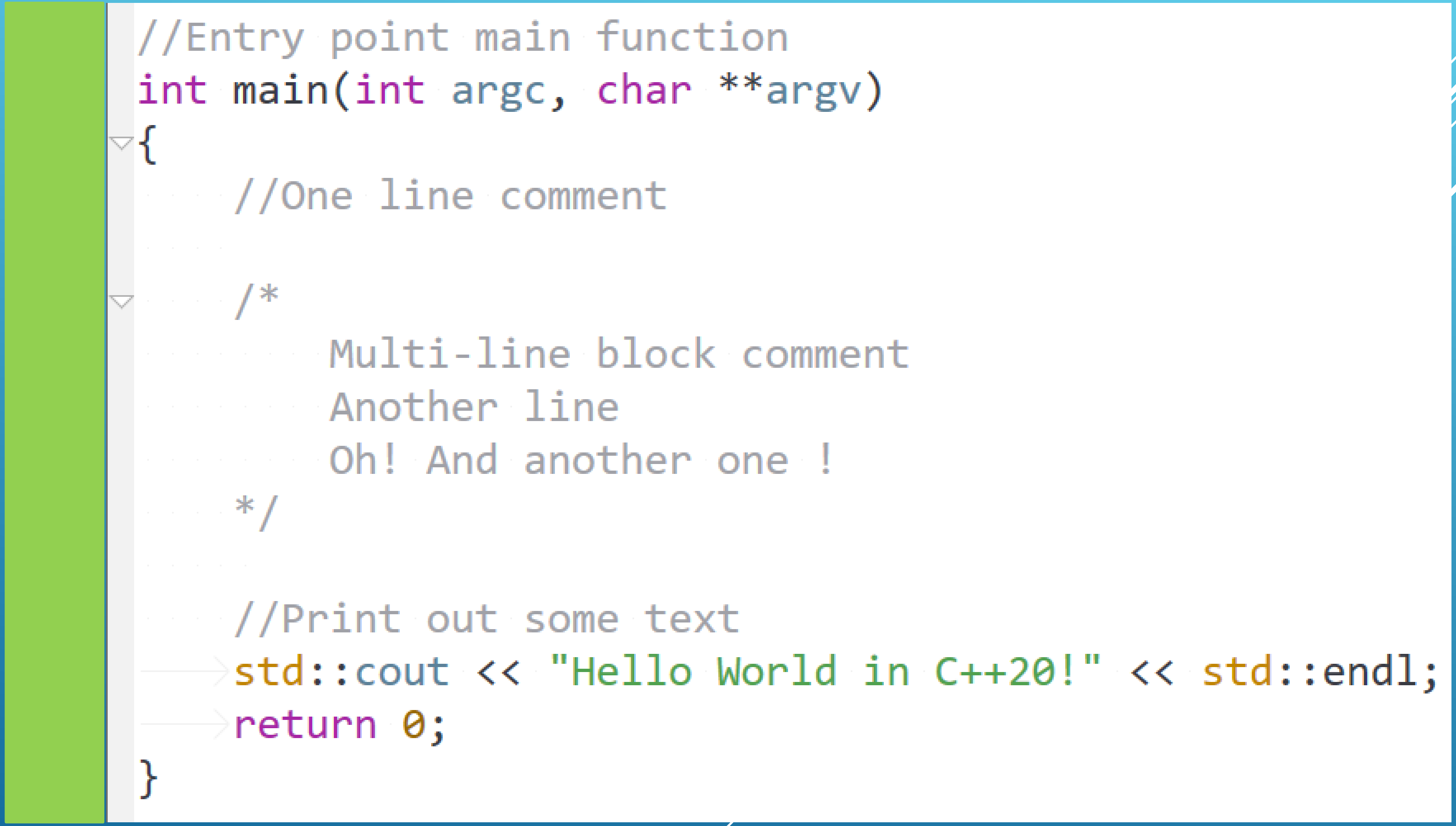
Comments



```
//Entry point main function
int main(int argc, char **argv)
{
    //One line comment

    /*
        Multi-line block comment
        Another line
        Oh! And another one !
    */

    //Print out some text
    std::cout << "Hello World in C++20!" << std::endl;
    return 0;
}
```

- // Comments out a single line
- /* … */ Block Comments out a block of text
- /* … */ Block comments can’t be nested
- Use comments to document your code. Don’t overdo it though.

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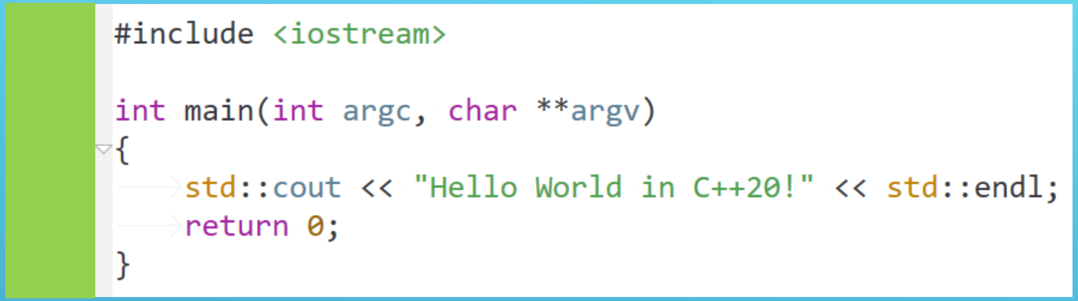
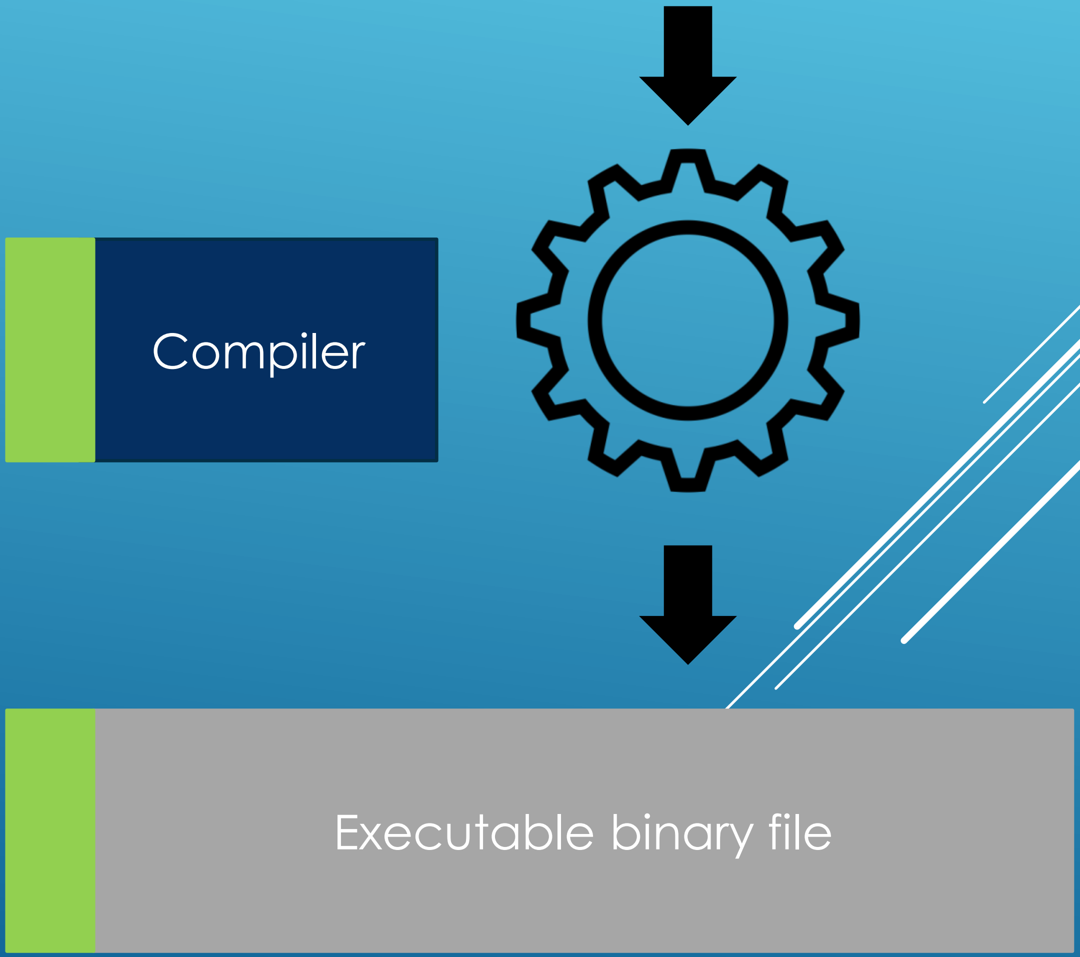
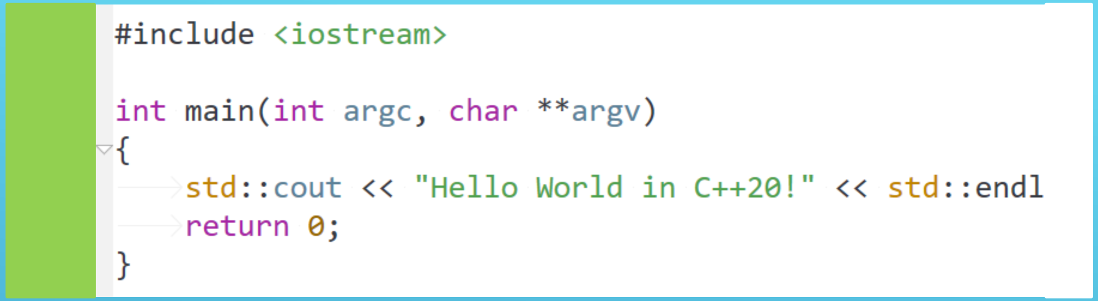
Errors and Warnings

- Compile Time Errors
- Runtime Errors
- Warnings

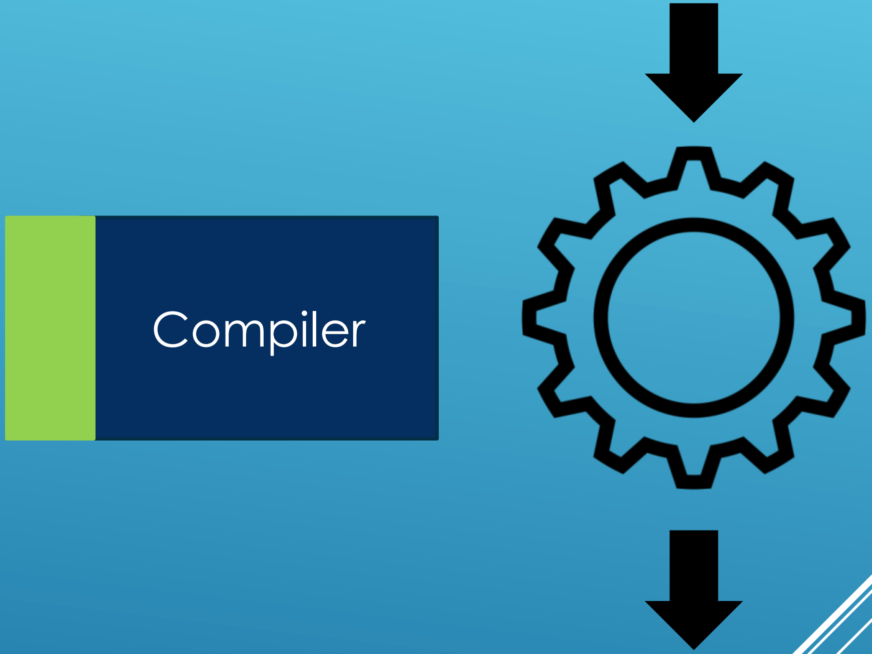


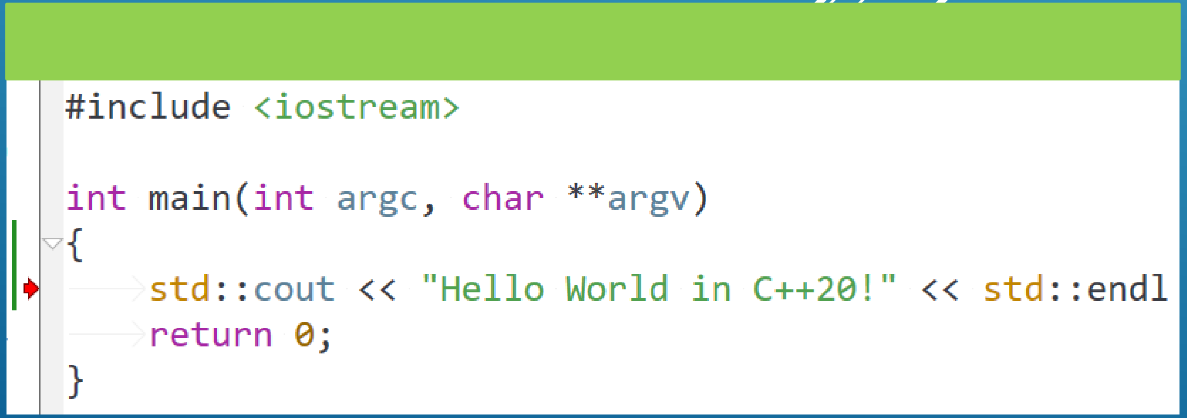
```cpp
#include <iostream>

int main(int argc, char **argv)
{
    std::cout << "Hello World in C++20!" << std::endl;
    return 0;
}
```



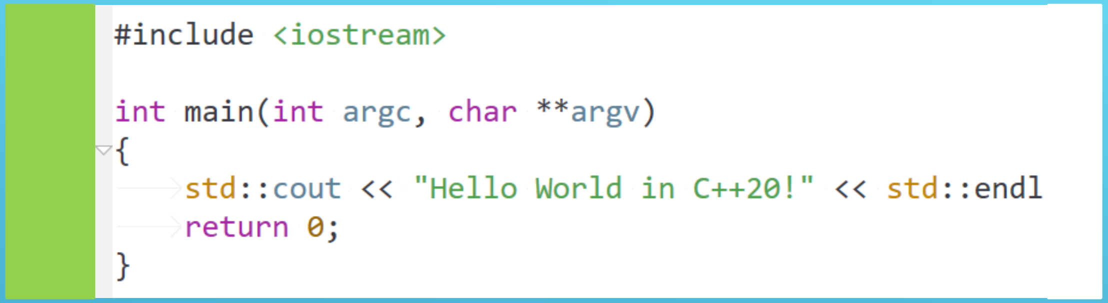


```
#include <iostream>

int main(int argc, char **argv)
{
    std::cout << "Hello World in C++20!" << std::endl
    return 0;
}
```



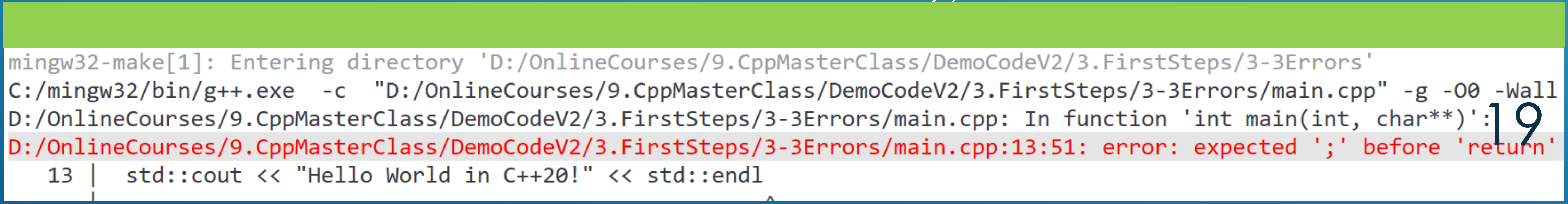


```
#include <iostream>

int main(int argc, char **argv)
{
    std::cout << "Hello World in C++20!" << std::endl
    return 0;
}
```



```cpp
#include <iostream>

int main(int argc, char **argv)
{
    std::cout << "Hello World in C++20!" << std::endl
    return 0;
}
```

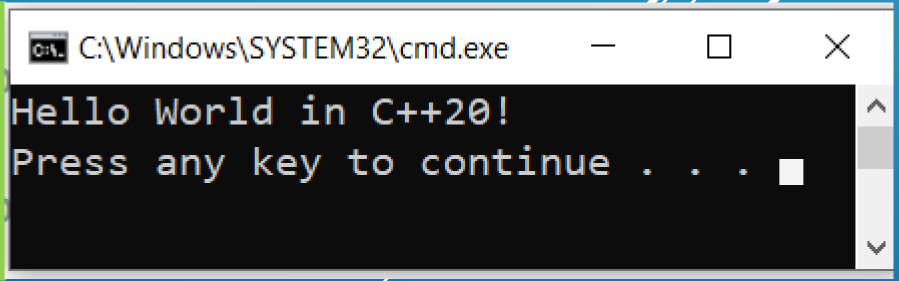
Compiler



```
mingw32-make[1]: Entering directory 'D:/OnlineCourses/9.CppMasterClass/DemoCodeV2/3.FirstSteps/3-3Errors'
C:/mingw32/bin/g++.exe  -c  "D:/OnlineCourses/9.CppMasterClass/DemoCodeV2/3.FirstSteps/3-3Errors/main.cpp" -g -O0 -Wall
D:/OnlineCourses/9.CppMasterClass/DemoCodeV2/3.FirstSteps/3-3Errors/main.cpp: In function 'int main(int, char**)':
D:/OnlineCourses/9.CppMasterClass/DemoCodeV2/3.FirstSteps/3-3Errors/main.cpp:13:51: error: expected ';' before 'return'
   13 |  std::cout << "Hello World in C++20!" << std::endl
```

Executable binary file

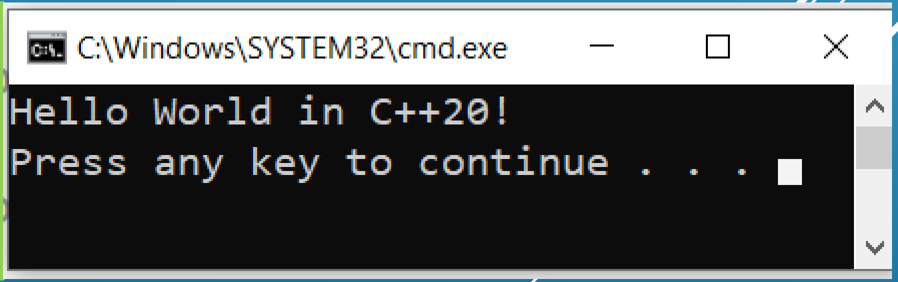
Runtime



```
Hello World in C++20!
Press any key to continue . . .
```

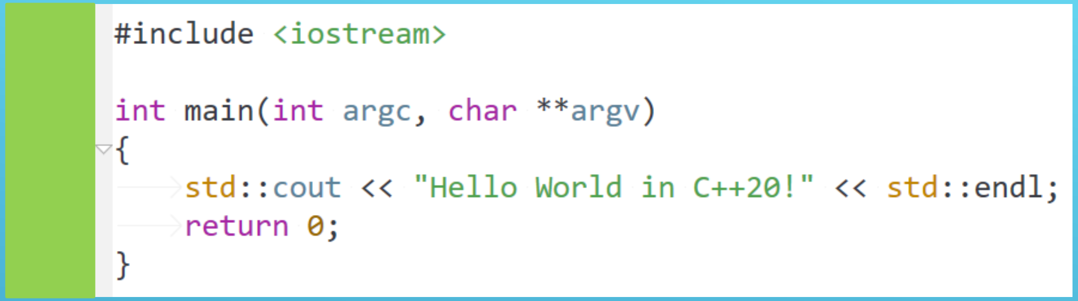
Executable binary file

Runtime


C:\Windows\SYSTEM32\cmd.exe

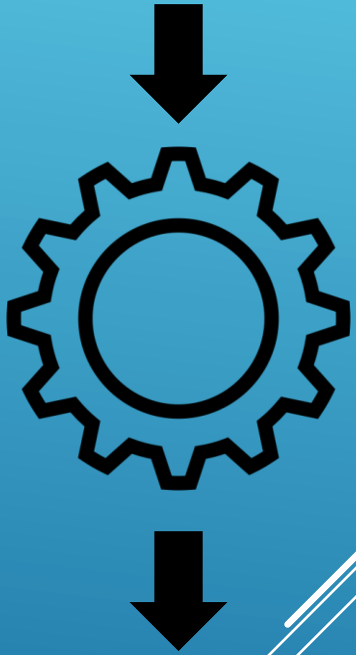
```
Hello World in C++20!
Press any key to continue . . .
```

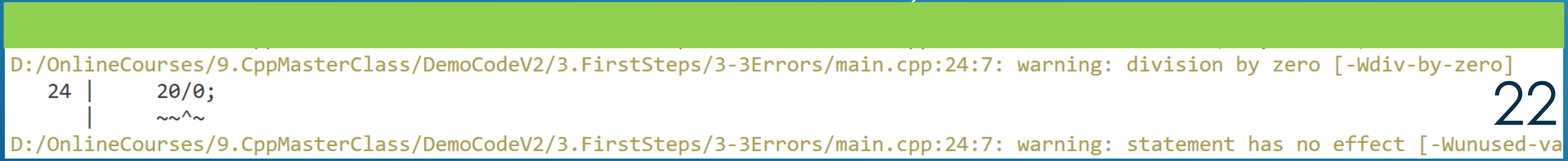
Crash



```
#include <iostream>

int main(int argc, char **argv)
{
    std::cout << "Hello World in C++20!" << std::endl;
    return 0;
}
```

Compiler





```
D:/OnlineCourses/9.CppMasterClass/DemoCodeV2/3.FirstSteps/3-3Errors/main.cpp:24:7: warning: division by zero [-Wdiv-by-zero]
   24 |      20/0;
      |      ~~^~
D:/OnlineCourses/9.CppMasterClass/DemoCodeV2/3.FirstSteps/3-3Errors/main.cpp:24:7: warning: statement has no effect [-Wunused-va
```

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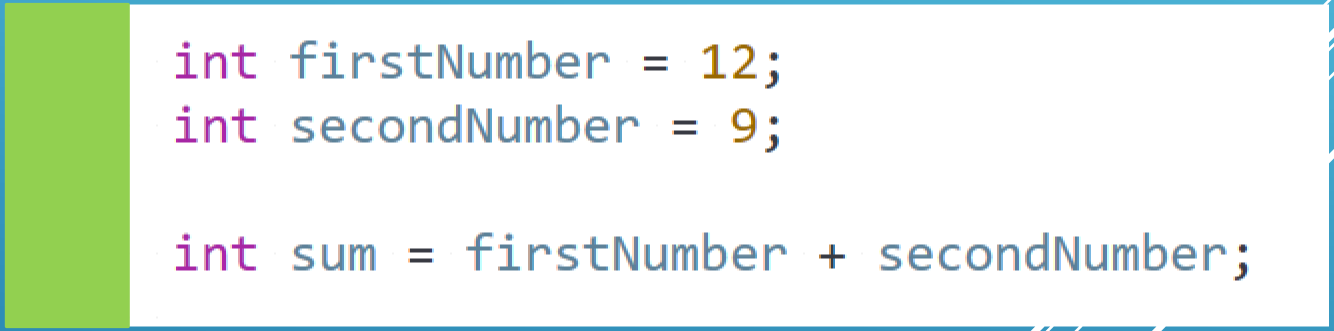
Statements and Functions

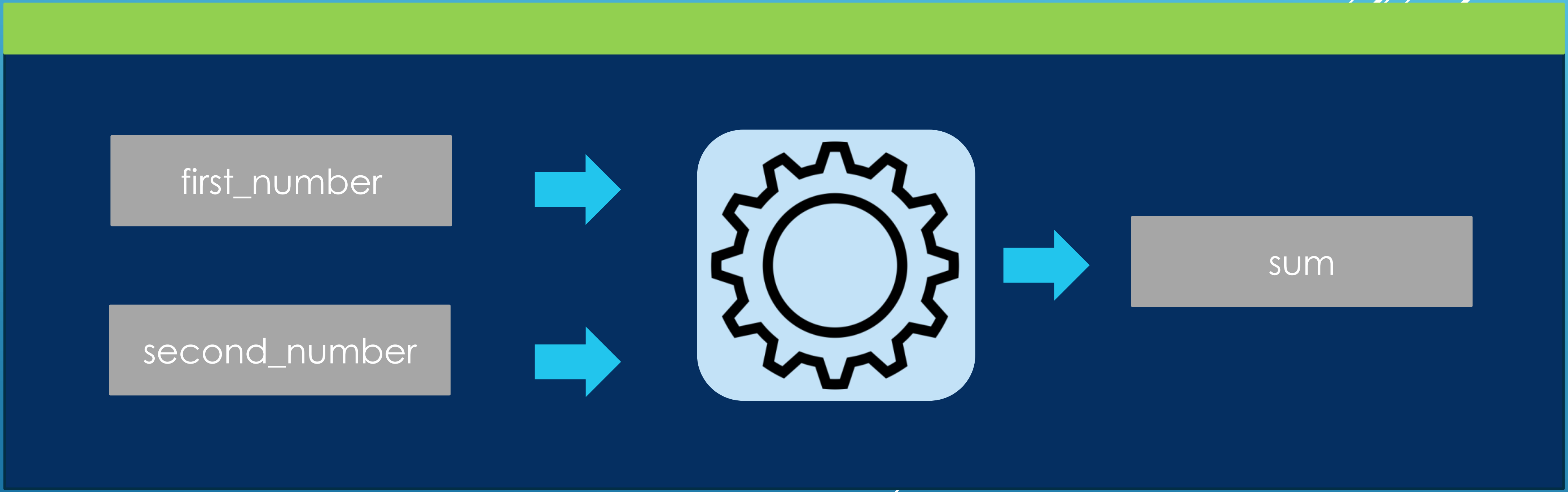
- A statement is a basic unit of computation in a C++ program
- Every C++ program is a collection of statements organized in a certain way to achieve some goal
- Statements end with a semicolon in C++ (;)

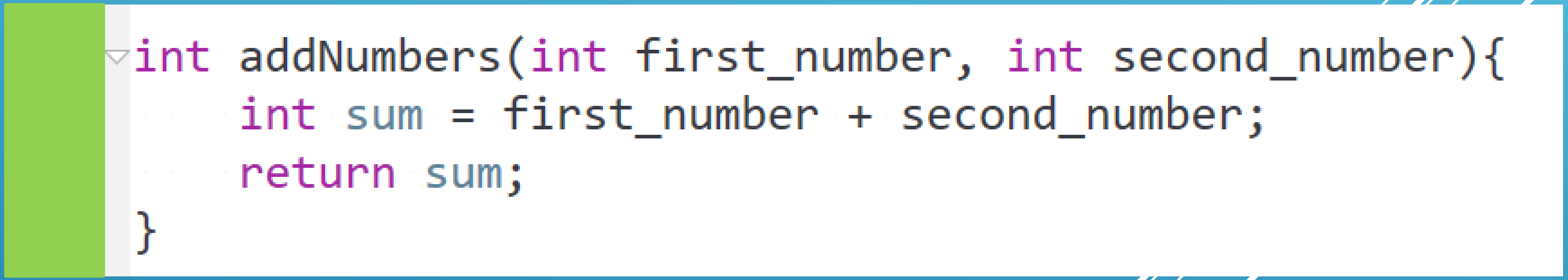
```cpp
int main(int argc, char **argv)
{

    int firstNumber = 12;
    int secondNumber = 9;

    int sum = firstNumber + secondNumber;

    std::cout << "The sum of the two numbers is : " << sum << std::endl;

    return 0;
}
```

- Statements are executed in order from top to bottom when the program is run
- Execution keeps going until there is a statement causing the program to terminate, or run another sequence of statements

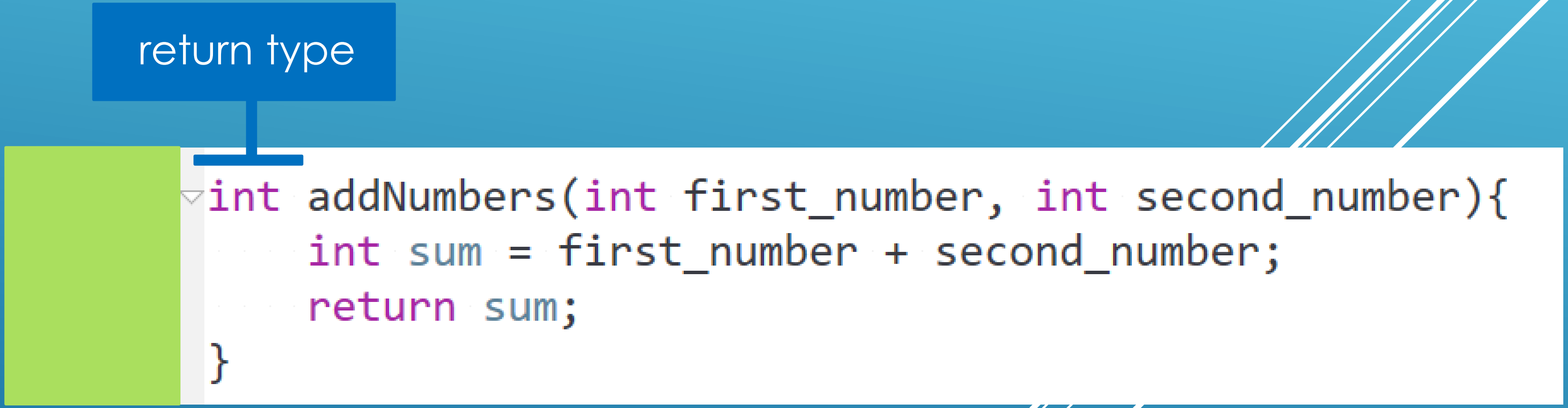


```
int firstNumber = 12;
int secondNumber = 9;

int sum = firstNumber + secondNumber;
```

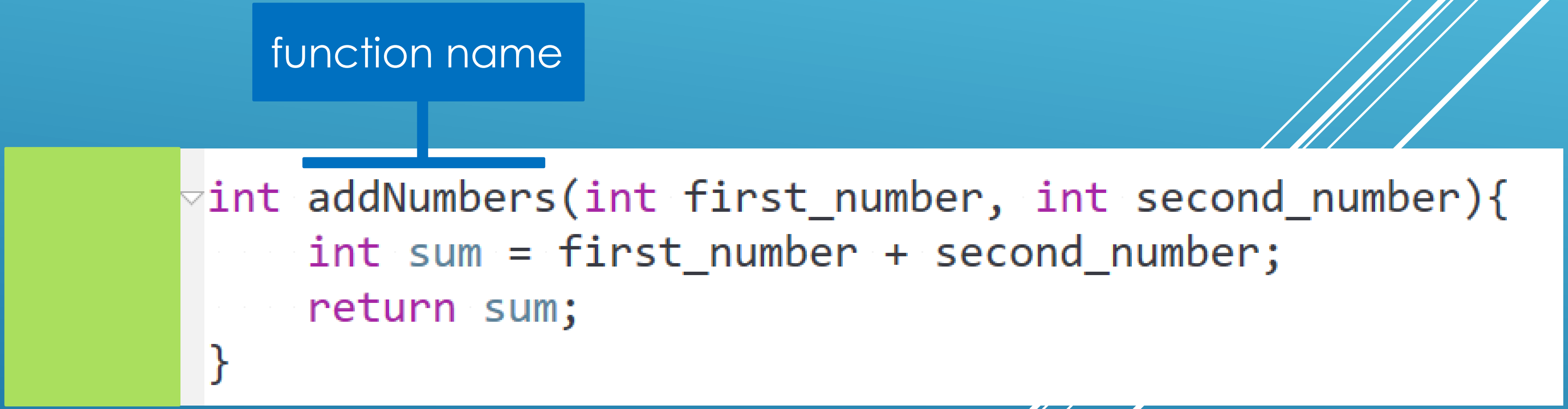

first_number
second_number
sum



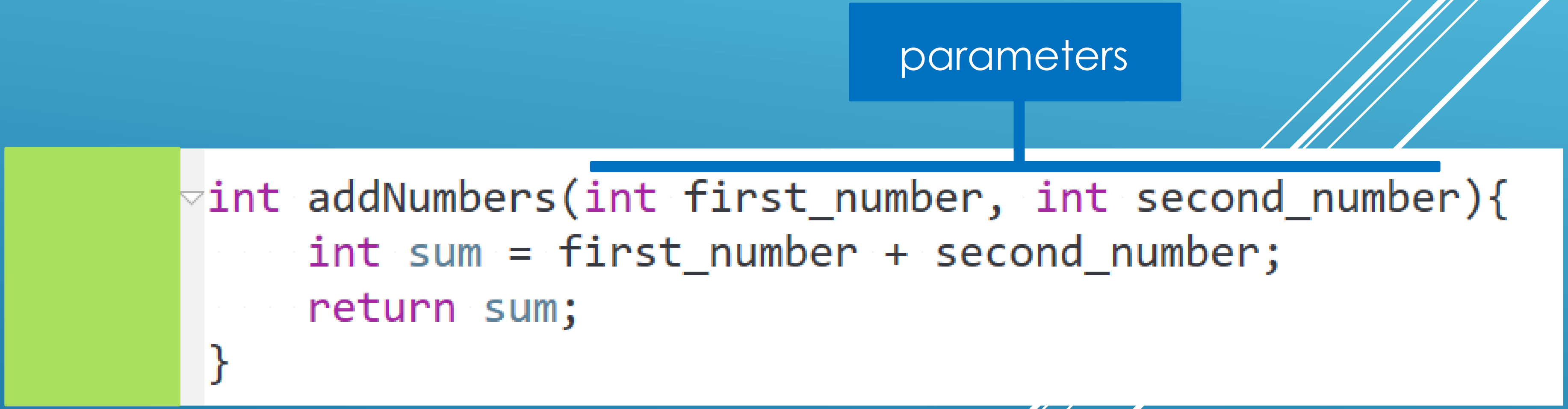
```
int addNumbers(int first_number, int second_number){
    int sum = first_number + second_number;
    return sum;
}
```



```
int addNumbers(int first_number, int second_number){
    int sum = first_number + second_number;
    return sum;
}
```

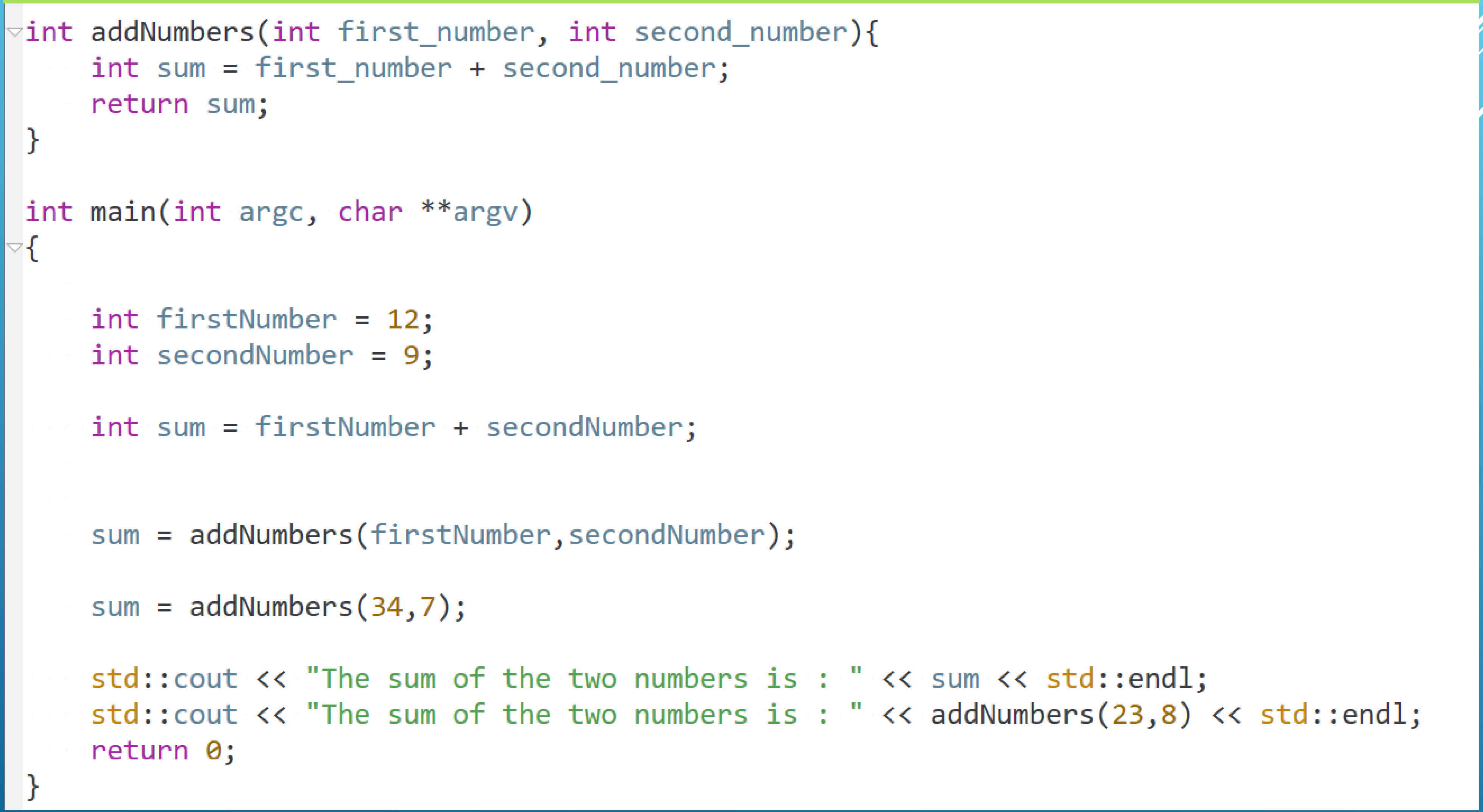


```
int addNumbers(int first_number, int second_number){
    int sum = first_number + second_number;
    return sum;
}
```



```
int addNumbers(int first_number, int second_number){
    int sum = first_number + second_number;
    return sum;
}
```

A function must be defined before it’s use


```
int addNumbers(int first_number, int second_number){
    int sum = first_number + second_number;
    return sum;
}

int main(int argc, char **argv)
{

    int firstNumber = 12;
    int secondNumber = 9;

    int sum = firstNumber + secondNumber;


    sum = addNumbers(firstNumber,secondNumber);

    sum = addNumbers(34,7);

    std::cout << "The sum of the two numbers is : " << sum << std::endl;
    std::cout << "The sum of the two numbers is : " << addNumbers(23,8) << std::endl;
    return 0;
}
```

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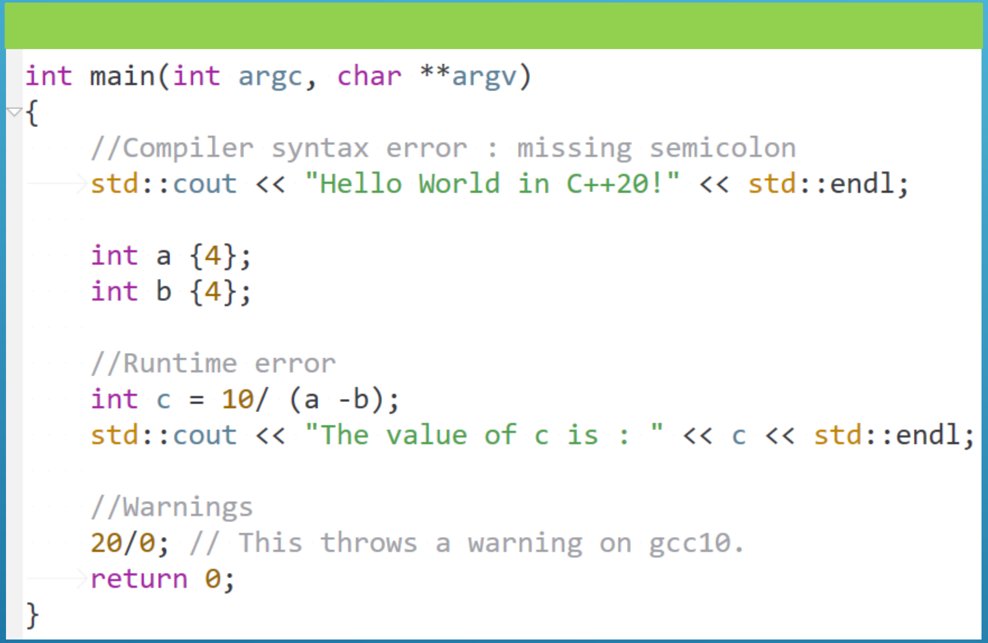
Input Output



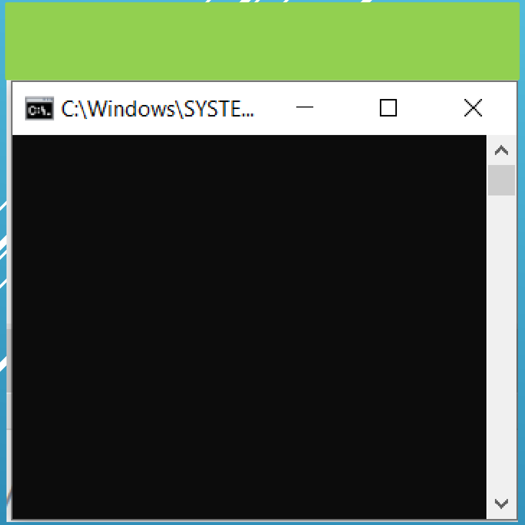
```
int main(int argc, char **argv)
{
    //Compiler syntax error : missing semicolon
    std::cout << "Hello World in C++20!" << std::endl;

    int a {4};
    int b {4};

    //Runtime error
    int c = 10/ (a -b);
    std::cout << "The value of c is : " << c << std::endl;

    //Warnings
    20/0; // This throws a warning on gcc10.
    return 0;
}
```

std::cout



stream	Purpose
std::cout	Printing data to the console(terminal)
std::cin	Reading data from the terminal
std::cerr	Printing errors to the console
std::clog	Printing log messages to the console

Printing data

```cpp
//std::cout : Printing stuff to the console
std::cout << "Hello World!" << std::endl;

std::cout << "The number is : " << 12 << std::endl;

int age {21};
std::cout << "The age is : " << age << std::endl;

//Error
std::cerr << "std::cerr output : Something went wrong" << std::endl;

//Log message
std::clog << " std::clog output : This is a log message" << std::endl;
```

Reading data in

```
int age;
std::string name;

std::cout << "Please type in your Last Name : " << std::endl;
std::cin >> name;


std::cout << "Please type in your age : " << std::endl;
std::cin >> age;

std::cout << "Hello " << name << "! You are " << age << " years old" << std::endl;
```

Chaining std::cin

```
int age;
std::string name;

std::cout << "Please type in your Last name and age, separated by spaces : " << std::endl;

std::cin >> name >> age ;//Input name and age

std::cout << "Hello " << name << "! You are " << age << " years old." << std::endl;
```

Reading data with spaces

```cpp
int age;
std::string full_name;

std::cout << "Please type in your full name : " << std::endl;
std::getline(std::cin,full_name);

std::cout << "Type in your age : " << std::endl;
std::cin >> age;
std::cout << "Hello " << full_name << "! You are " << age << " years old." << std::endl;
```

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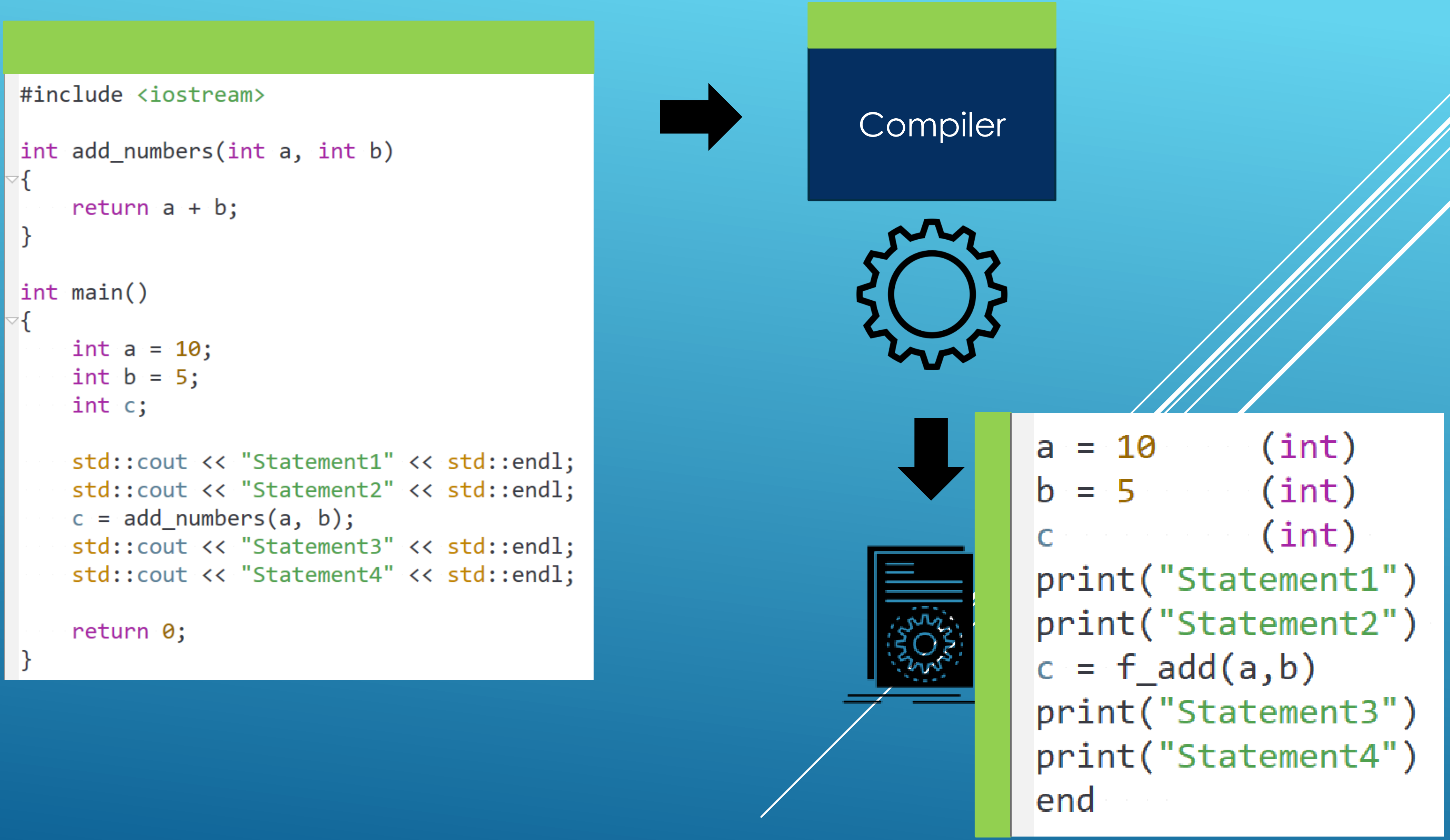
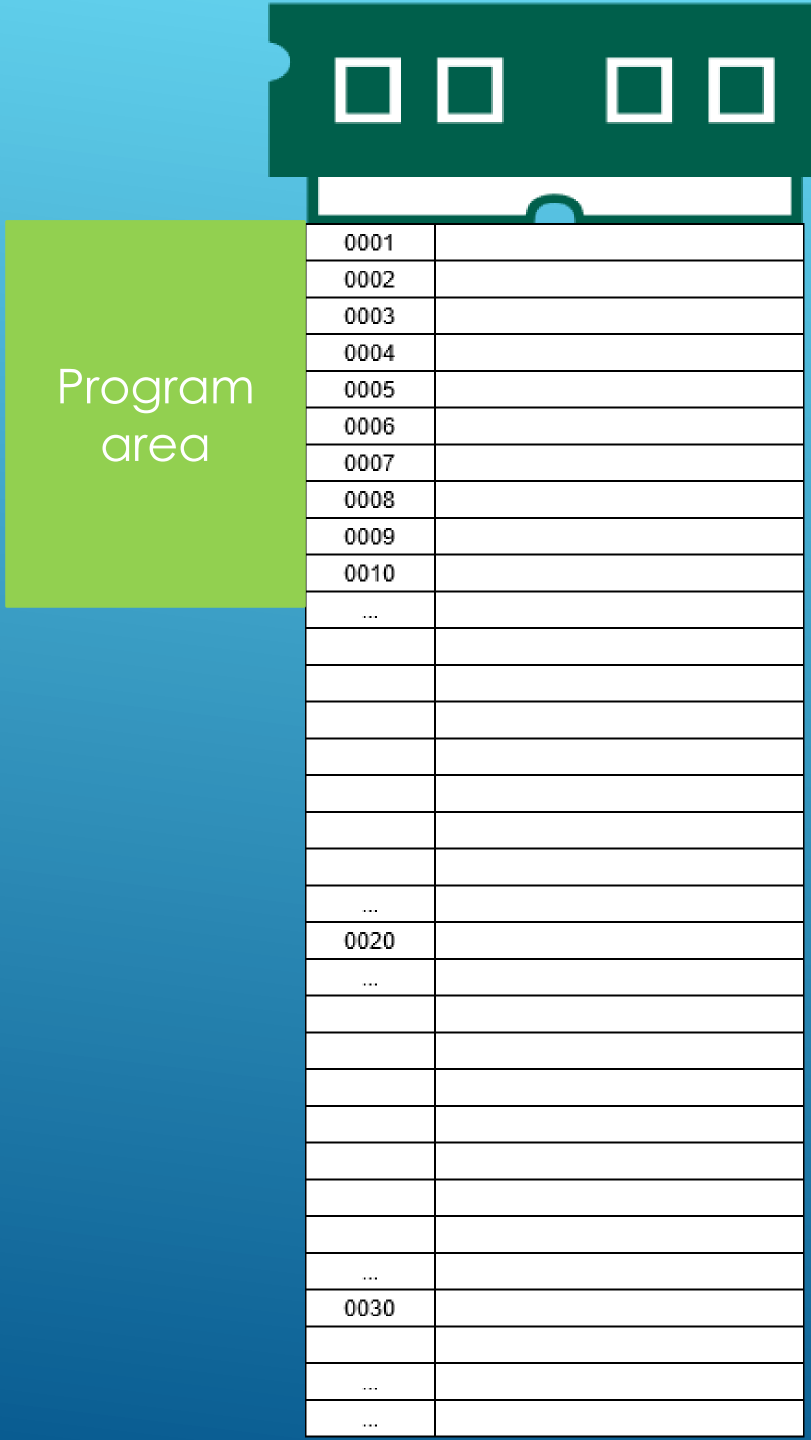
C++ Program Execution Model & Memory Model



```cpp
#include <iostream>

int add_numbers(int a, int b)
{
    return a + b;
}

int main()
{
    int a = 10;
    int b = 5;
    int c;

    std::cout << "Statement1" << std::endl;
    std::cout << "Statement2" << std::endl;
    c = add_numbers(a, b);
    std::cout << "Statement3" << std::endl;
    std::cout << "Statement4" << std::endl;

    return 0;
}
```

```
a = 10        (int)
b = 5         (int)
c             (int)
print("Statement1")
print("Statement2")
c = f_add(a,b)
print("Statement3")
print("Statement4")
end
```



0001	
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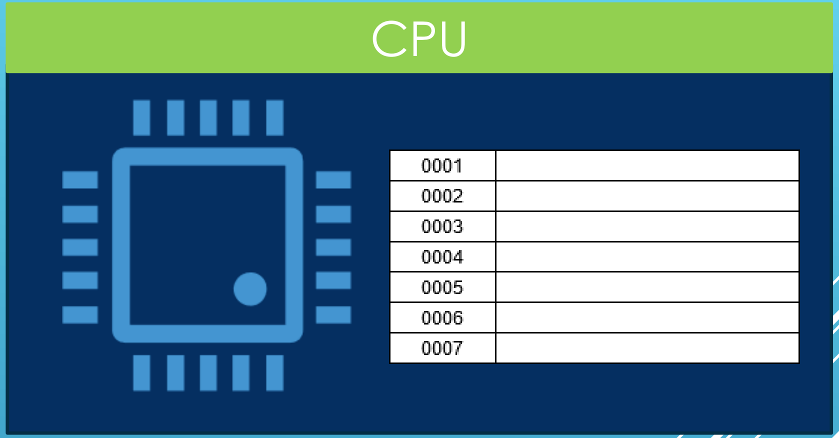
…	



0001	
0002	
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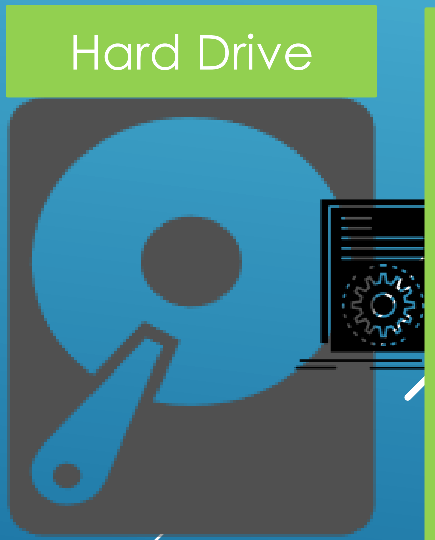
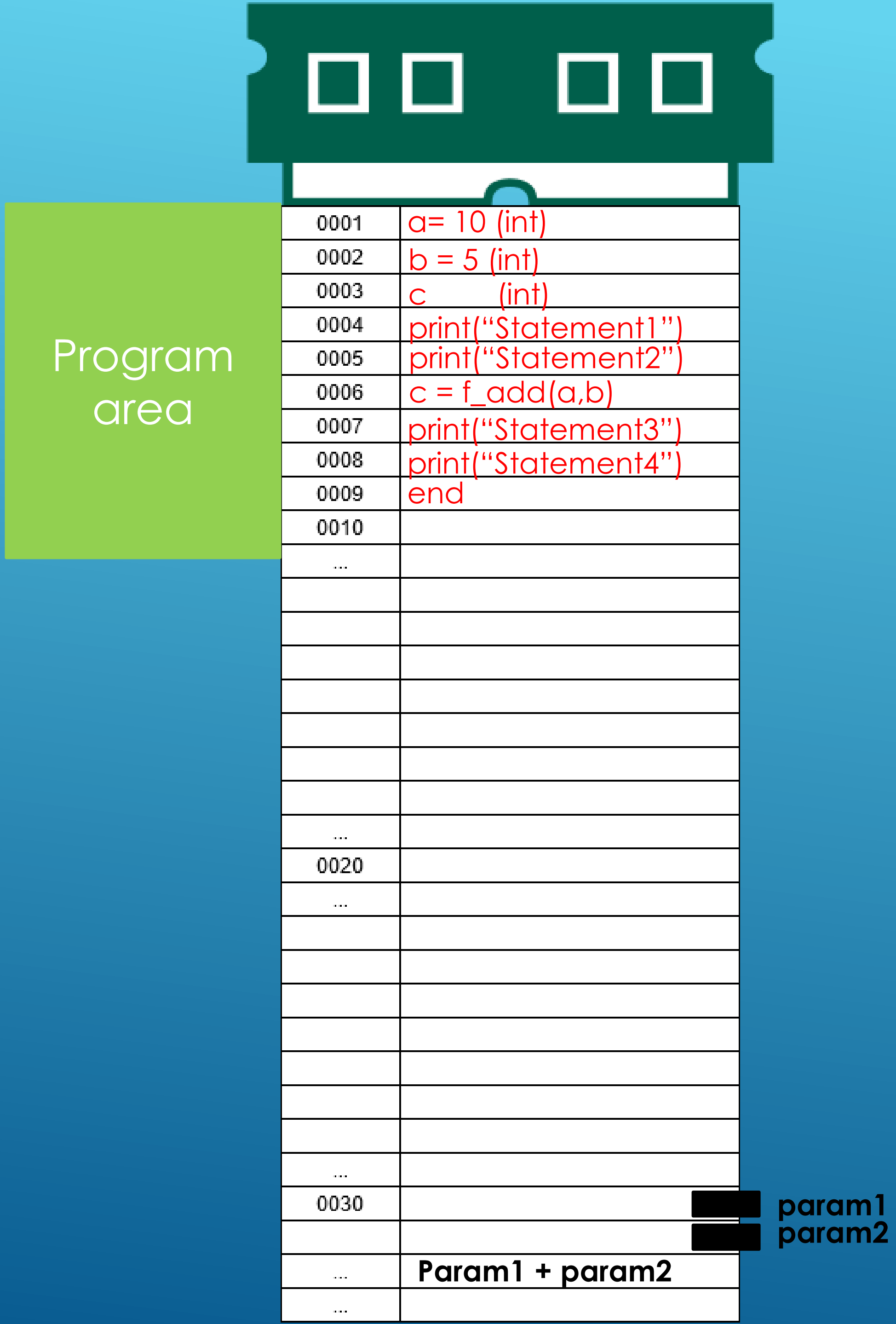


```
a = 10        (int)
b = 5         (int)
c             (int)
print("Statement1")
print("Statement2")
c = f_add(a,b)
print("Statement3")
print("Statement4")
end
```



0001	a= 10 (int)
0002	b = 5 (int)
0003	c (int)
0004	print("Statement1")
0005	print("Statement2")
0006	c = f_add(a,b)
0007	print("Statement3")
0008	print("Statement4")
0009	end
0010	
…	
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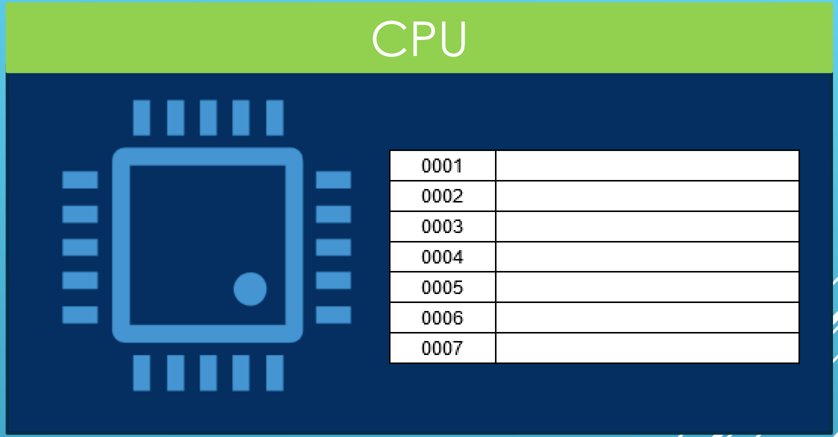
0020	
…	
…	
0030	
…	Param1 + param2
…	



0001	
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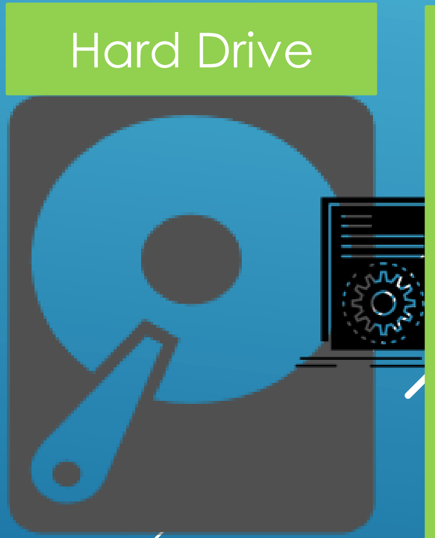
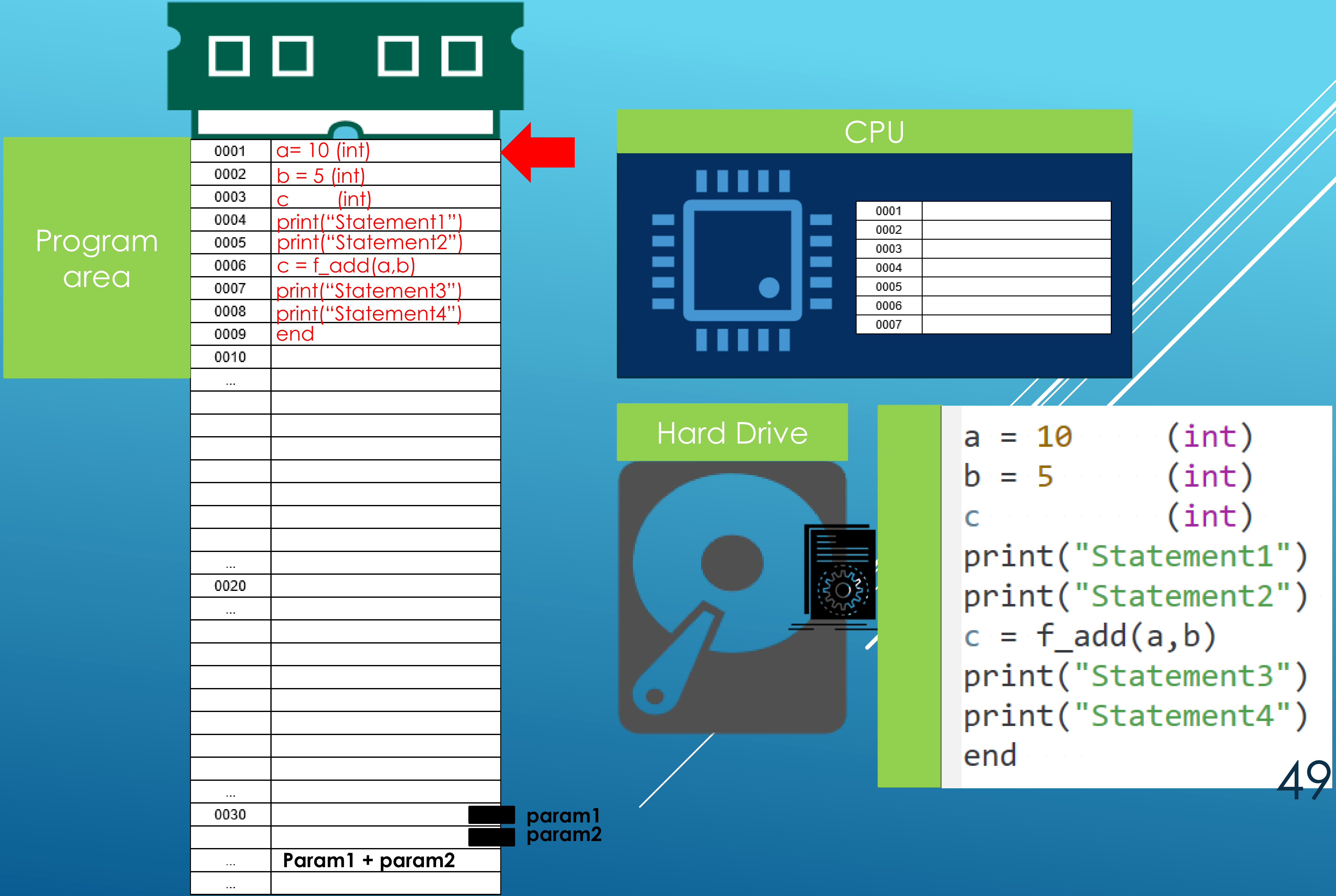


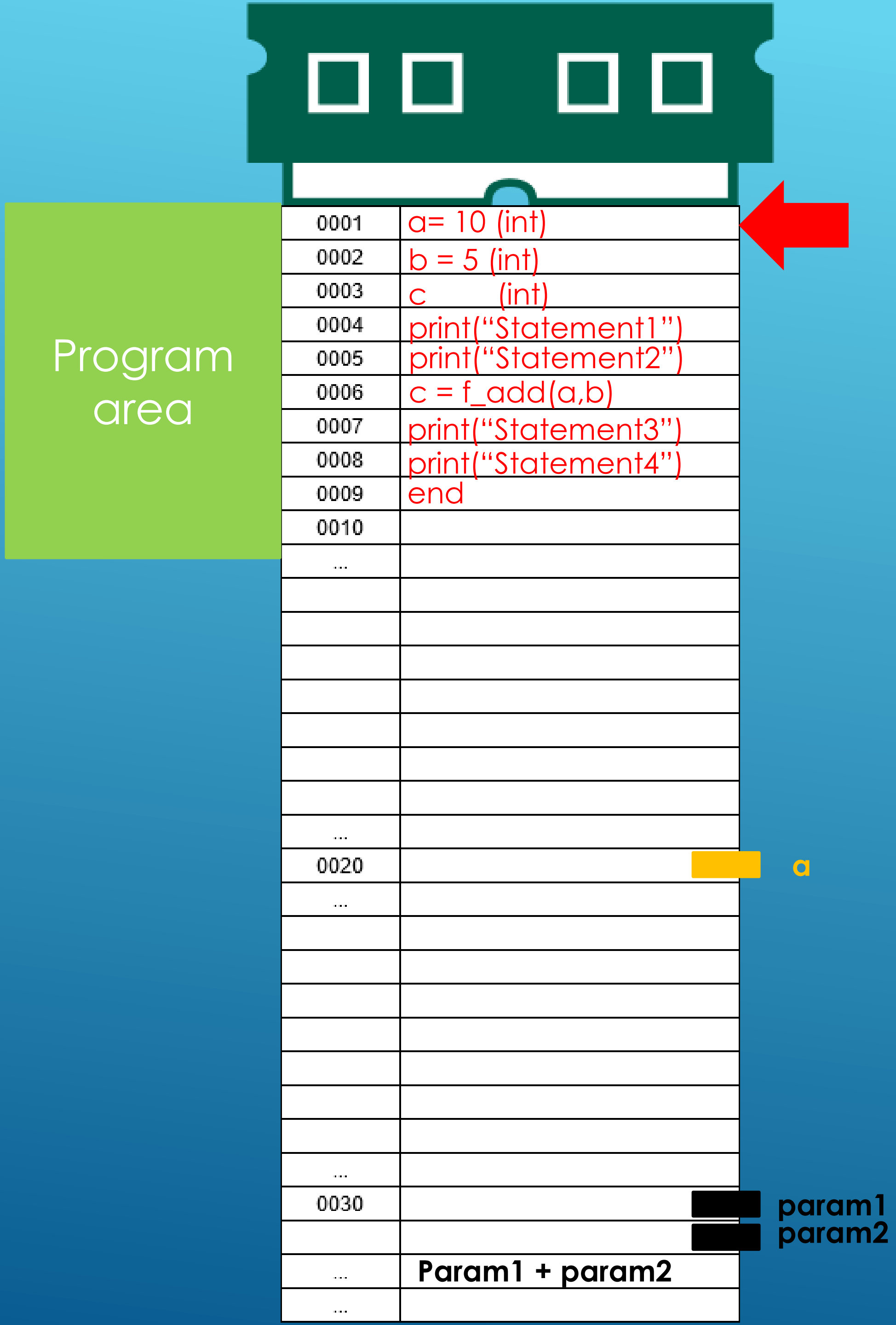
```
a = 10      (int)
b = 5       (int)
c           (int)
print("Statement1")
print("Statement2")
c = f_add(a,b)
print("Statement3")
print("Statement4")
end
```



0001	a= 10 (int)
0002	b = 5 (int)
0003	c (int)
0004	print(“Statement1”)
0005	print(“Statement2”)
0006	c = f_add(a,b)
0007	print(“Statement3”)
0008	print(“Statement4”)
0009	end
0010	
…	
…	
0020	
…	
…	
0030	
…	Param1 + param2
…	

0001	
0002	
0003	
0004	
0005	
0006	
0007	

```
a = 10      (int)
b = 5       (int)
c           (int)
print("Statement1")
print("Statement2")
c = f_add(a,b)
print("Statement3")
print("Statement4")
end
```



0001	a= 10 (int)
0002	b = 5 (int)
0003	c (int)
0004	print(“Statement1”)
0005	print(“Statement2”)
0006	c = f_add(a,b)
0007	print(“Statement3”)
0008	print(“Statement4”)
0009	end
0010	
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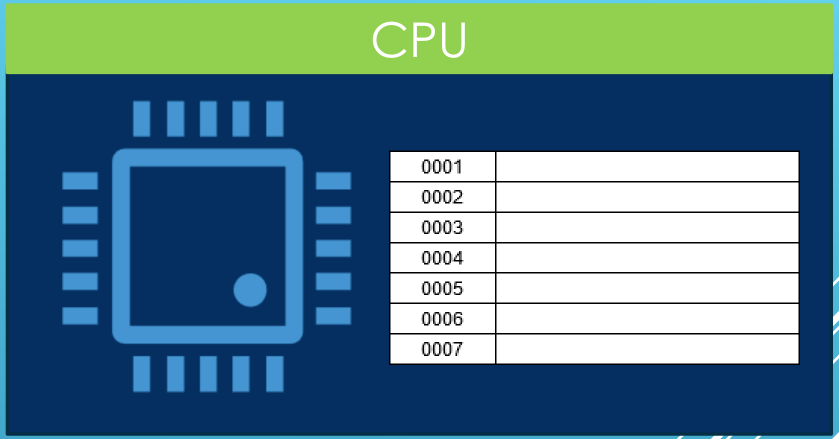
…	Param1 + param2
…	



0001	
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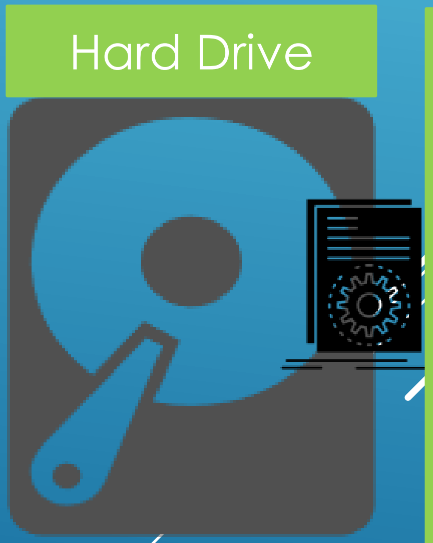
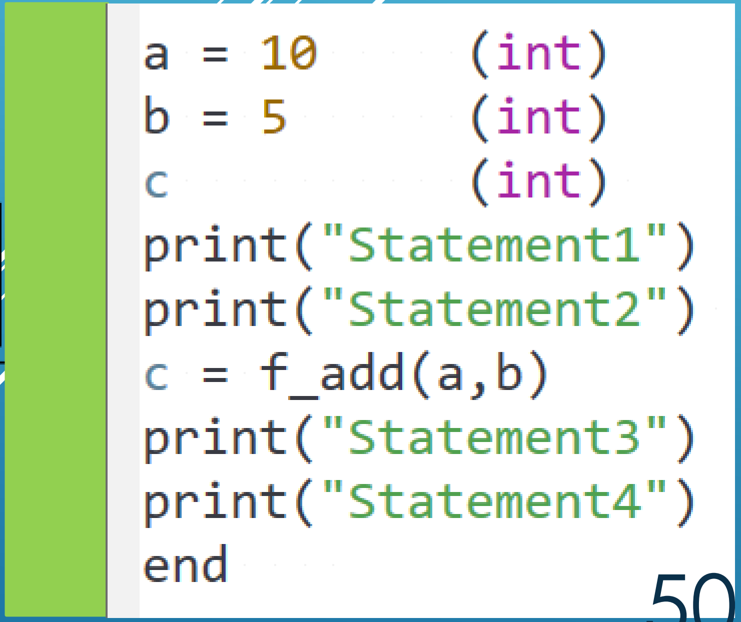
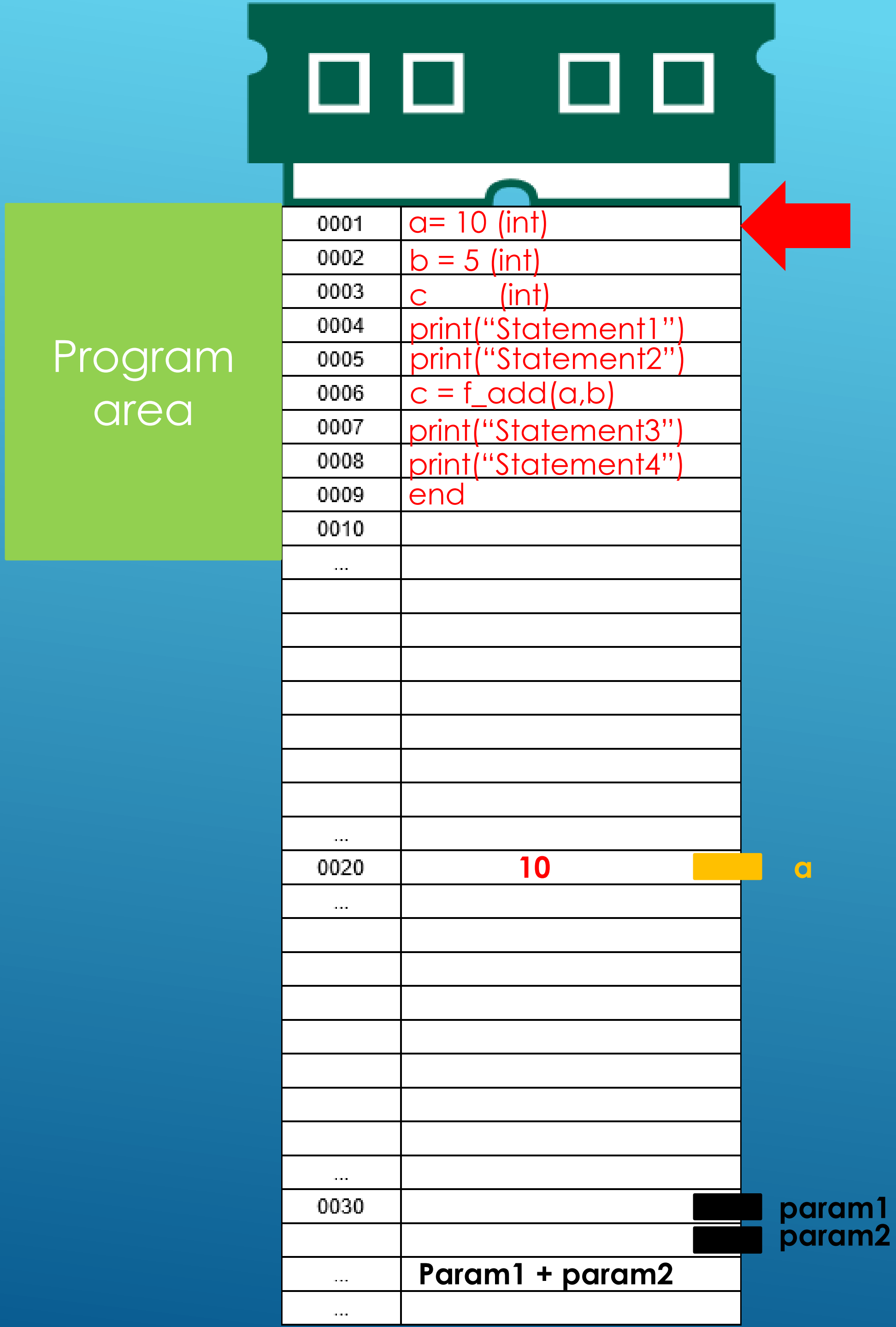
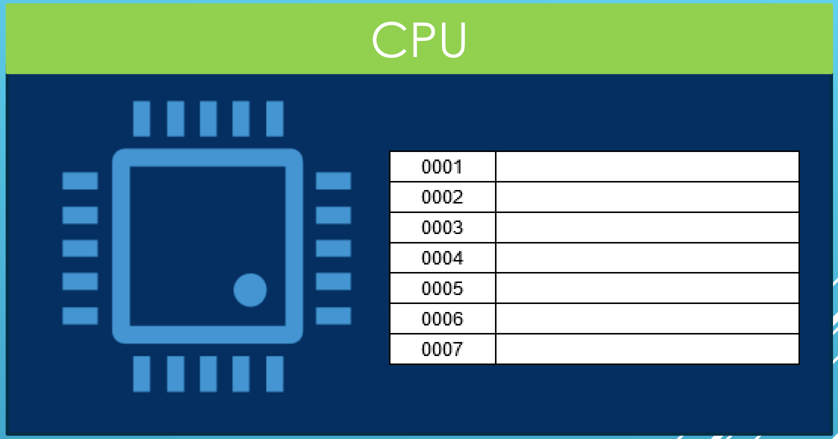




```
a = 10      (int)
b = 5       (int)
c           (int)
print("Statement1")
print("Statement2")
c = f_add(a,b)
print("Statement3")
print("Statement4")
end
```



0001	a= 10 (int)	
0002	b = 5 (int)	
0003	c (int)	
0004	print("Statement1")	
0005	print("Statement2")	
0006	c = f_add(a,b)	
0007	print("Statement3")	
0008	print("Statement4")	
0009	end	
0010		
...		
...		
0020	10	a
...		
...		
0030		param1
		param2
...	Param1 + param2	
...		



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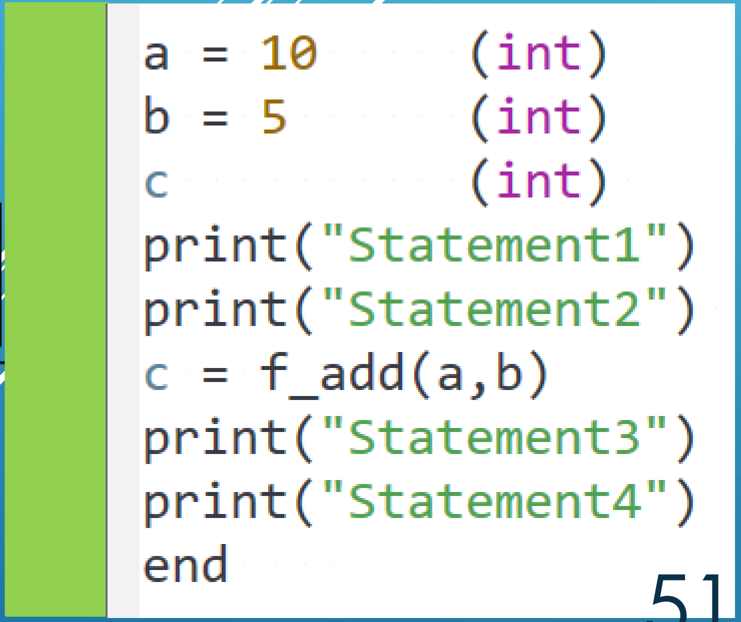
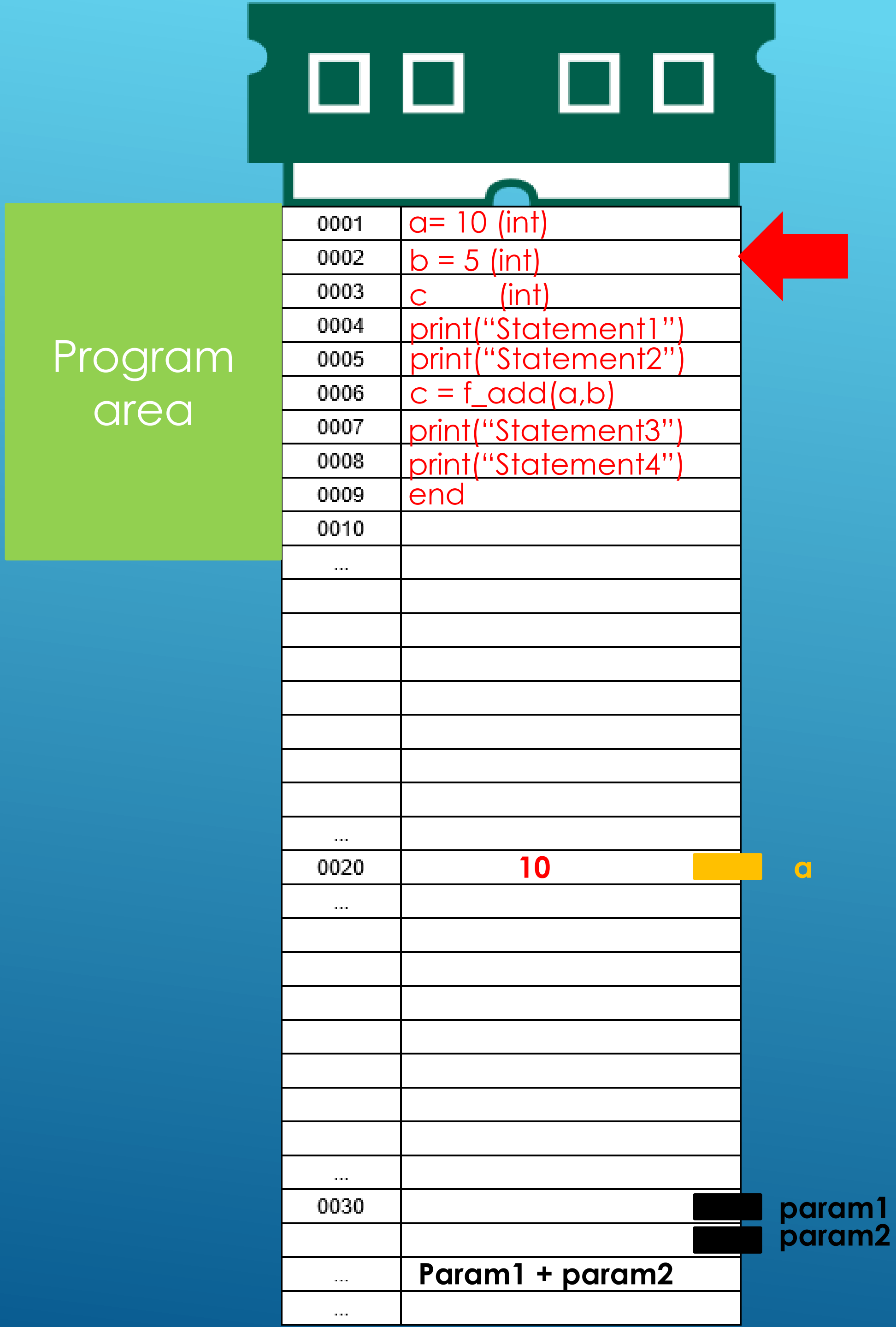
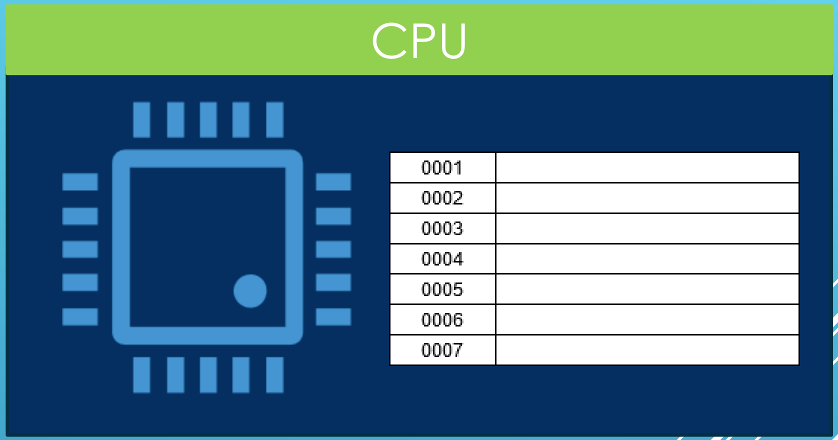


```
a = 10        (int)
b = 5         (int)
c             (int)
print("Statement1")
print("Statement2")
c = f_add(a,b)
print("Statement3")
print("Statement4")
end
```



0001	a= 10 (int)
0002	b = 5 (int)
0003	c (int)
0004	print("Statement1")
0005	print("Statement2")
0006	c = f_add(a,b)
0007	print("Statement3")
0008	print("Statement4")
0009	end
0010	
…	
…	
0020	10
…	
…	
0030	
…	Param1 + param2
…	



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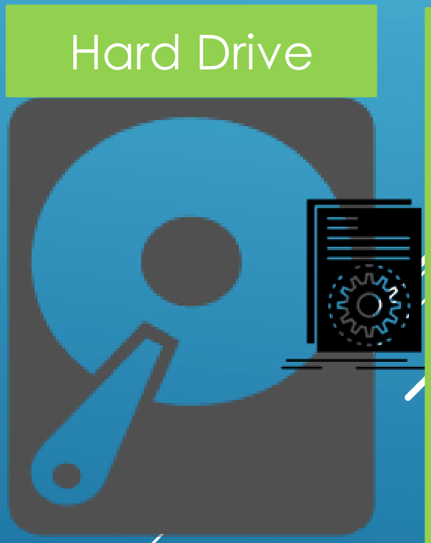
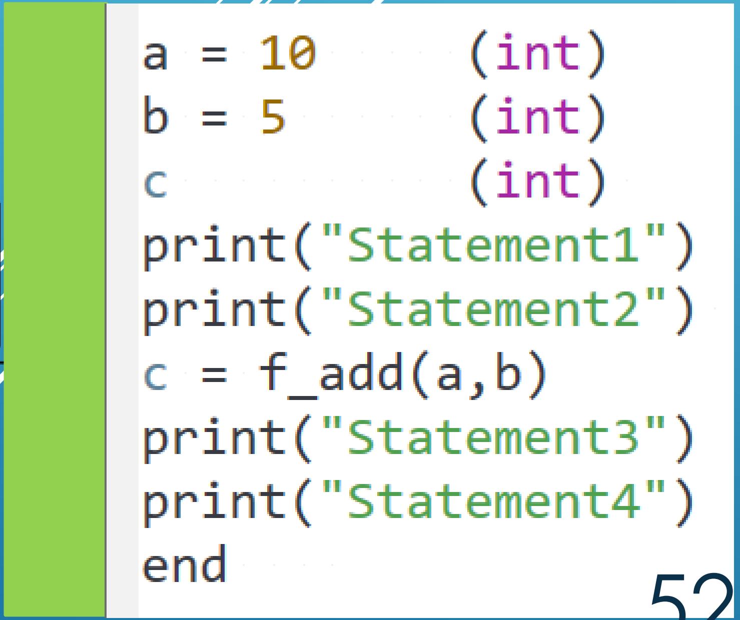
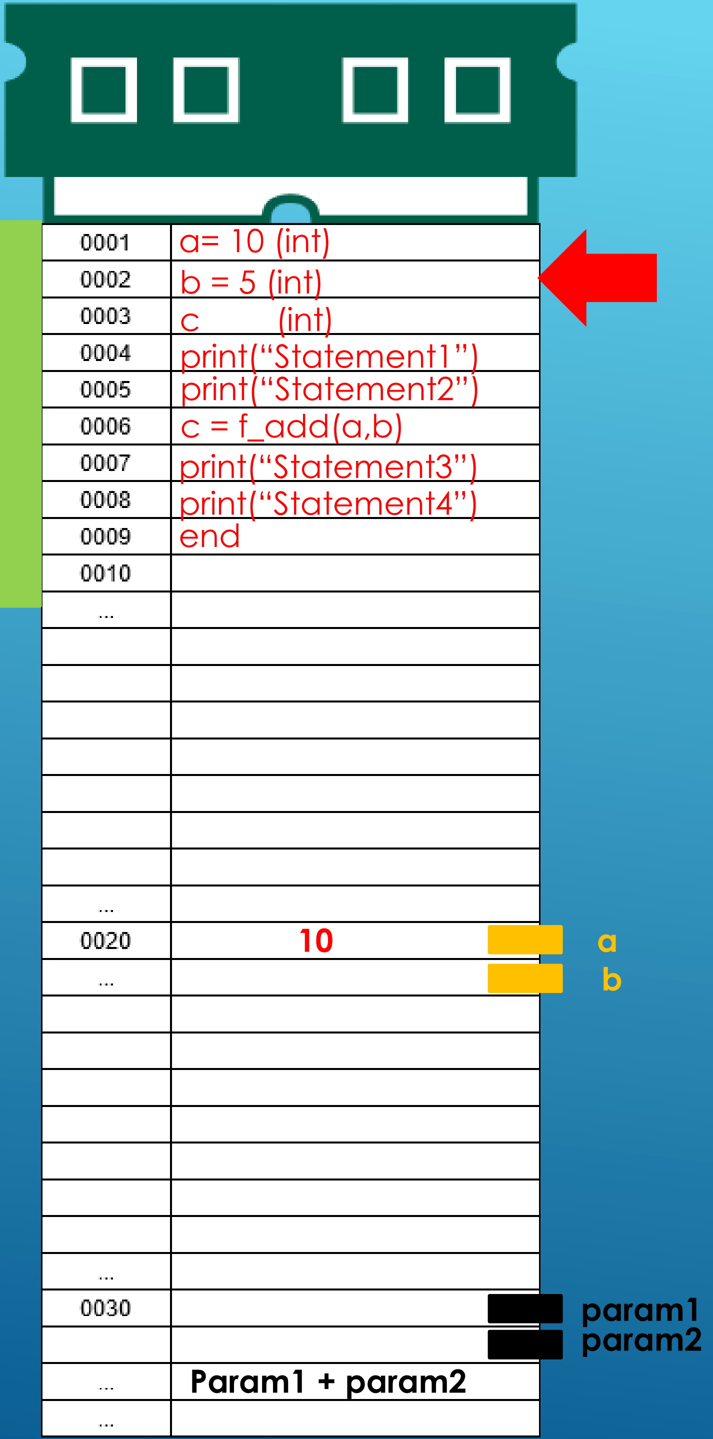




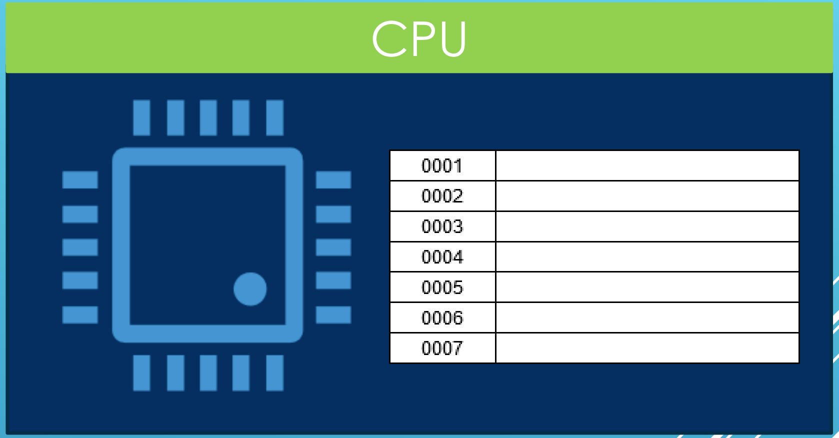
```
a = 10      (int)
b = 5       (int)
c           (int)
print("Statement1")
print("Statement2")
c = f_add(a,b)
print("Statement3")
print("Statement4")
end
```

Program area



0001	a= 10 (int)
0002	b = 5 (int)
0003	c (int)
0004	print("Statement1")
0005	print("Statement2")
0006	c = f_add(a,b)
0007	print("Statement3")
0008	print("Statement4")
0009	end
0010	
…	
…	
0020	10
…	
…	
0030	
…	Param1 + param2
…	

CPU



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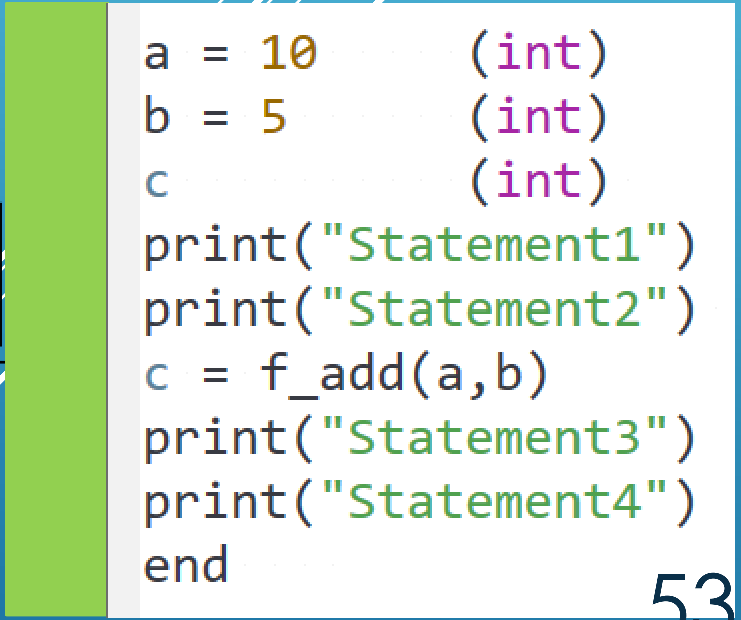
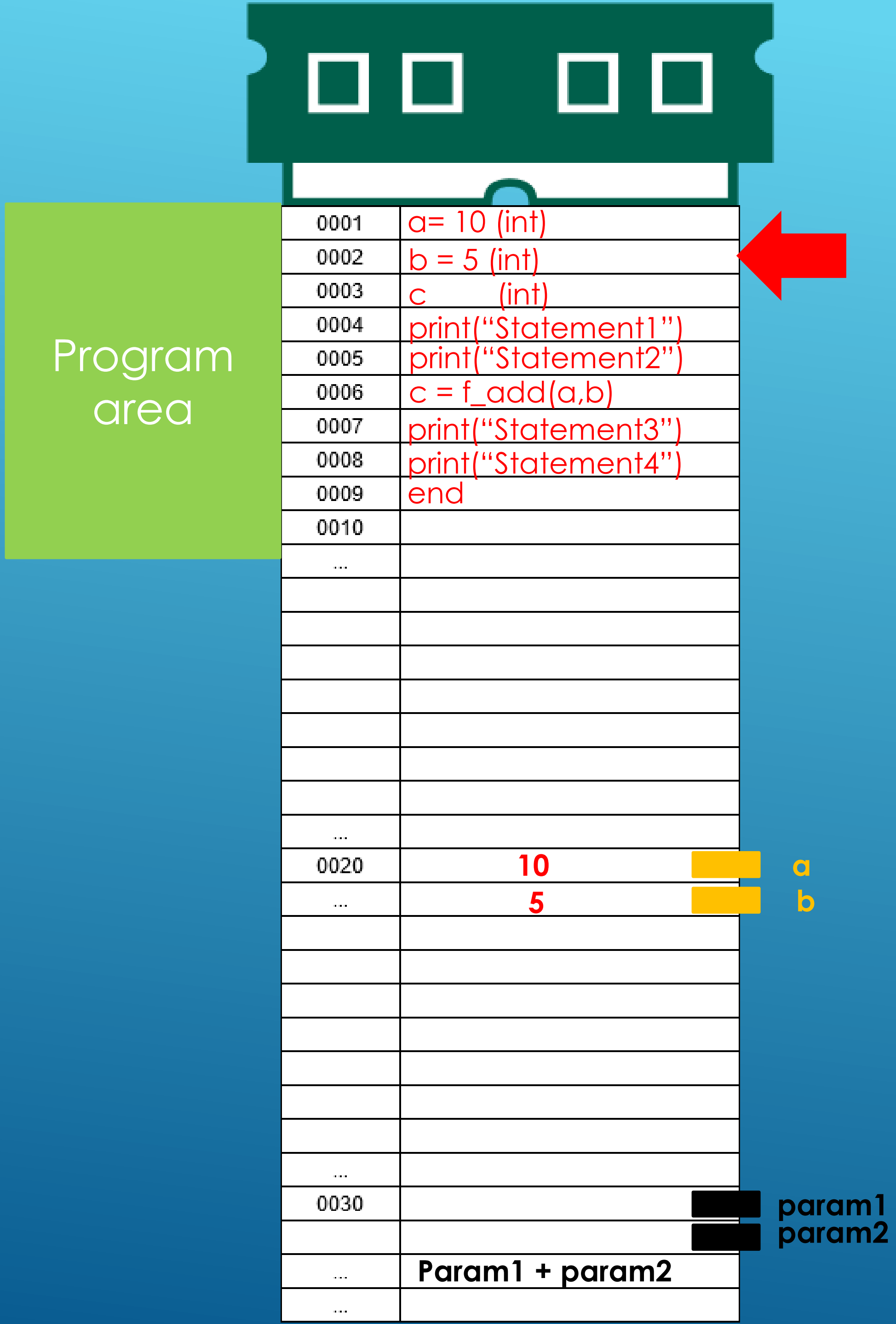
Hard Drive

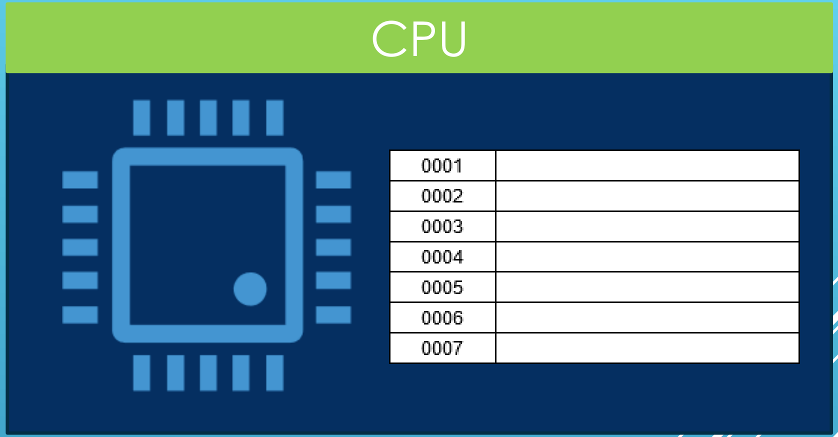


```
a = 10      (int)
b = 5       (int)
c           (int)
print("Statement1")
print("Statement2")
c = f_add(a,b)
print("Statement3")
print("Statement4")
end
```



0001	a= 10 (int)
0002	b = 5 (int)
0003	c (int)
0004	print("Statement1")
0005	print("Statement2")
0006	c = f_add(a,b)
0007	print("Statement3")
0008	print("Statement4")
0009	end
0010	
…	
…	
0020	10
…	5
…	
0030	
…	Param1 + param2
…	

CPU



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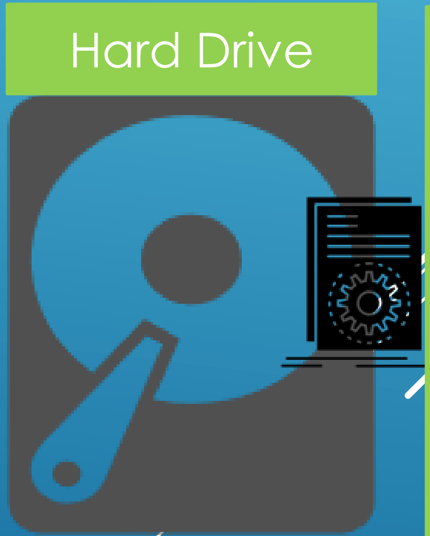
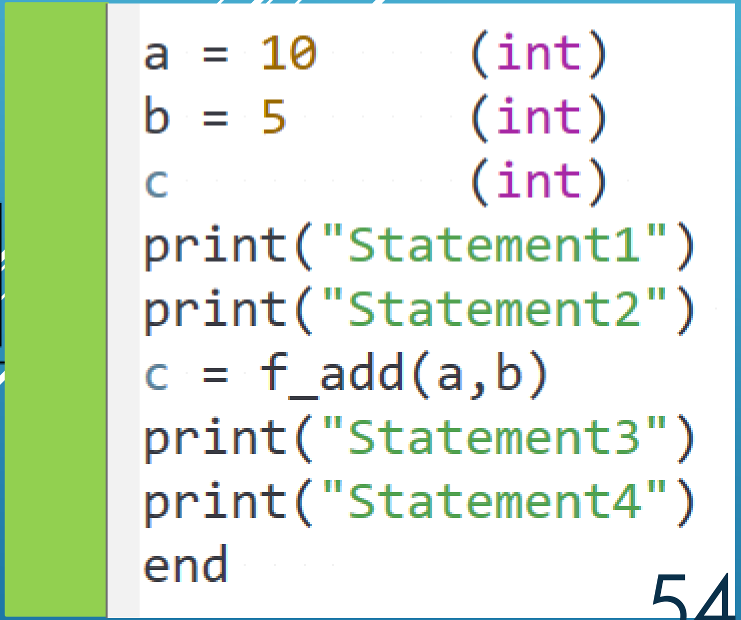
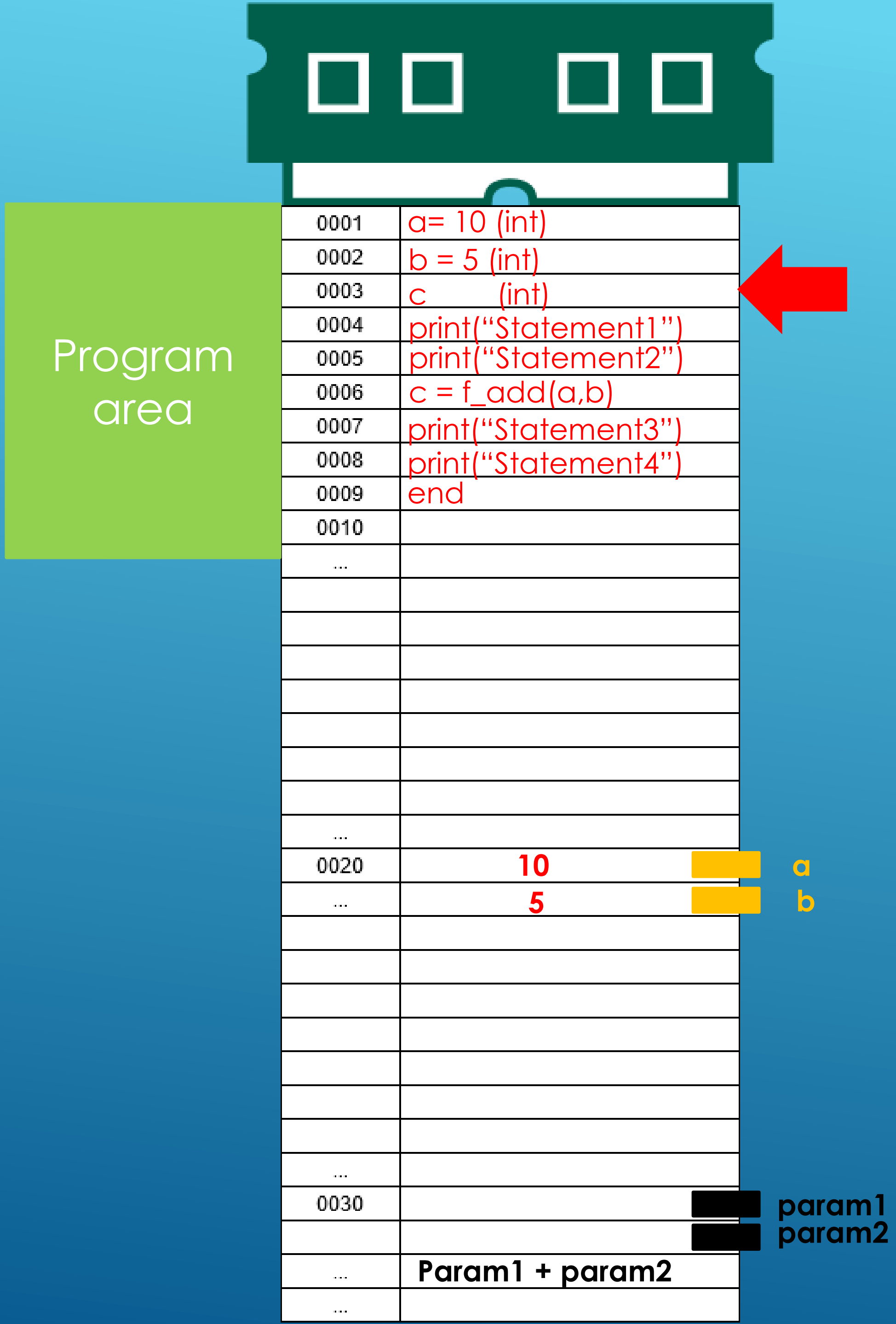
Hard Drive

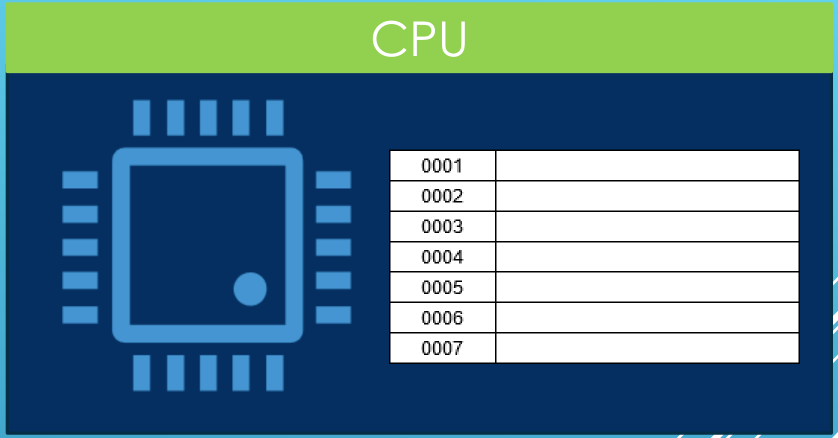




```
a = 10      (int)
b = 5       (int)
c           (int)
print("Statement1")
print("Statement2")
c = f_add(a,b)
print("Statement3")
print("Statement4")
end
```



0001	a= 10 (int)	
0002	b = 5 (int)	
0003	c (int)	
0004	print("Statement1")	
0005	print("Statement2")	
0006	c = f_add(a,b)	
0007	print("Statement3")	
0008	print("Statement4")	
0009	end	
0010		
...		
...		
0020	10	a
...	5	b
...		
0030		param1
		param2
...	Param1 + param2	
...		



0001	
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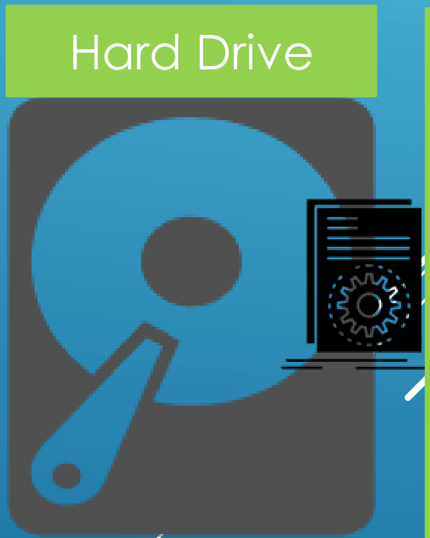
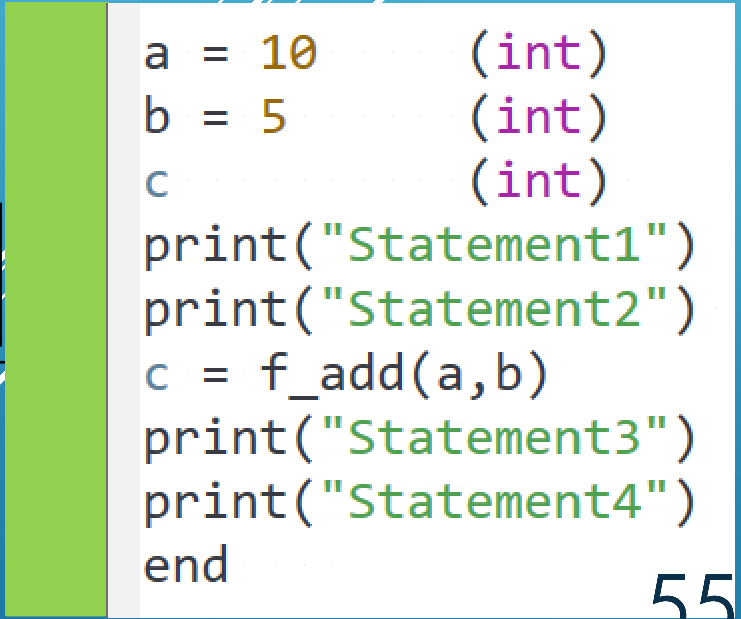
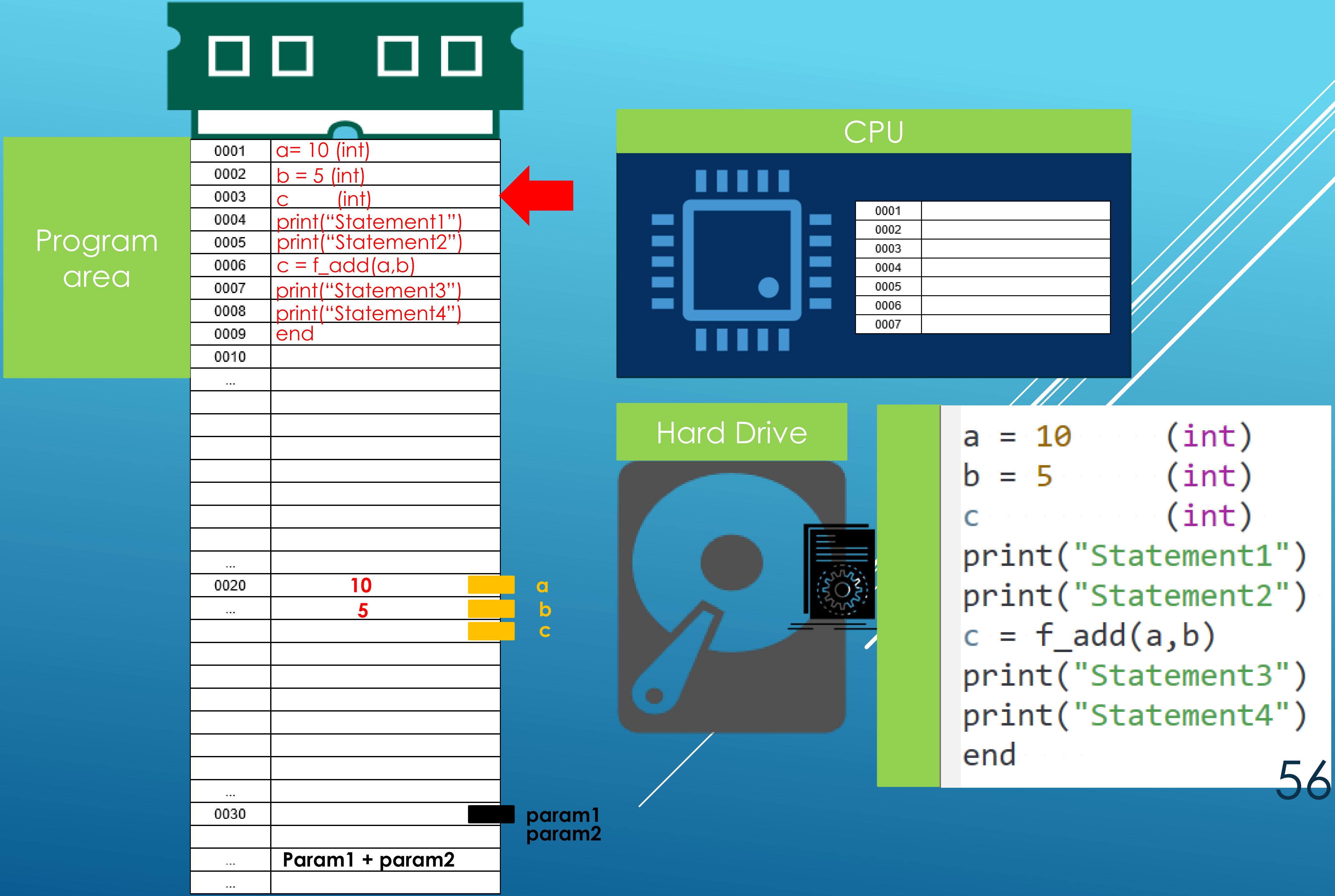




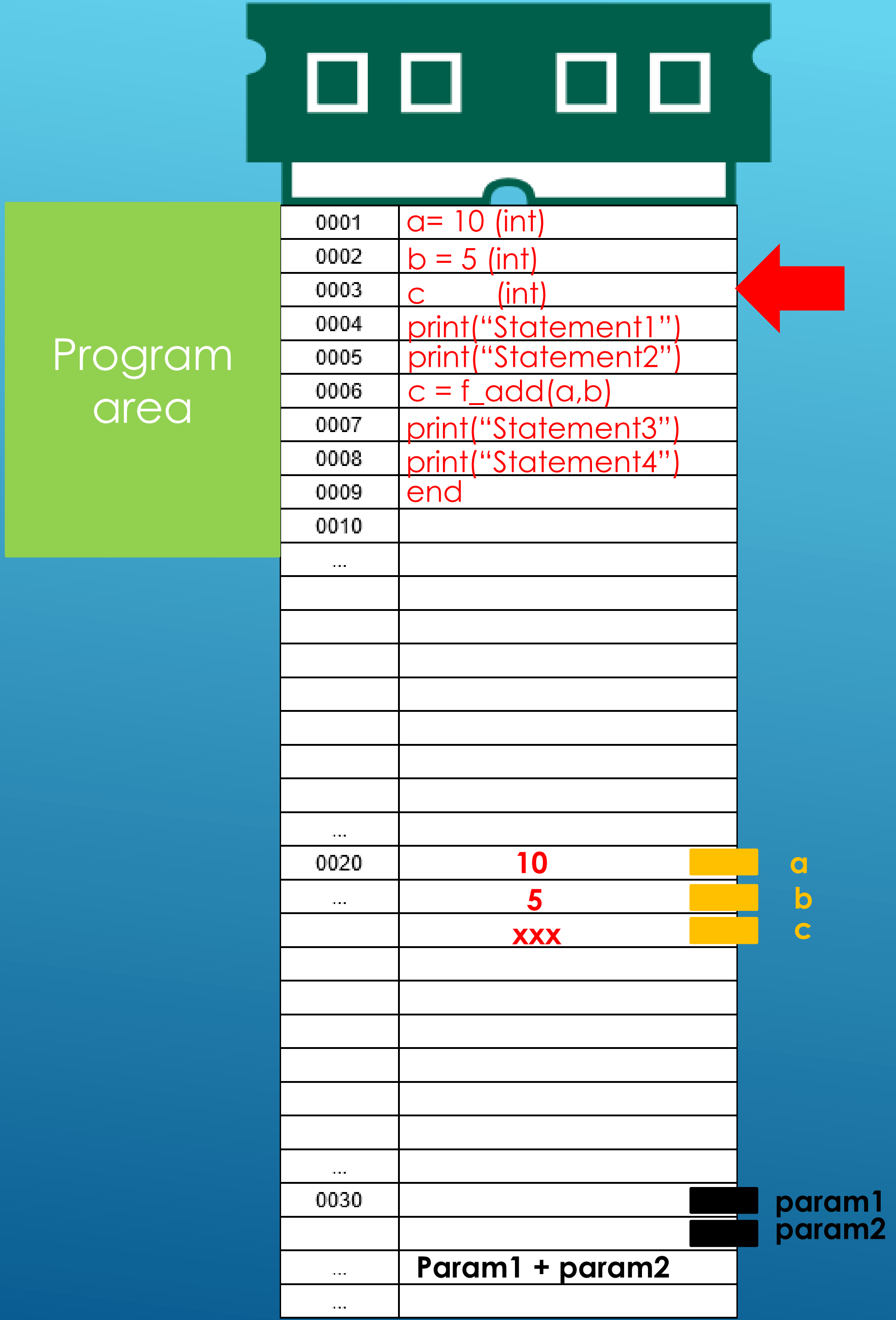
```
a = 10      (int)
b = 5       (int)
c           (int)
print("Statement1")
print("Statement2")
c = f_add(a,b)
print("Statement3")
print("Statement4")
end
```



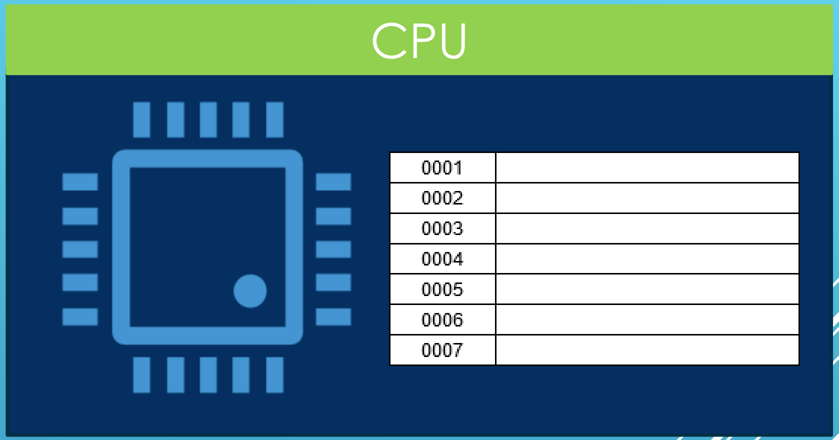
0001	a= 10 (int)	
0002	b = 5 (int)	
0003	c (int)	
0004	print("Statement1")	
0005	print("Statement2")	
0006	c = f_add(a,b)	
0007	print("Statement3")	
0008	print("Statement4")	
0009	end	
0010		
…		
…		
0020	10	a
…	5	b
		c
…		
0030		param1 param2
…	Param1 + param2	
…		

0001	
0002	
0003	
0004	
0005	
0006	
0007	

```
a = 10      (int)
b = 5       (int)
c           (int)
print("Statement1")
print("Statement2")
c = f_add(a,b)
print("Statement3")
print("Statement4")
end
```

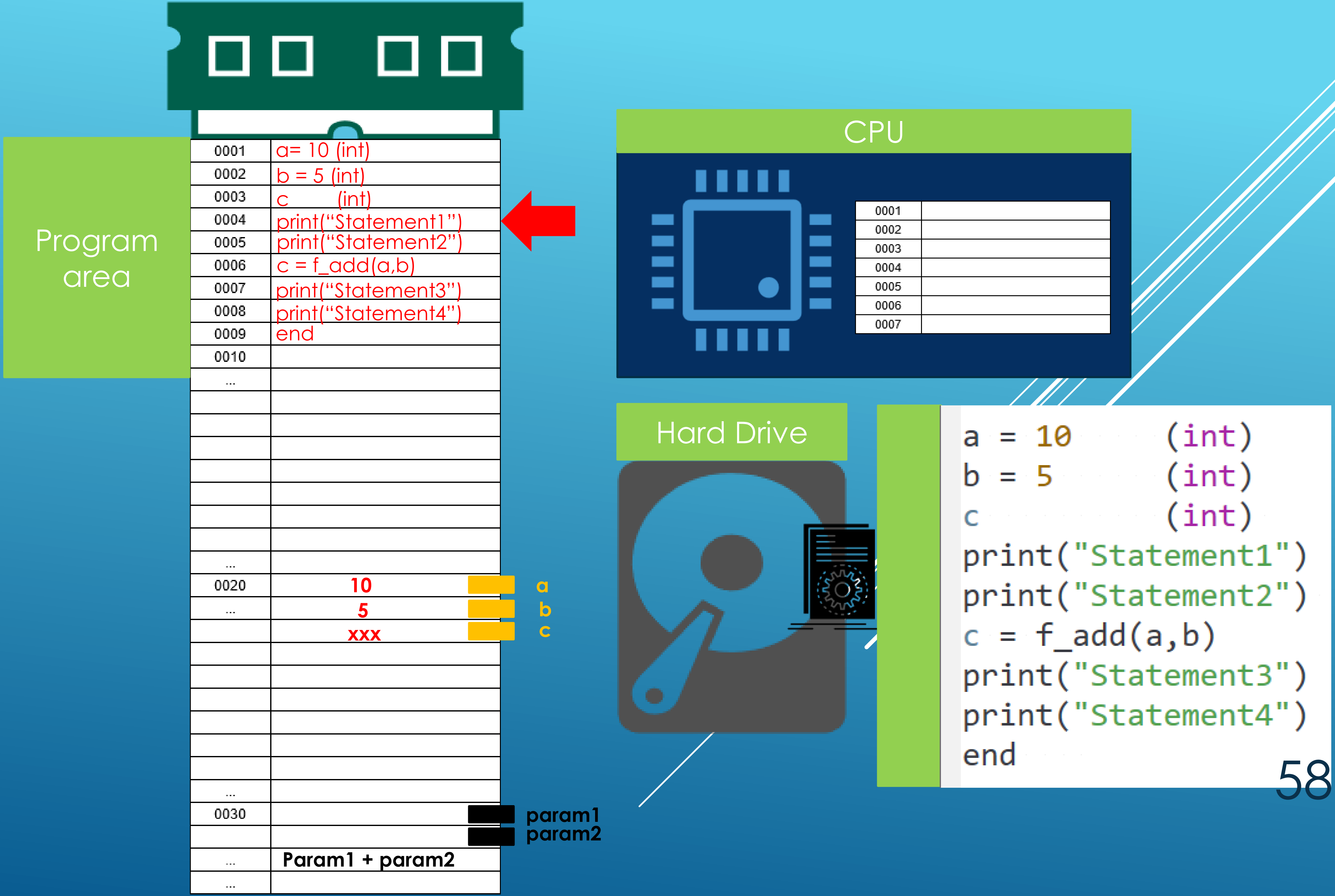


0001	a= 10 (int)
0002	b = 5 (int)
0003	c (int)
0004	print(“Statement1”)
0005	print(“Statement2”)
0006	c = f_add(a,b)
0007	print(“Statement3”)
0008	print(“Statement4”)
0009	end
0010	
…	
…	
0020	10
…	5
	xxx
…	
0030	
…	Param1 + param2
…	



0001	
0002	
0003	
0004	
0005	
0006	
0007	

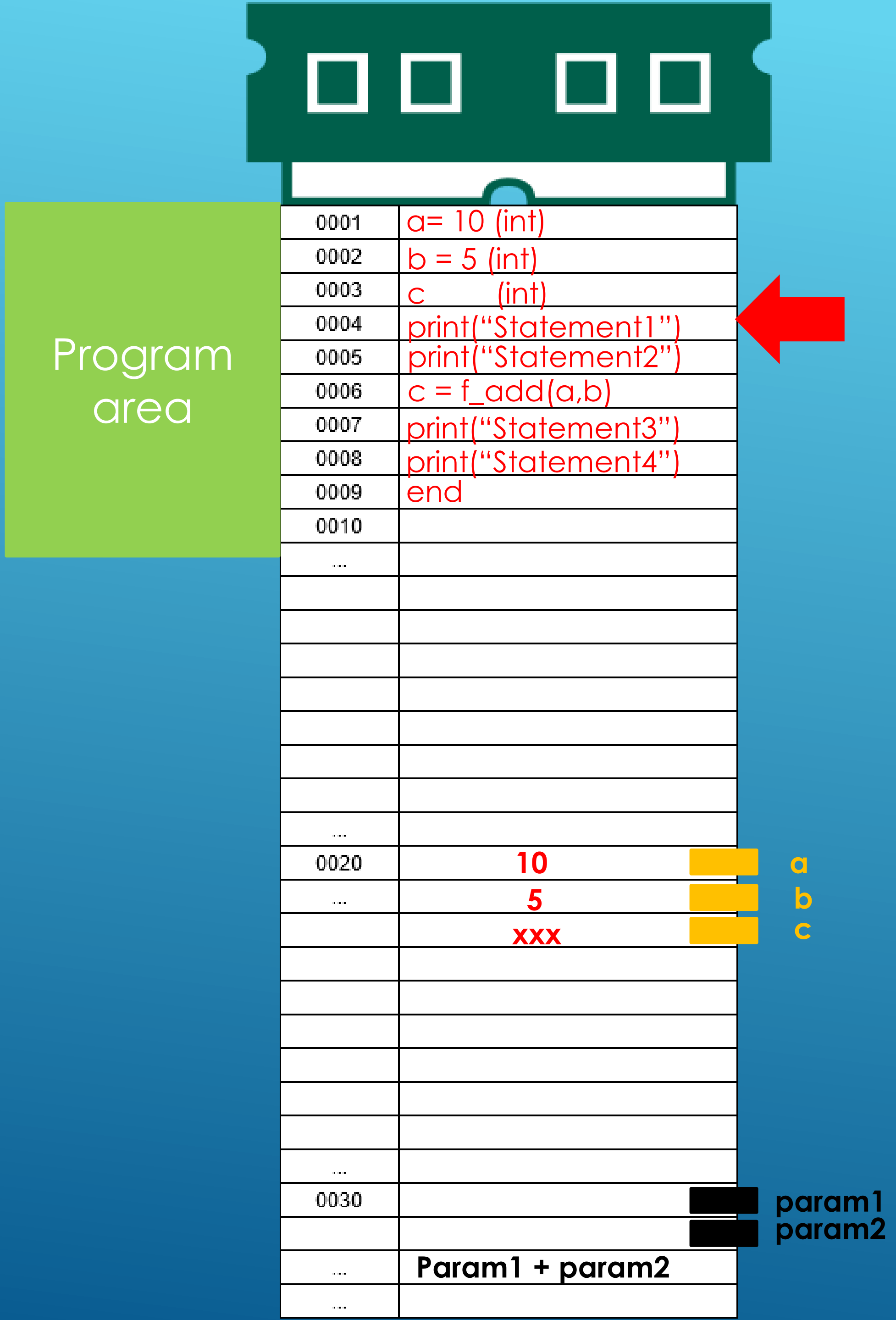
```
a = 10      (int)
b = 5       (int)
c           (int)
print("Statement1")
print("Statement2")
c = f_add(a,b)
print("Statement3")
print("Statement4")
end
```

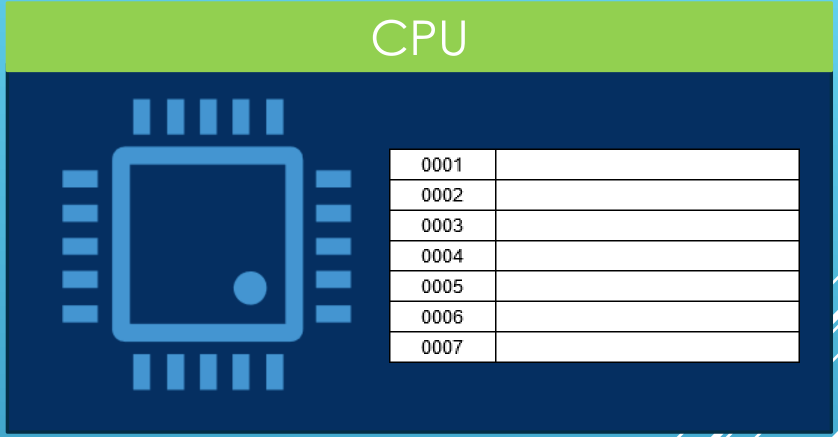


0001	a= 10 (int)	
0002	b = 5 (int)	
0003	c (int)	
0004	print("Statement1")	
0005	print("Statement2")	
0006	c = f_add(a,b)	
0007	print("Statement3")	
0008	print("Statement4")	
0009	end	
0010		
...		
...		
0020	10	a
...	5	b
	xxx	c
...		
0030		param1
		param2
...	Param1 + param2	
...		

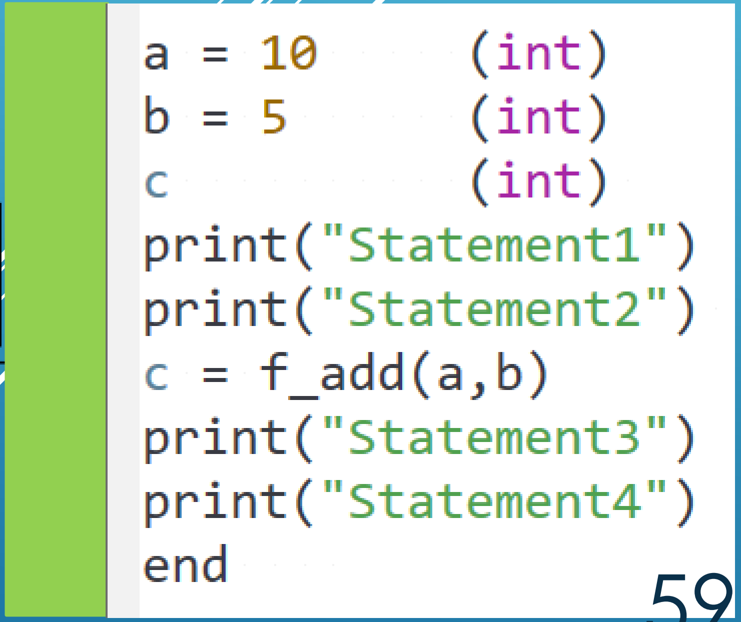
0001	
0002	
0003	
0004	
0005	
0006	
0007	

```
a = 10       (int)
b = 5        (int)
c            (int)
print("Statement1")
print("Statement2")
c = f_add(a,b)
print("Statement3")
print("Statement4")
end
```

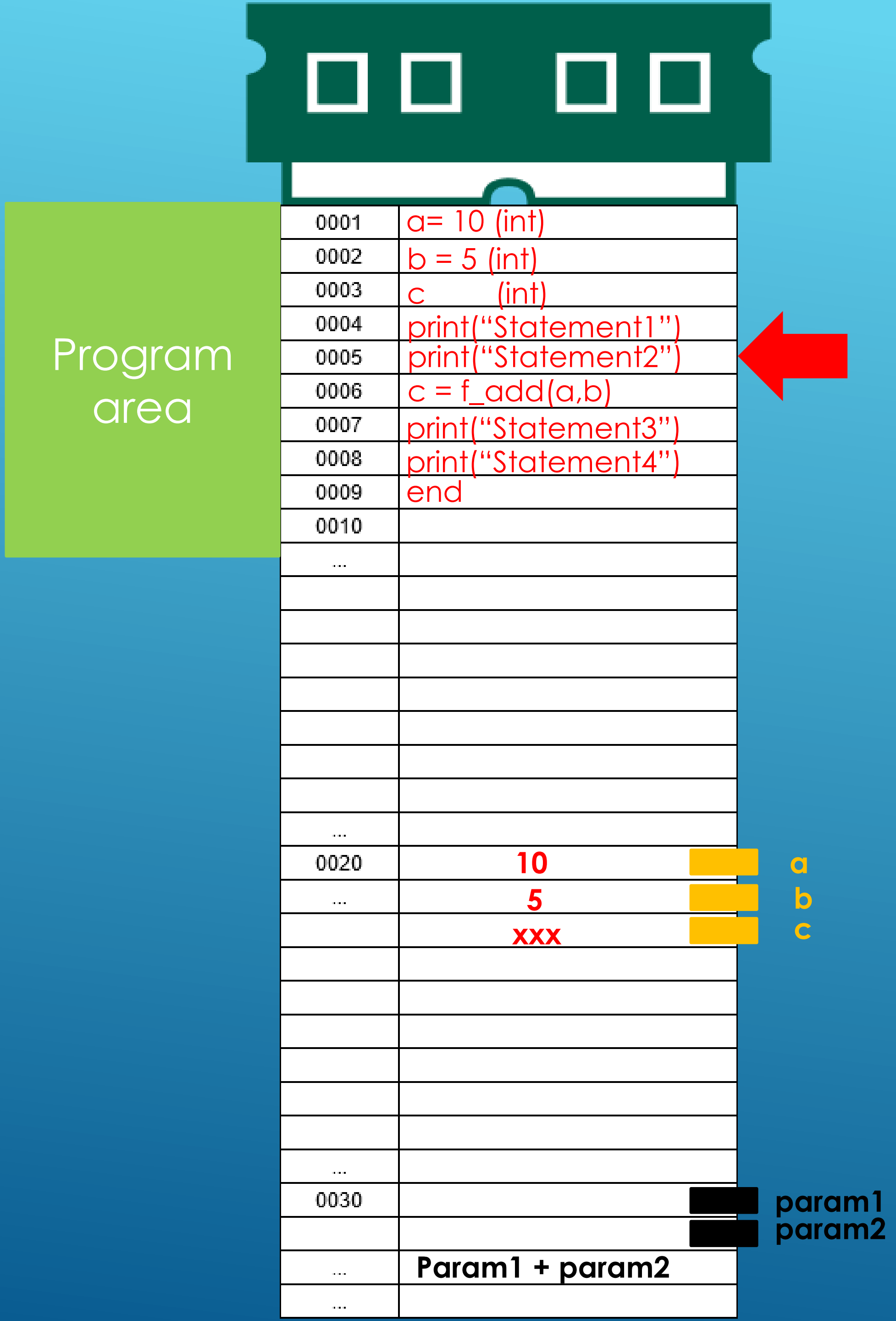




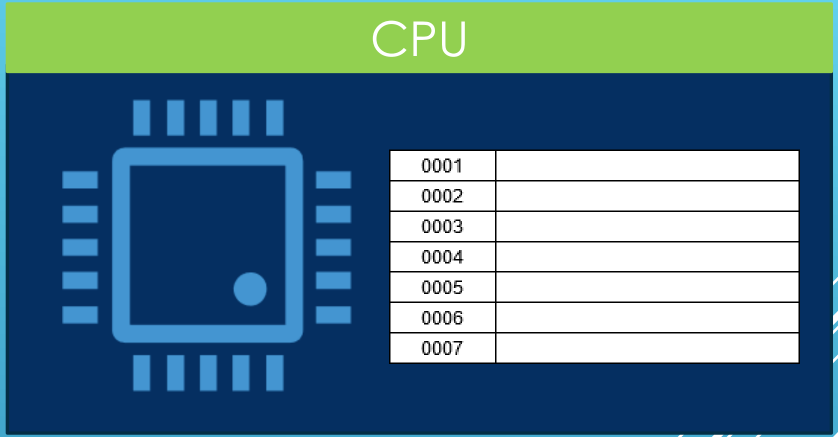
Statement1



```
a = 10      (int)
b = 5       (int)
c           (int)
print("Statement1")
print("Statement2")
c = f_add(a,b)
print("Statement3")
print("Statement4")
end
```

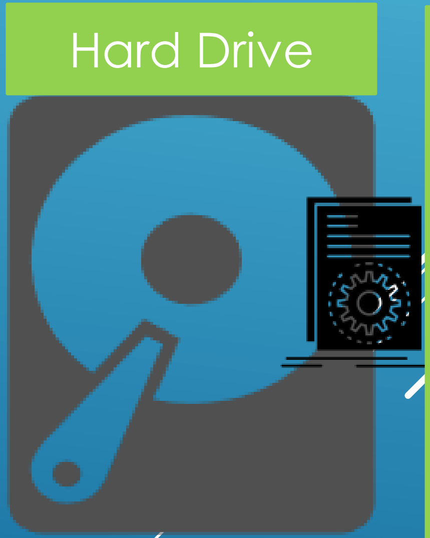


0001	a= 10 (int)
0002	b = 5 (int)
0003	c (int)
0004	print(“Statement1”)
0005	print(“Statement2”)
0006	c = f_add(a,b)
0007	print(“Statement3”)
0008	print(“Statement4”)
0009	end
0010	
…	
…	
0020	10
…	5
	xxx
…	
0030	
…	Param1 + param2
…	

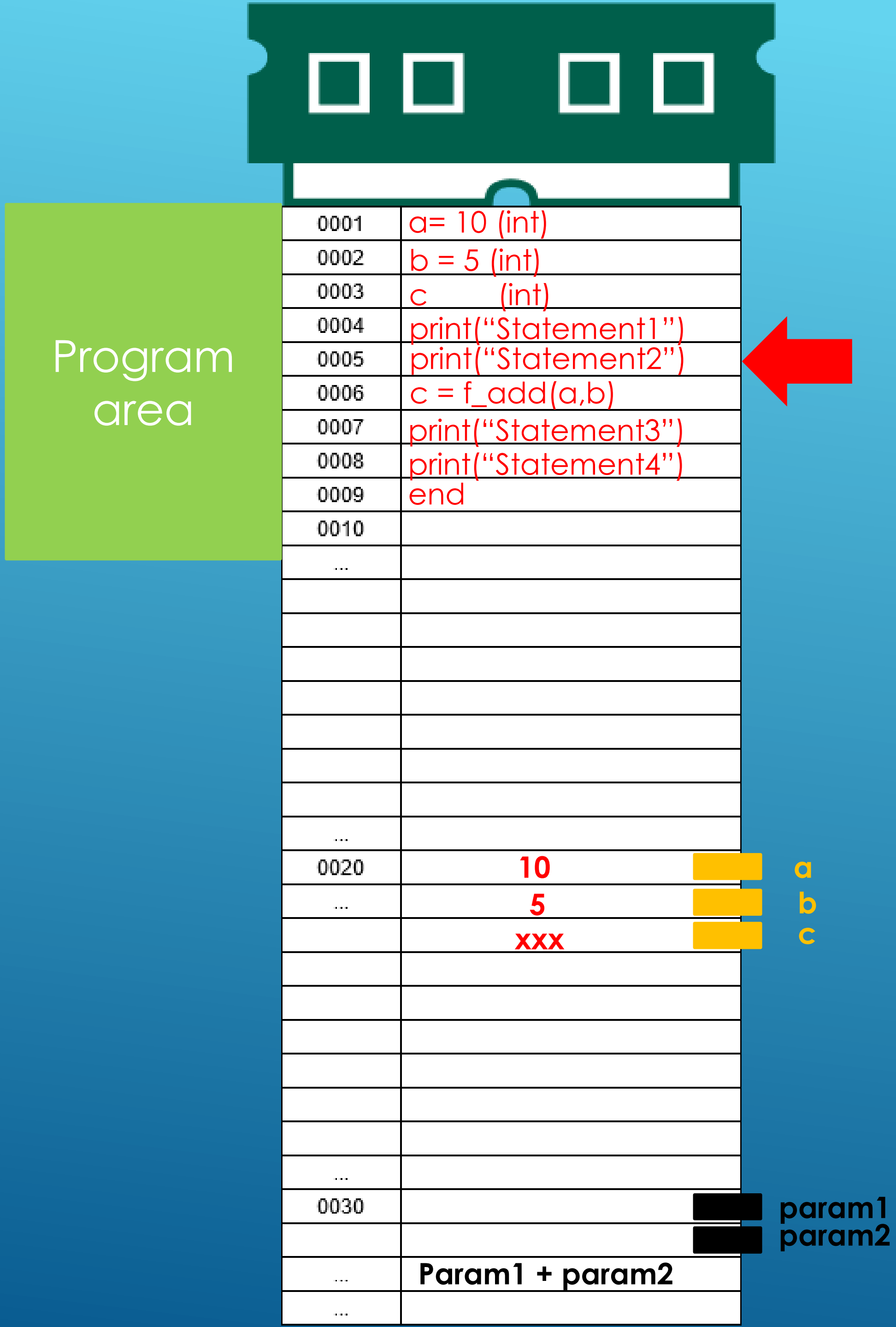


0001	
0002	
0003	
0004	
0005	
0006	
0007	

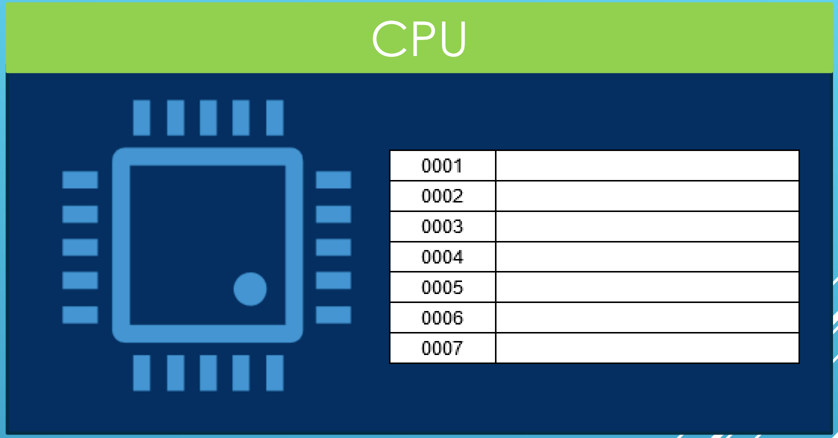
Statement1



```
a = 10      (int)
b = 5       (int)
c           (int)
print("Statement1")
print("Statement2")
c = f_add(a,b)
print("Statement3")
print("Statement4")
end
```

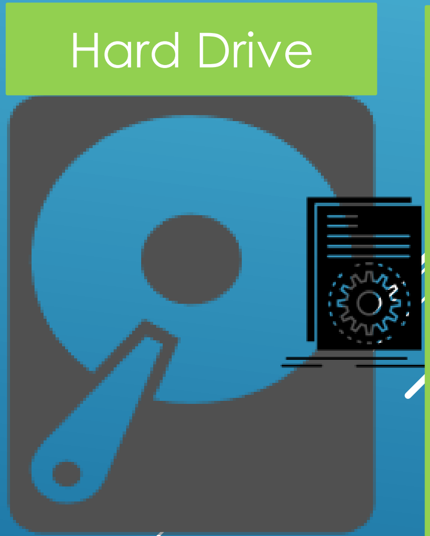


0001	a= 10 (int)	
0002	b = 5 (int)	
0003	c (int)	
0004	print(“Statement1”)	
0005	print(“Statement2”)	
0006	c = f_add(a,b)	
0007	print(“Statement3”)	
0008	print(“Statement4”)	
0009	end	
0010		
…		
…		
0020	10	a
…	5	b
	xxx	c
…		
0030		param1
		param2
…	Param1 + param2	
…		

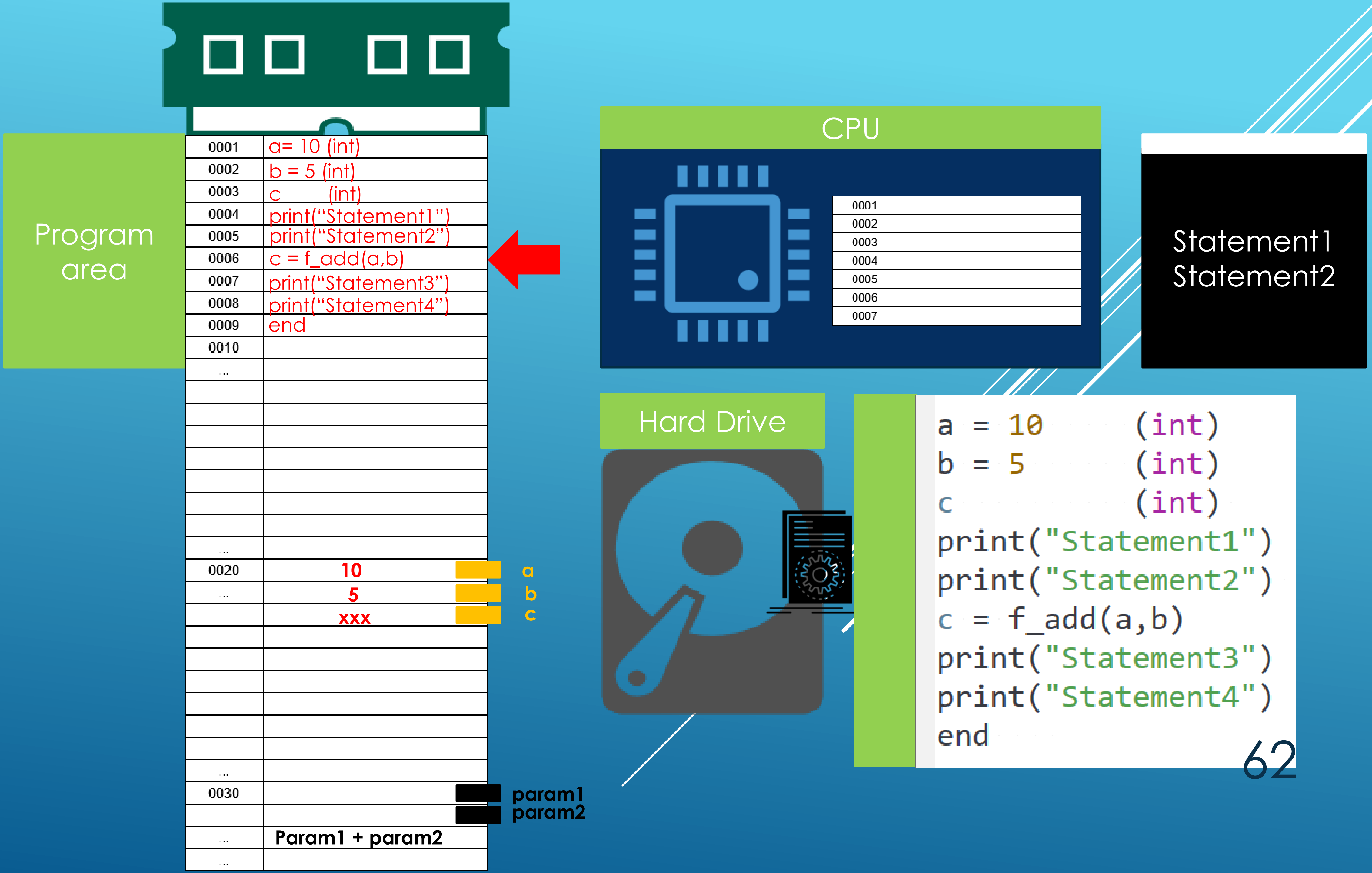


0001	
0002	
0003	
0004	
0005	
0006	
0007	

Statement1
Statement2



```
a = 10      (int)
b = 5       (int)
c           (int)
print("Statement1")
print("Statement2")
c = f_add(a,b)
print("Statement3")
print("Statement4")
end
```

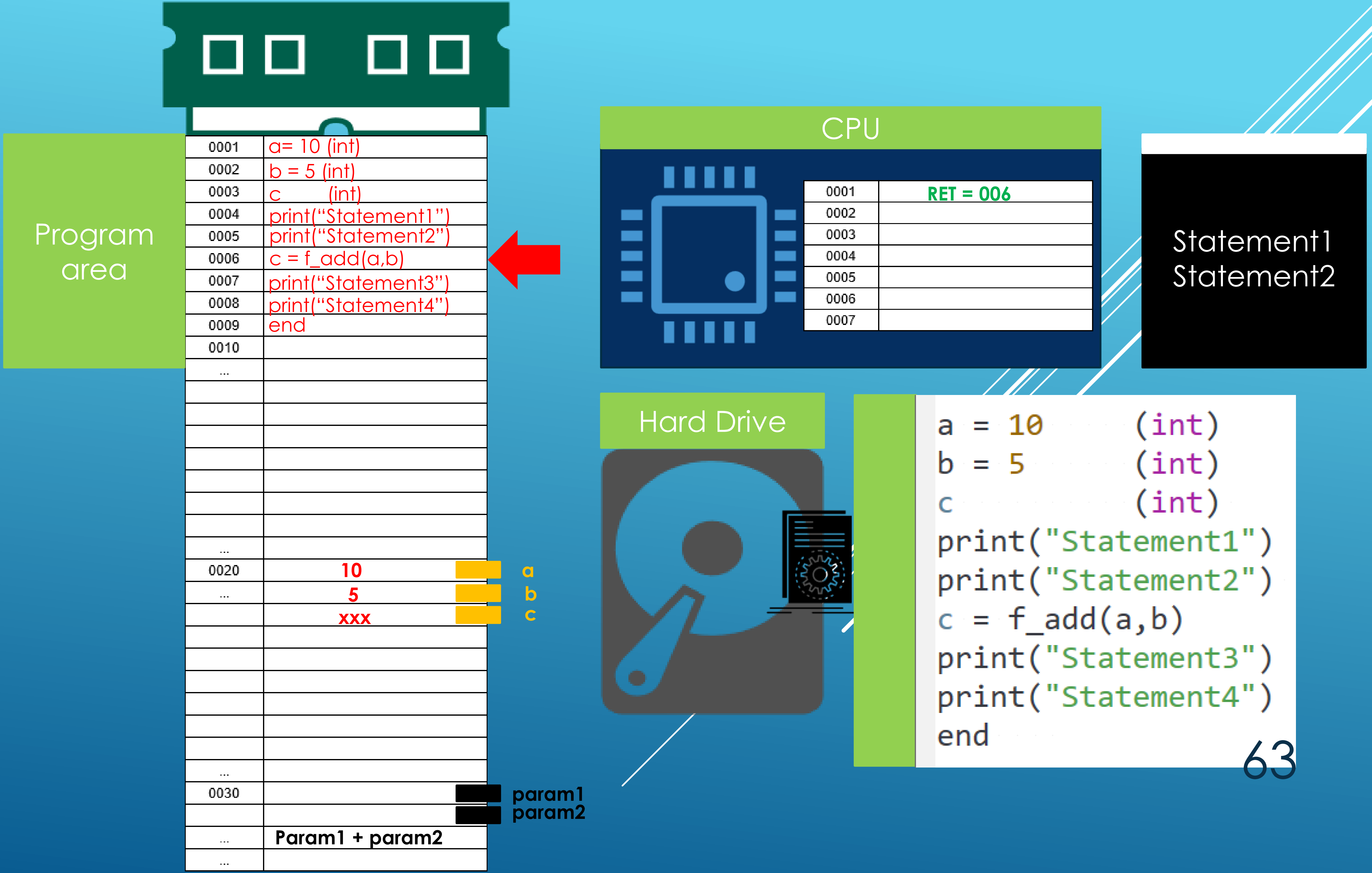


0001	a= 10 (int)
0002	b = 5 (int)
0003	c (int)
0004	print("Statement1")
0005	print("Statement2")
0006	c = f_add(a,b)
0007	print("Statement3")
0008	print("Statement4")
0009	end
0010	
…	
…	
0020	10
…	5
	xxx
…	
0030	
…	Param1 + param2
…	

0001	
0002	
0003	
0004	
0005	
0006	
0007	

```
Statement1
Statement2
```

```
a = 10        (int)
b = 5         (int)
c             (int)
print("Statement1")
print("Statement2")
c = f_add(a,b)
print("Statement3")
print("Statement4")
end
```

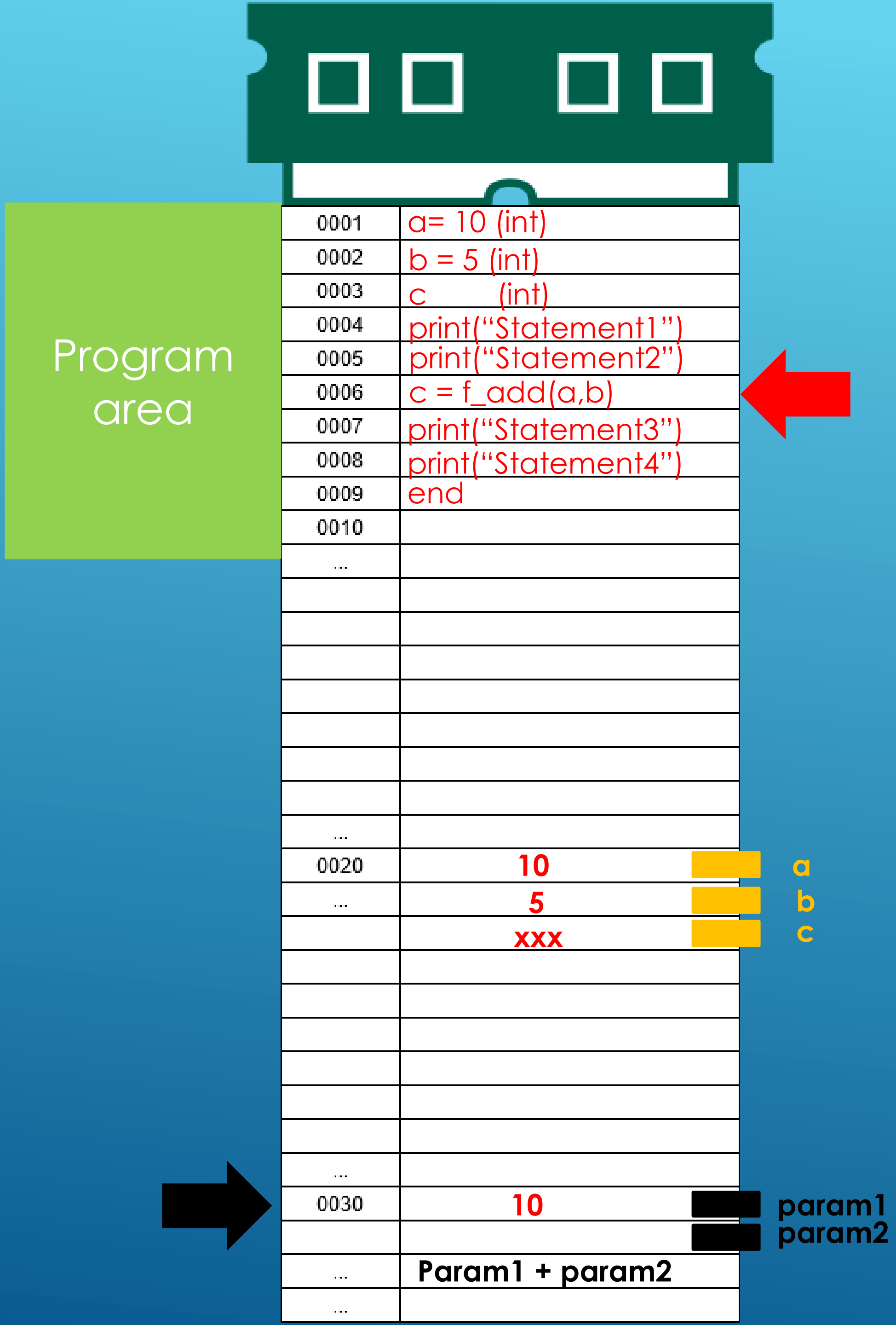


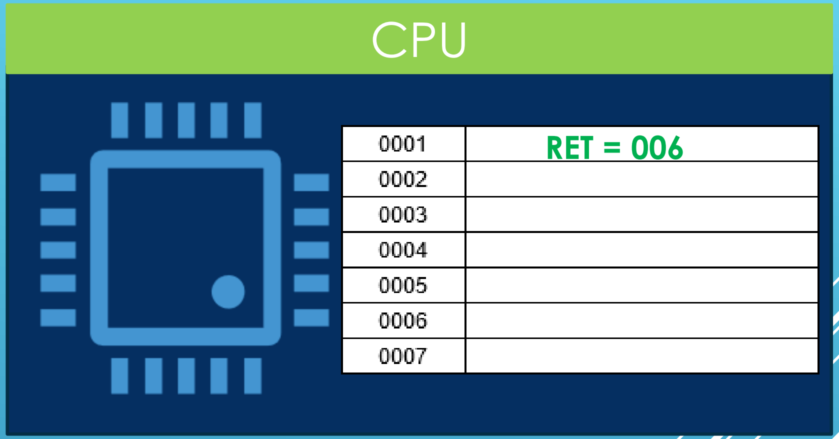
0001	a= 10 (int)	
0002	b = 5 (int)	
0003	c (int)	
0004	print("Statement1")	
0005	print("Statement2")	
0006	c = f_add(a,b)	
0007	print("Statement3")	
0008	print("Statement4")	
0009	end	
0010		
...		
...		
0020	10	a
...	5	b
	xxx	c
...		
0030		param1
		param2
...	Param1 + param2	
...		

0001	RET = 006
0002	
0003	
0004	
0005	
0006	
0007	

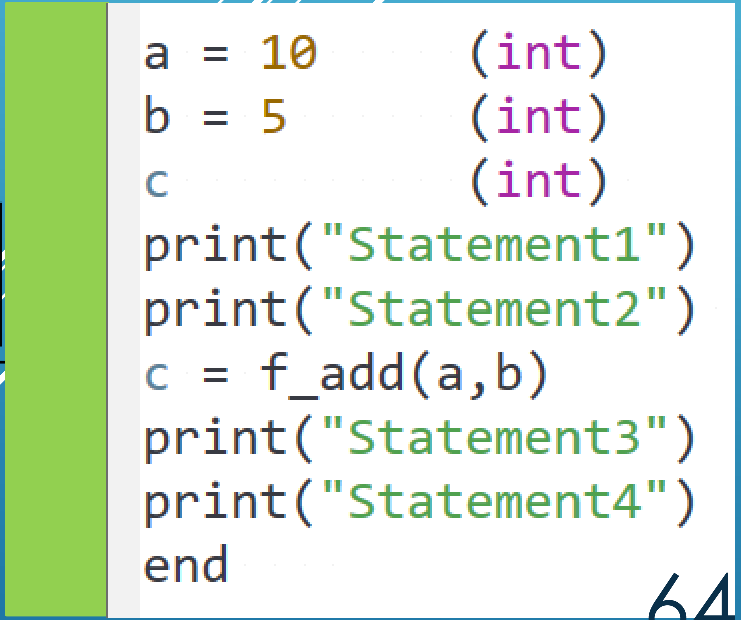
Statement1
Statement2

```
a = 10      (int)
b = 5       (int)
c           (int)
print("Statement1")
print("Statement2")
c = f_add(a,b)
print("Statement3")
print("Statement4")
end
```

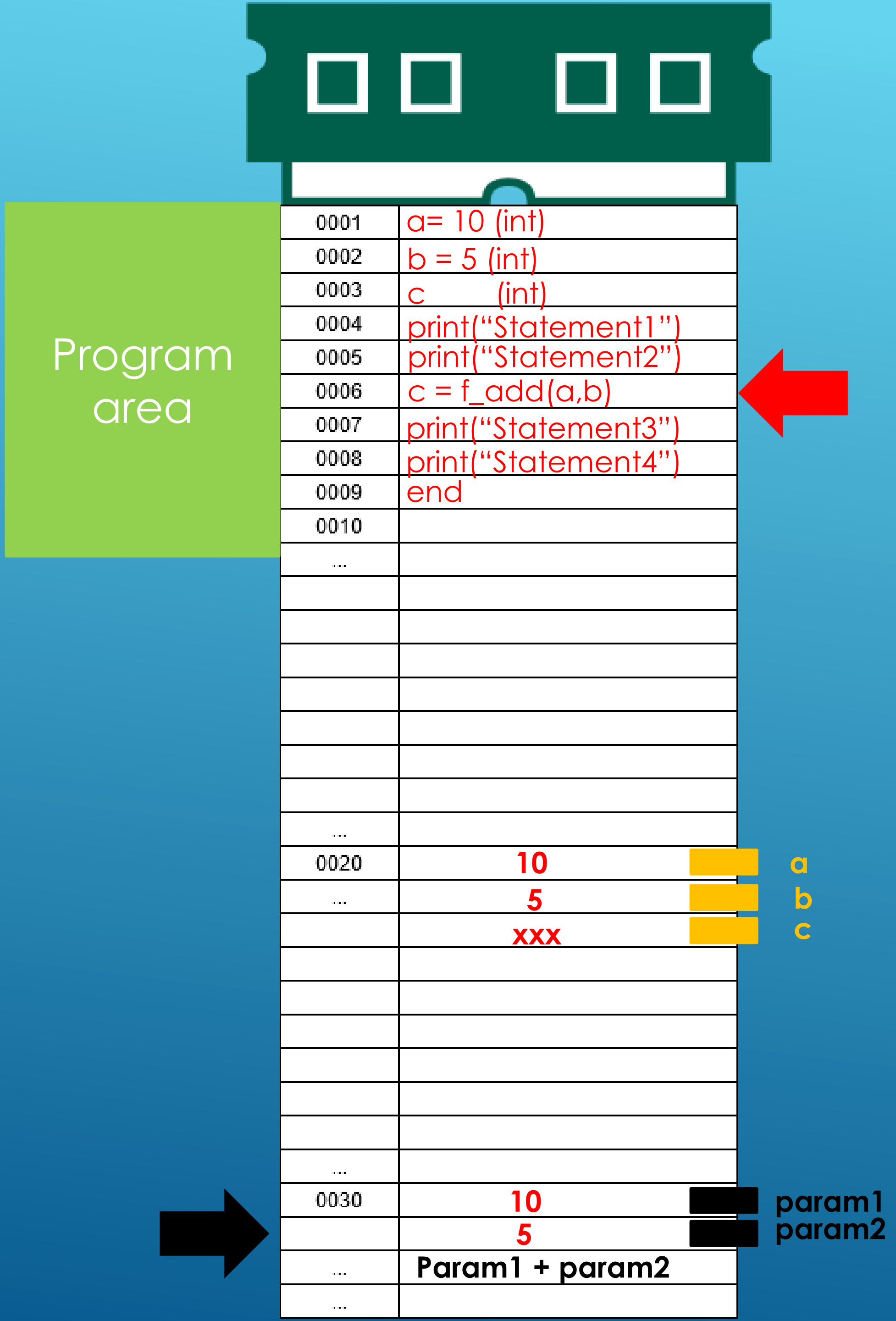




Statement1
Statement2

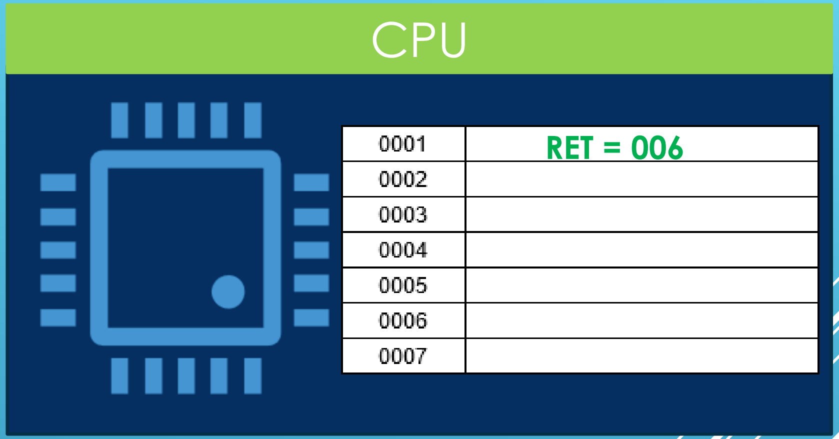


```
a = 10        (int)
b = 5         (int)
c             (int)
print("Statement1")
print("Statement2")
c = f_add(a,b)
print("Statement3")
print("Statement4")
end
```



Program area

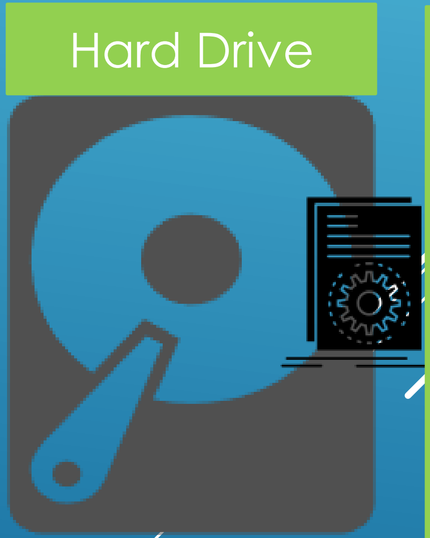
0001	a= 10 (int)	
0002	b = 5 (int)	
0003	c (int)	
0004	print("Statement1")	
0005	print("Statement2")	
0006	c = f_add(a,b)	
0007	print("Statement3")	
0008	print("Statement4")	
0009	end	
0010		
…		
…		
0020	10	a
…	5	b
	xxx	c
…		
0030	10	param1
	5	param2
…	Param1 + param2	
…		



CPU

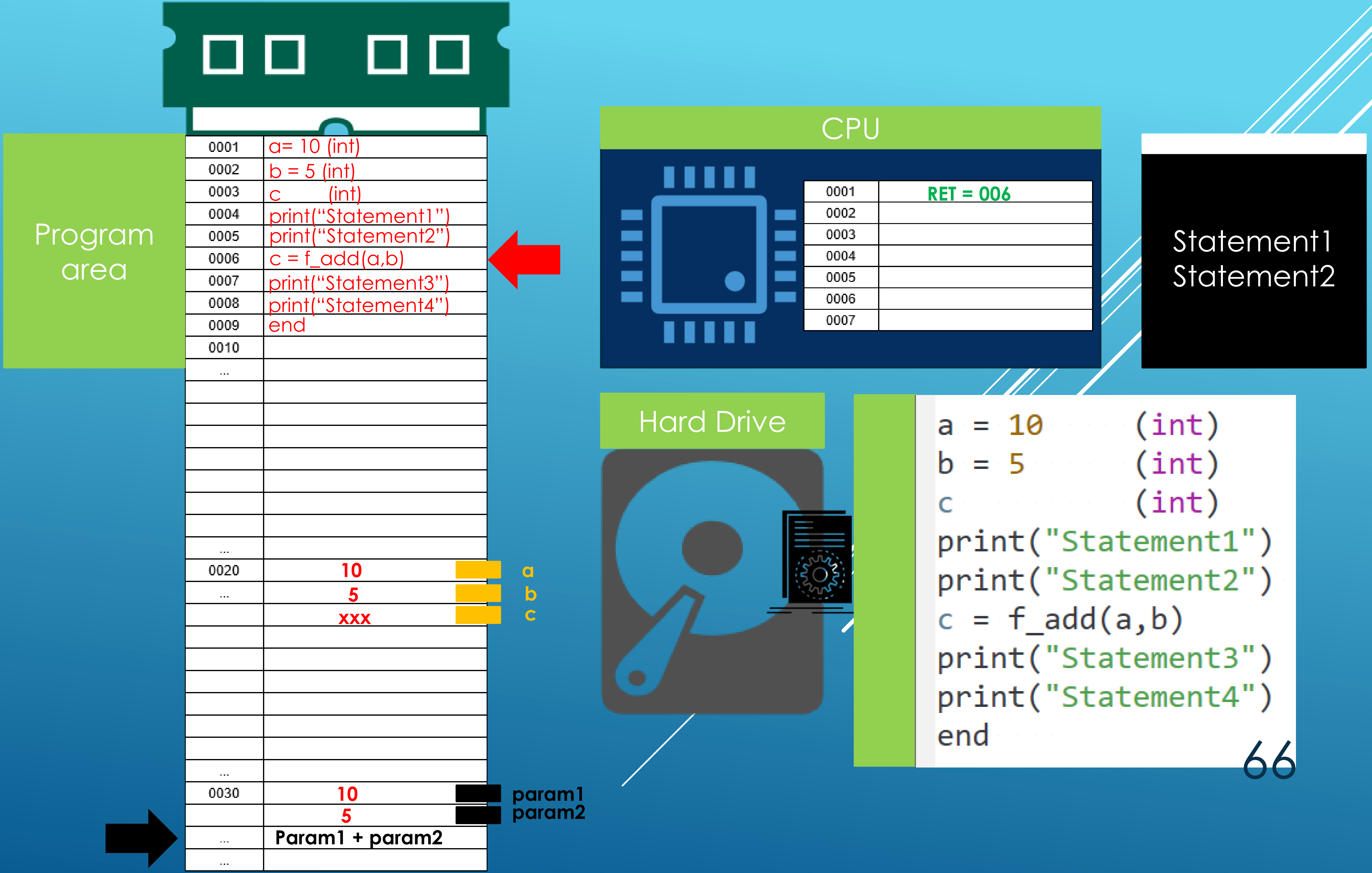
0001	RET = 006
0002	
0003	
0004	
0005	
0006	
0007	

```
Statement1
Statement2
```



Hard Drive

```
a = 10      (int)
b = 5       (int)
c           (int)
print("Statement1")
print("Statement2")
c = f_add(a,b)
print("Statement3")
print("Statement4")
end
```

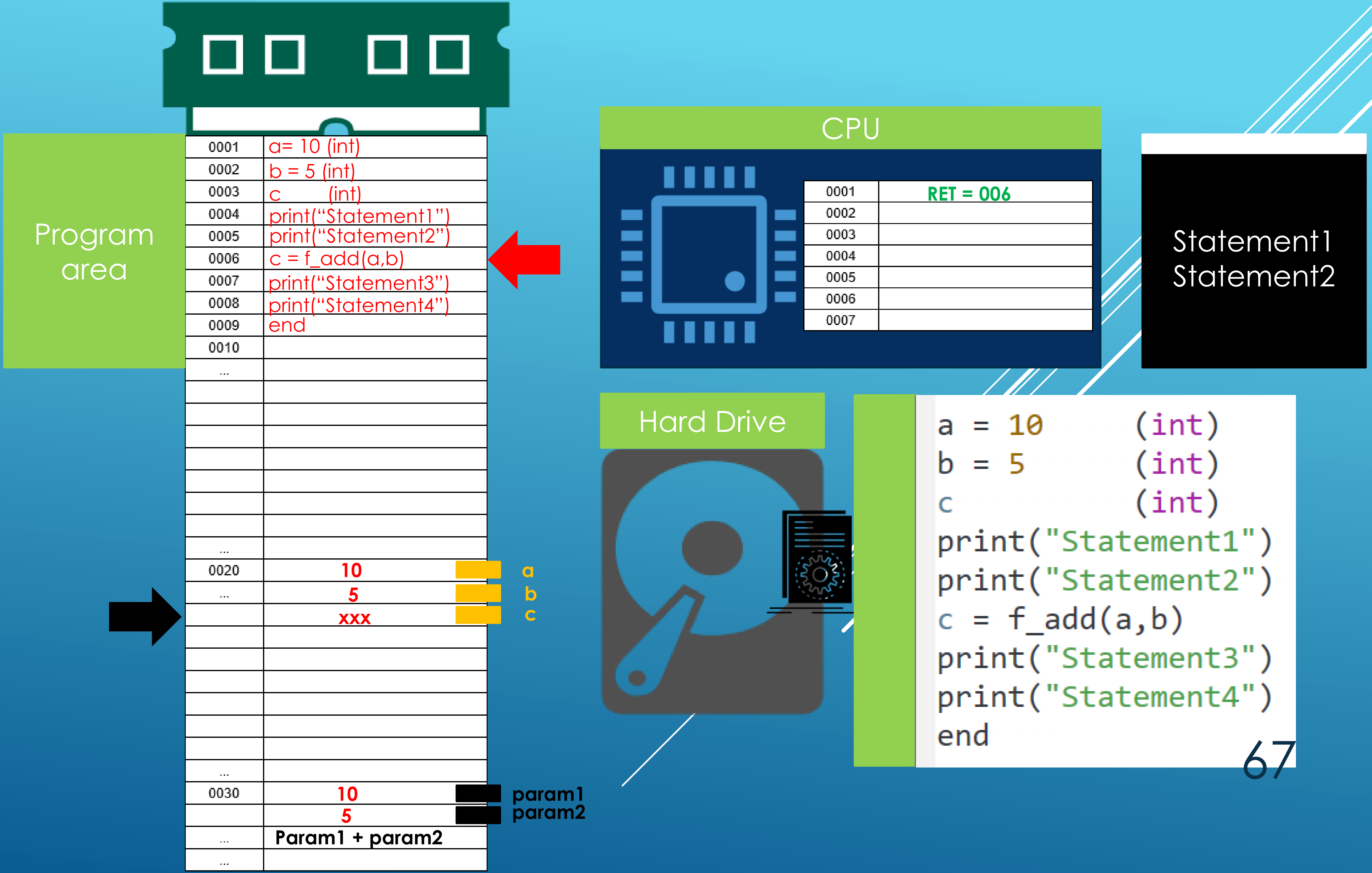


0001	a= 10 (int)	
0002	b = 5 (int)	
0003	c (int)	
0004	print("Statement1")	
0005	print("Statement2")	
0006	c = f_add(a,b)	
0007	print("Statement3")	
0008	print("Statement4")	
0009	end	
0010		
…		
…		
0020	10	a
…	5	b
	xxx	c
…		
0030	10	param1
	5	param2
…	Param1 + param2	
…		

0001	RET = 006
0002	
0003	
0004	
0005	
0006	
0007	

```
Statement1
Statement2
```

```
a = 10       (int)
b = 5        (int)
c            (int)
print("Statement1")
print("Statement2")
c = f_add(a,b)
print("Statement3")
print("Statement4")
end
```

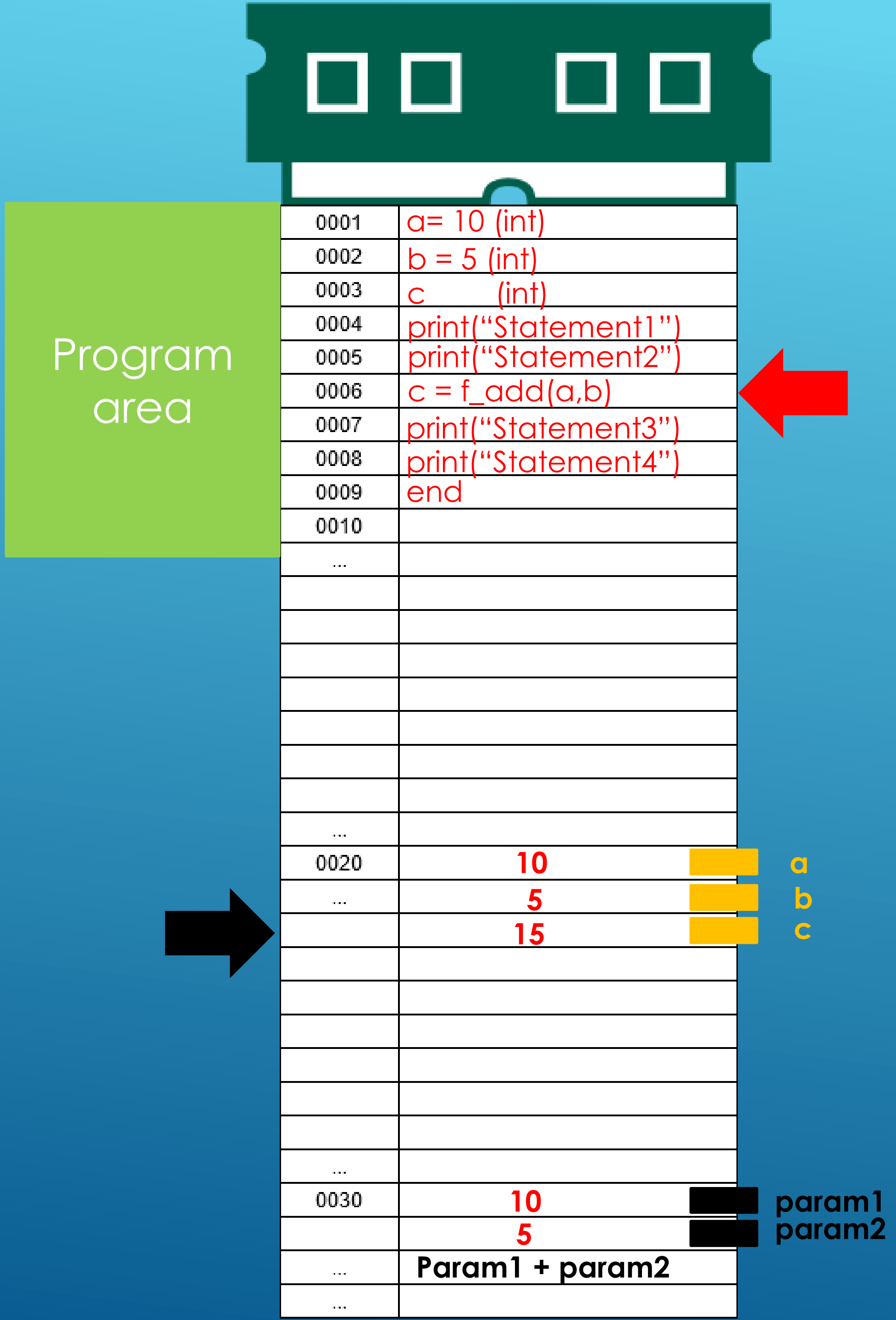


0001	a= 10 (int)	
0002	b = 5 (int)	
0003	c (int)	
0004	print("Statement1")	
0005	print("Statement2")	
0006	c = f_add(a,b)	
0007	print("Statement3")	
0008	print("Statement4")	
0009	end	
0010		
…		
…		
0020	10	a
…	5	b
	xxx	c
…		
0030	10	param1
	5	param2
…	Param1 + param2	
…		

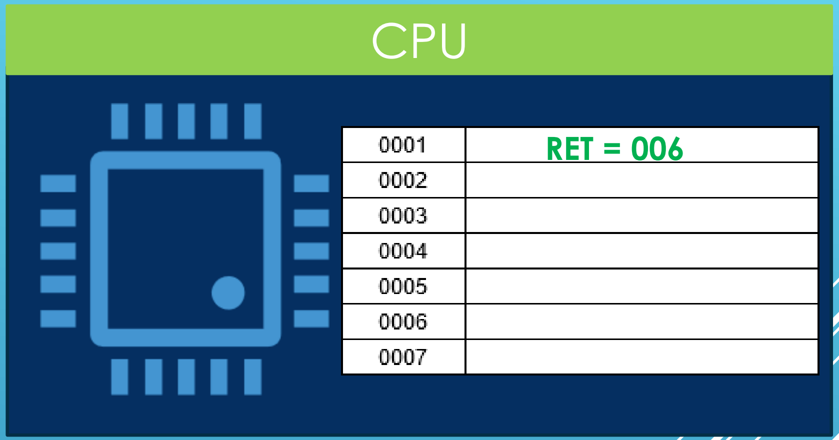
0001	RET = 006
0002	
0003	
0004	
0005	
0006	
0007	

```
Statement1
Statement2
```

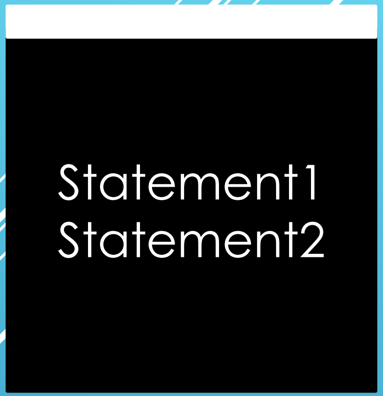
```
a = 10       (int)
b = 5        (int)
c            (int)
print("Statement1")
print("Statement2")
c = f_add(a,b)
print("Statement3")
print("Statement4")
end
```



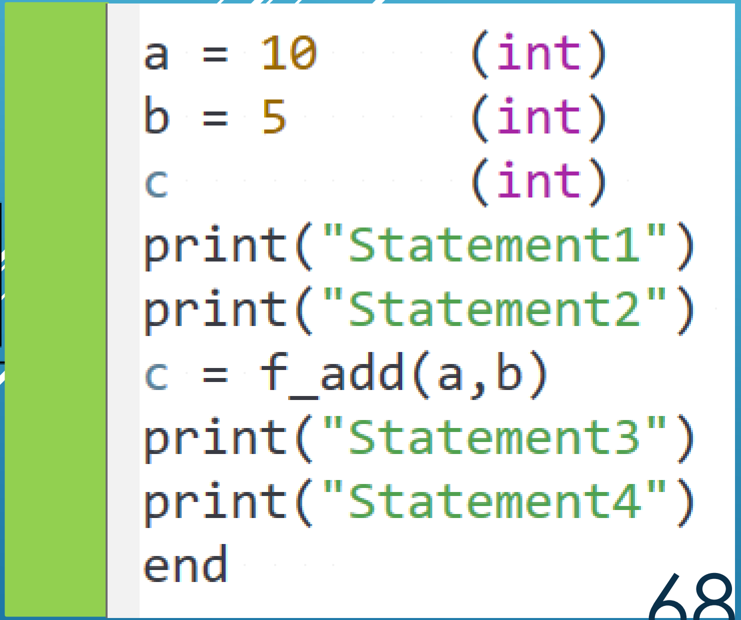
0001	a= 10 (int)
0002	b = 5 (int)
0003	c (int)
0004	print(“Statement1”)
0005	print(“Statement2”)
0006	c = f_add(a,b)
0007	print(“Statement3”)
0008	print(“Statement4”)
0009	end
0010	
…	
…	
0020	10
…	5
	15
…	
0030	10
	5
…	Param1 + param2
…	



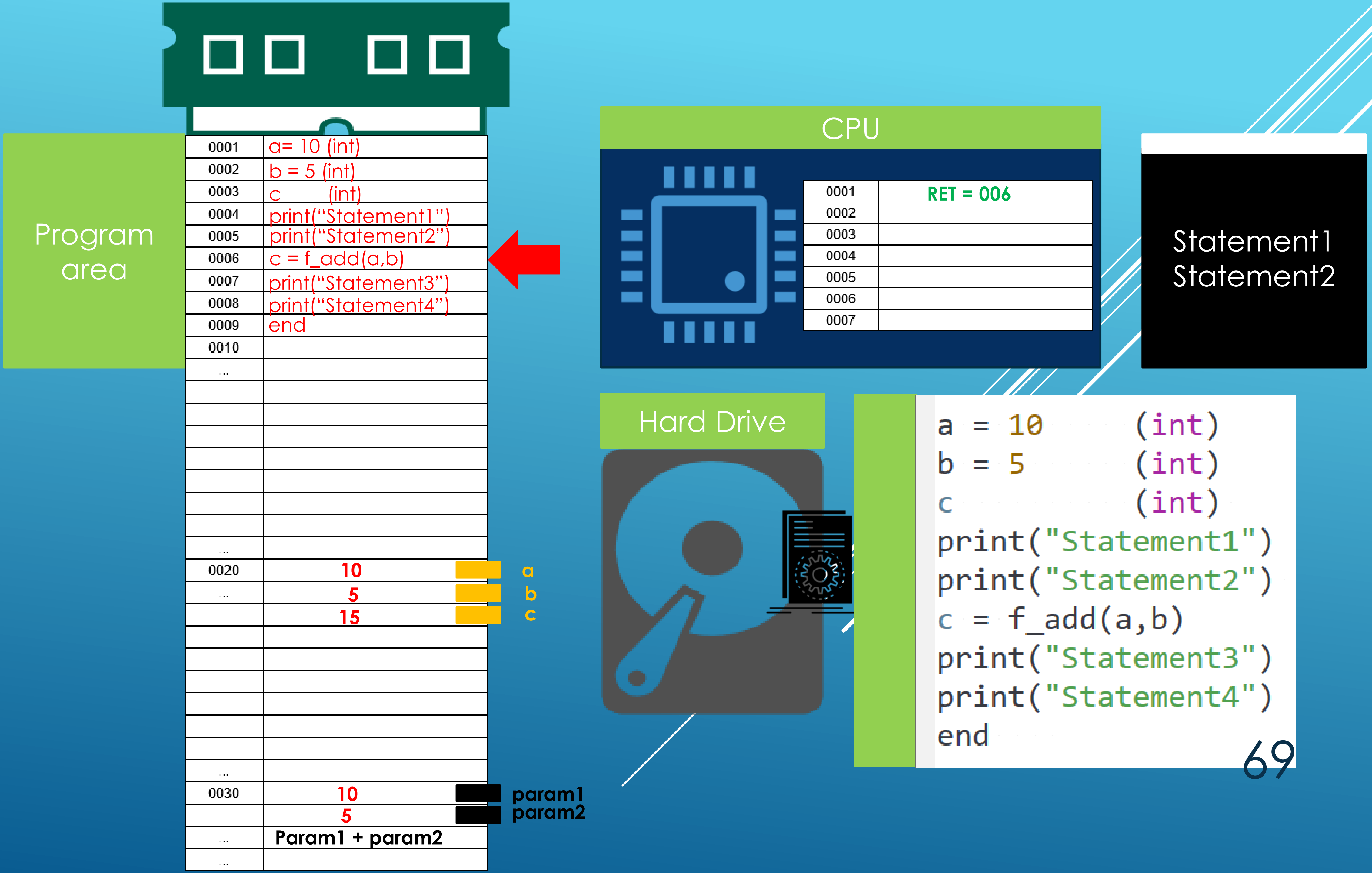
0001	RET = 006
0002	
0003	
0004	
0005	
0006	
0007	



Statement1
Statement2



```
a = 10      (int)
b = 5       (int)
c           (int)
print("Statement1")
print("Statement2")
c = f_add(a,b)
print("Statement3")
print("Statement4")
end
```

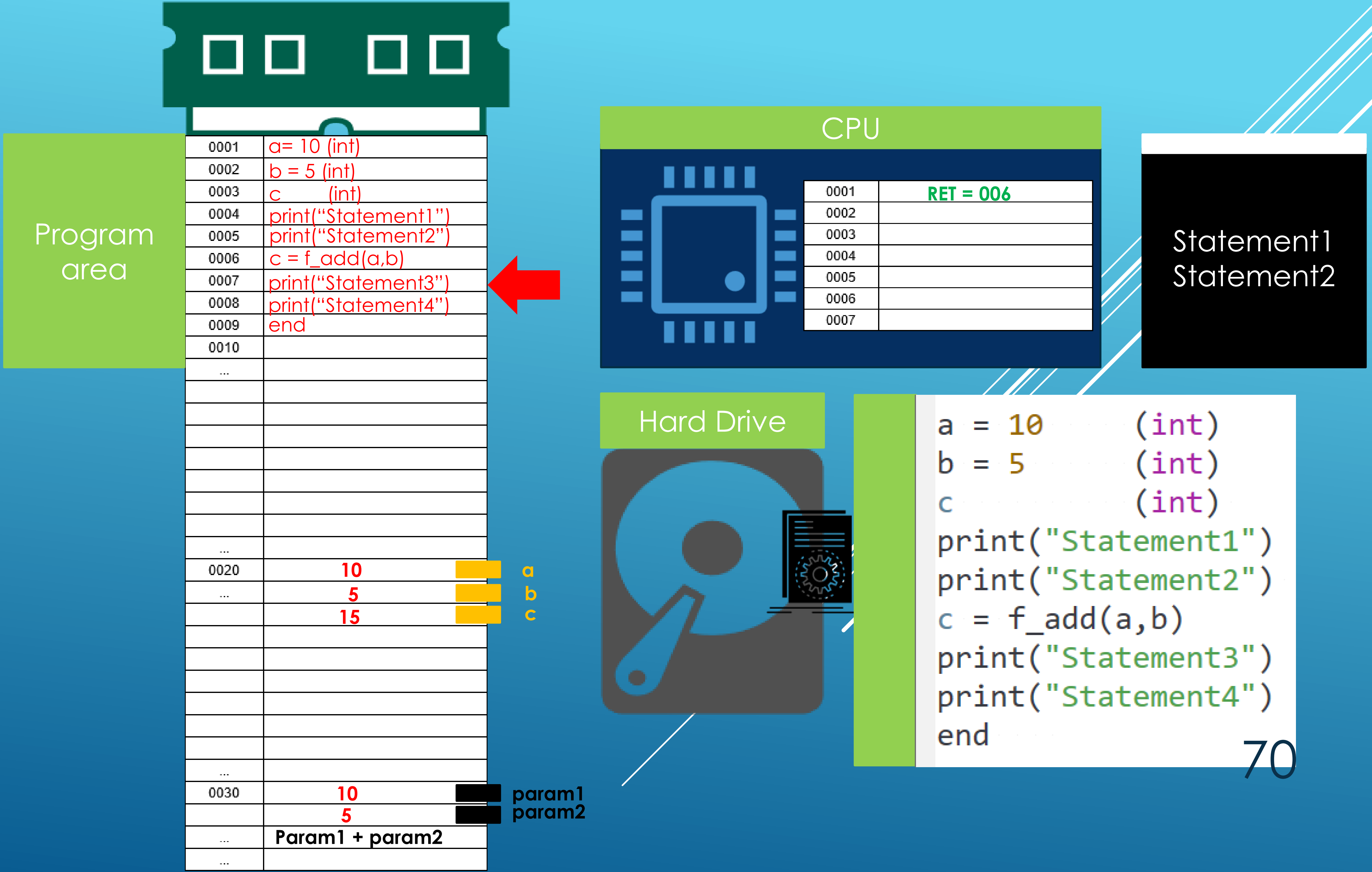


0001	a= 10 (int)	
0002	b = 5 (int)	
0003	c (int)	
0004	print(“Statement1”)	
0005	print(“Statement2”)	
0006	c = f_add(a,b)	
0007	print(“Statement3”)	
0008	print(“Statement4”)	
0009	end	
0010		
…		
…		
0020	10	a
…	5	b
	15	c
…		
0030	10	param1
	5	param2
…	Param1 + param2	
…		

0001	RET = 006
0002	
0003	
0004	
0005	
0006	
0007	

```
Statement1
Statement2
```

```
a = 10      (int)
b = 5       (int)
c           (int)
print("Statement1")
print("Statement2")
c = f_add(a,b)
print("Statement3")
print("Statement4")
end
```

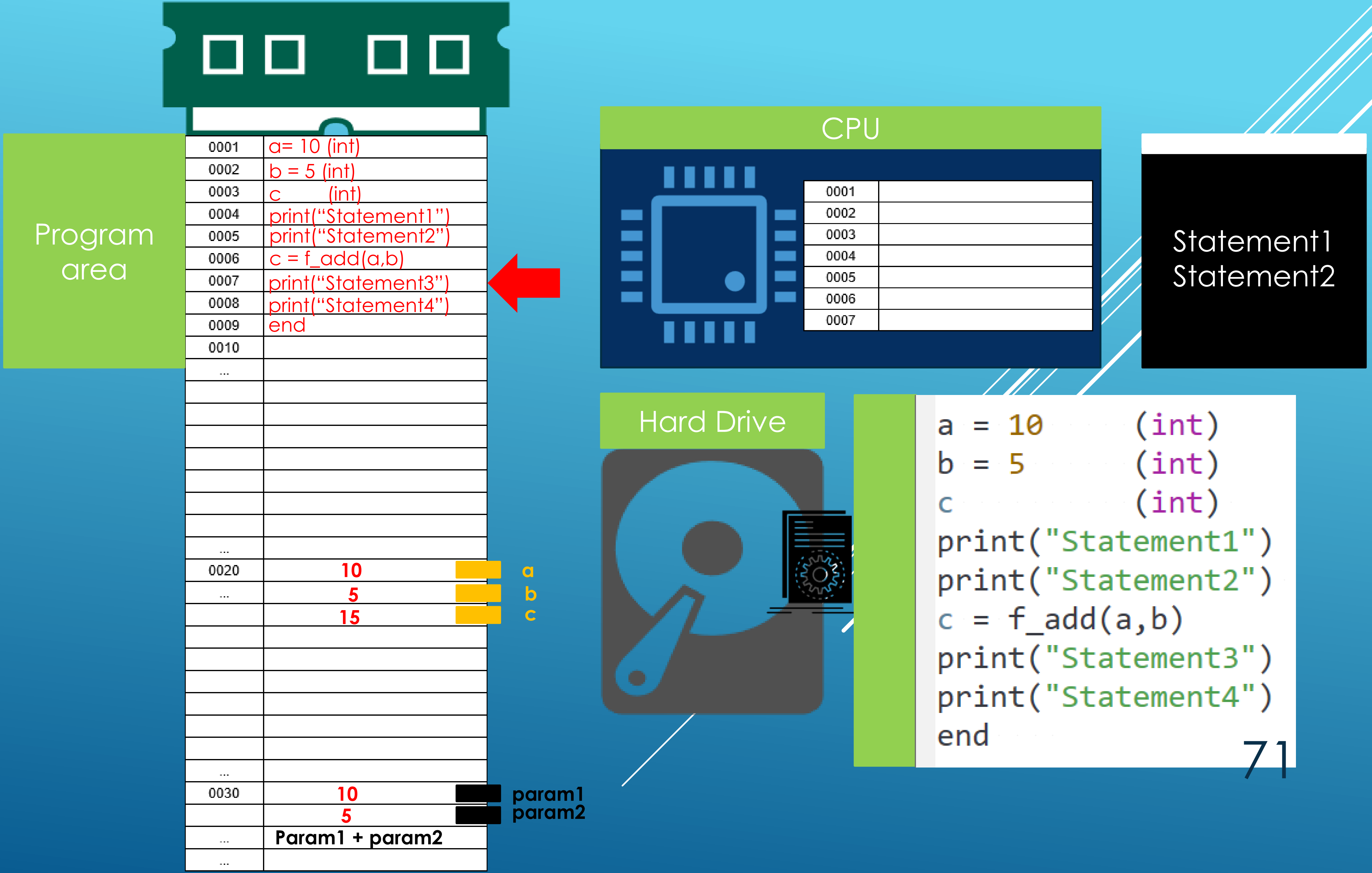


0001	a= 10 (int)
0002	b = 5 (int)
0003	c (int)
0004	print("Statement1")
0005	print("Statement2")
0006	c = f_add(a,b)
0007	print("Statement3")
0008	print("Statement4")
0009	end
0010	
…	
…	
0020	10
…	5
	15
…	
0030	10
	5
…	Param1 + param2
…	

0001	RET = 006
0002	
0003	
0004	
0005	
0006	
0007	

```
Statement1
Statement2
```

```
a = 10      (int)
b = 5       (int)
c           (int)
print("Statement1")
print("Statement2")
c = f_add(a,b)
print("Statement3")
print("Statement4")
end
```

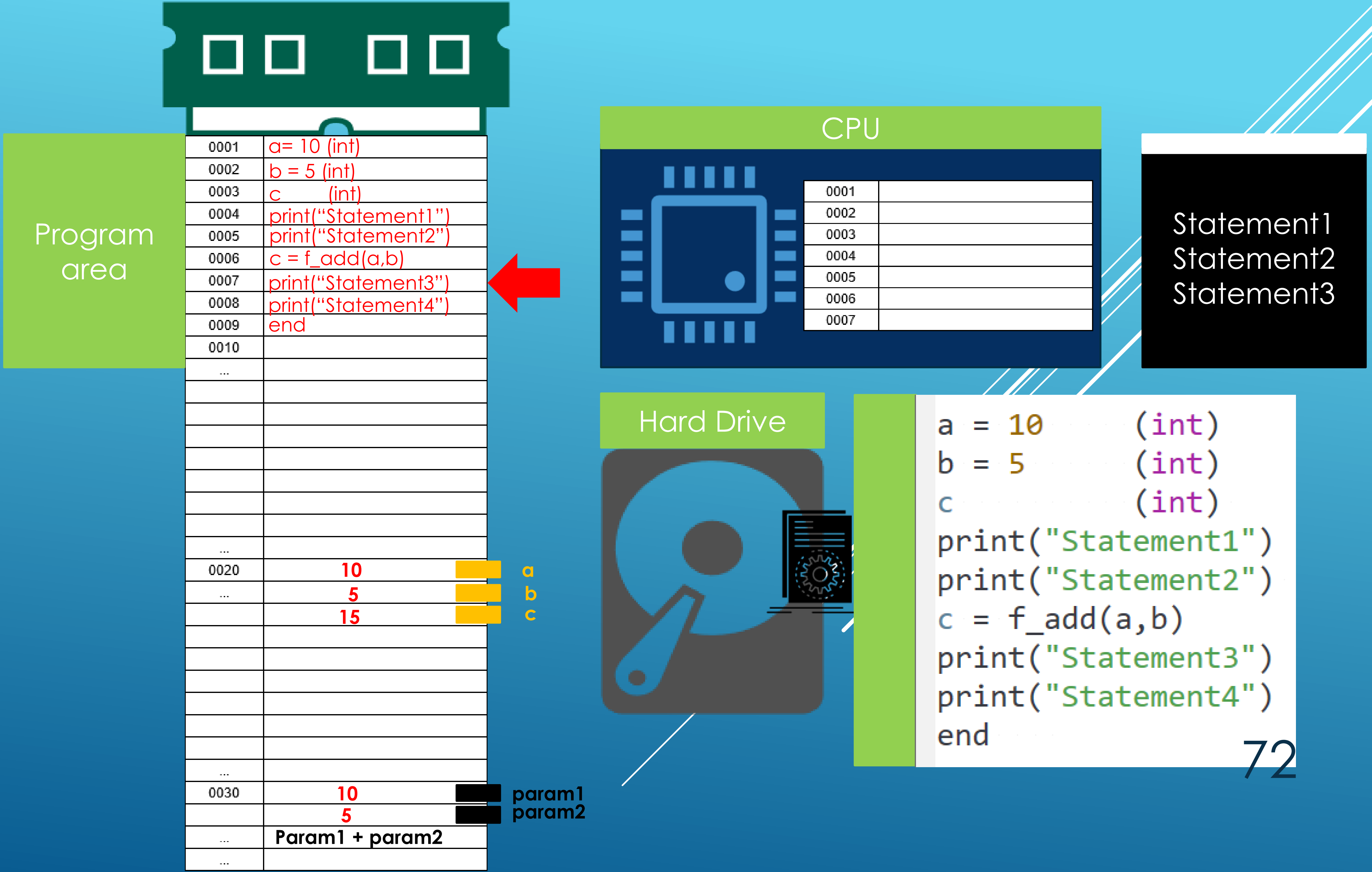


0001	a= 10 (int)	
0002	b = 5 (int)	
0003	c (int)	
0004	print(“Statement1”)	
0005	print(“Statement2”)	
0006	c = f_add(a,b)	
0007	print(“Statement3”)	
0008	print(“Statement4”)	
0009	end	
0010		
…		
…		
0020	10	a
…	5	b
	15	c
…		
0030	10	param1
	5	param2
…	Param1 + param2	
…		

0001	
0002	
0003	
0004	
0005	
0006	
0007	

```
Statement1
Statement2
```

```
a = 10      (int)
b = 5       (int)
c           (int)
print("Statement1")
print("Statement2")
c = f_add(a,b)
print("Statement3")
print("Statement4")
end
```

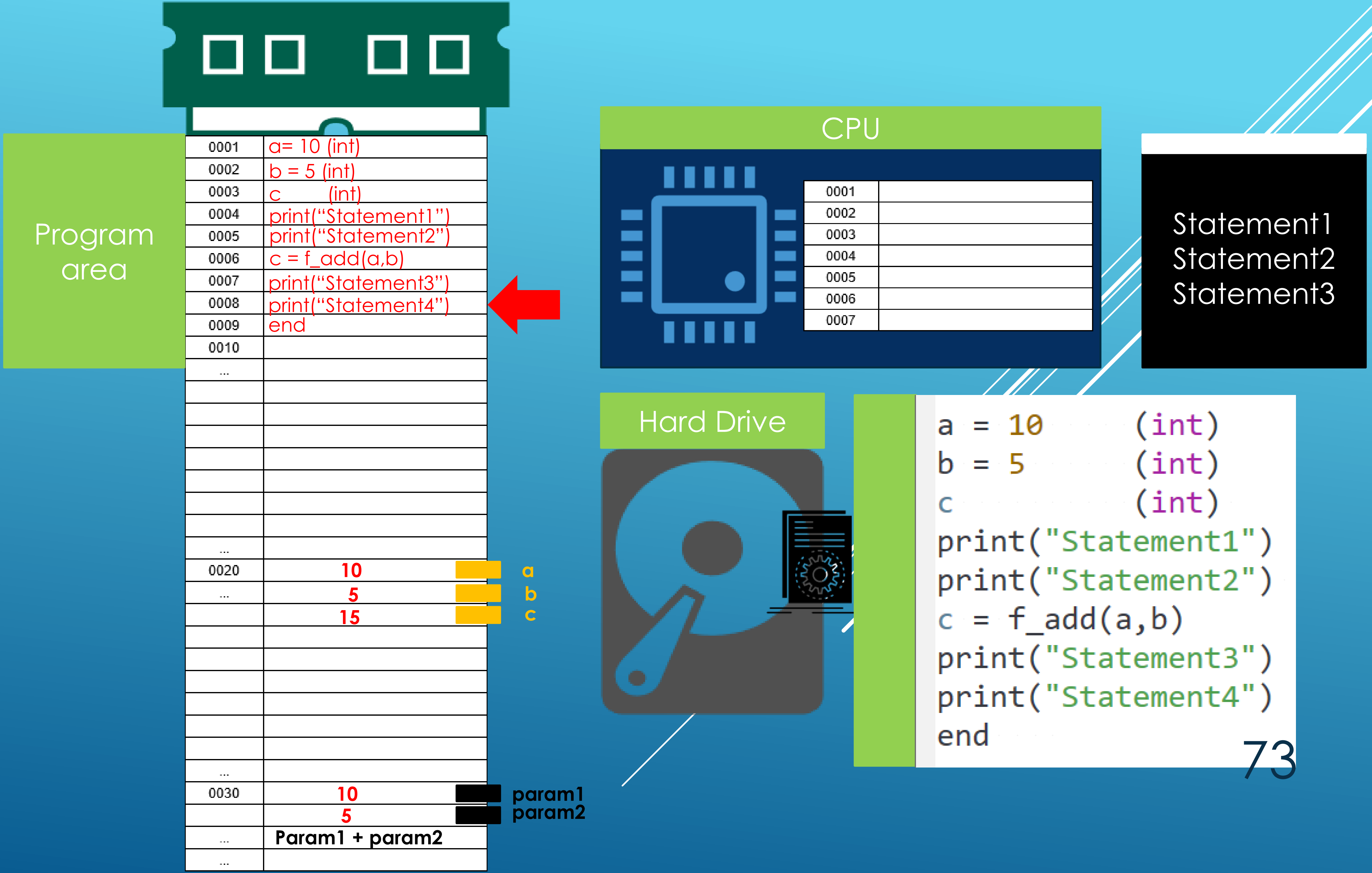


0001	a= 10 (int)	
0002	b = 5 (int)	
0003	c (int)	
0004	print("Statement1")	
0005	print("Statement2")	
0006	c = f_add(a,b)	
0007	print("Statement3")	
0008	print("Statement4")	
0009	end	
0010		
…		
…		
0020	10	a
…	5	b
	15	c
…		
0030	10	param1
	5	param2
…	Param1 + param2	
…		

0001	
0002	
0003	
0004	
0005	
0006	
0007	

```
Statement1
Statement2
Statement3
```

```
a = 10      (int)
b = 5       (int)
c           (int)
print("Statement1")
print("Statement2")
c = f_add(a,b)
print("Statement3")
print("Statement4")
end
```

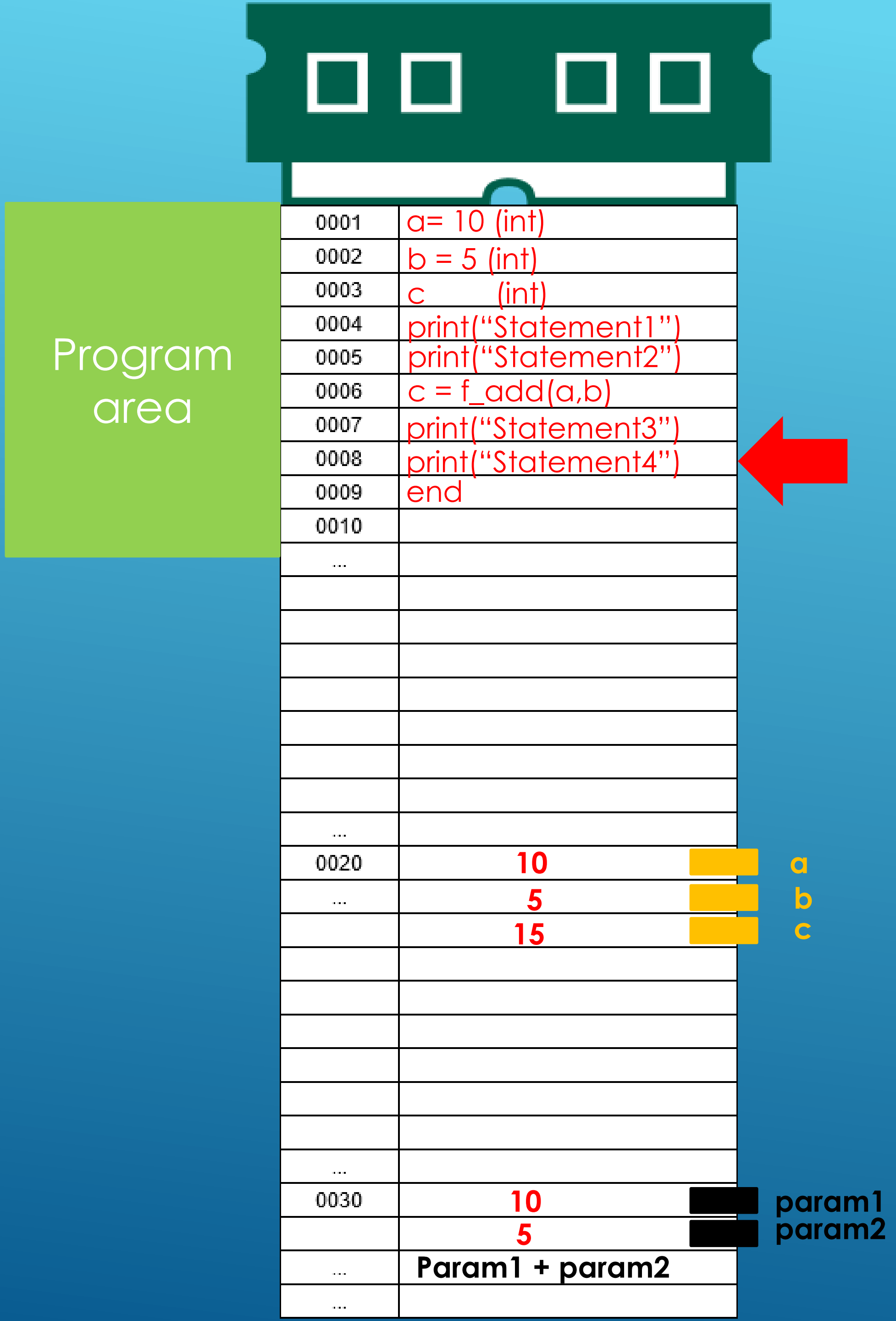


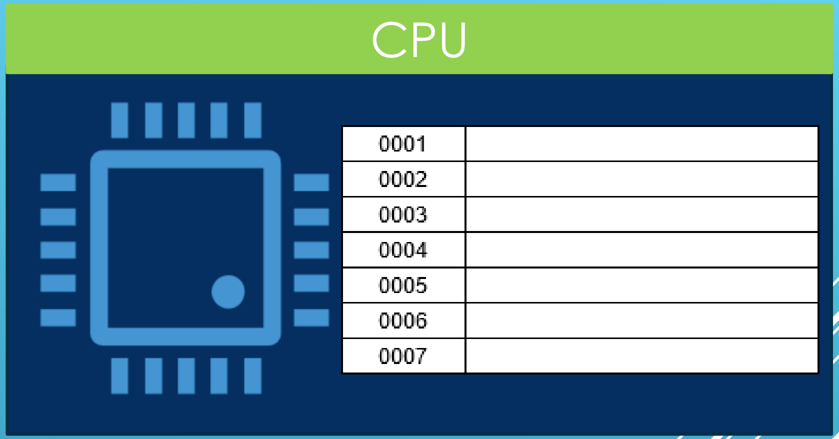
0001	a= 10 (int)	
0002	b = 5 (int)	
0003	c (int)	
0004	print(“Statement1”)	
0005	print(“Statement2”)	
0006	c = f_add(a,b)	
0007	print(“Statement3”)	
0008	print(“Statement4”)	
0009	end	
0010		
…		
…		
0020	10	a
…	5	b
	15	c
…		
0030	10	param1
	5	param2
…	Param1 + param2	
…		

0001	
0002	
0003	
0004	
0005	
0006	
0007	

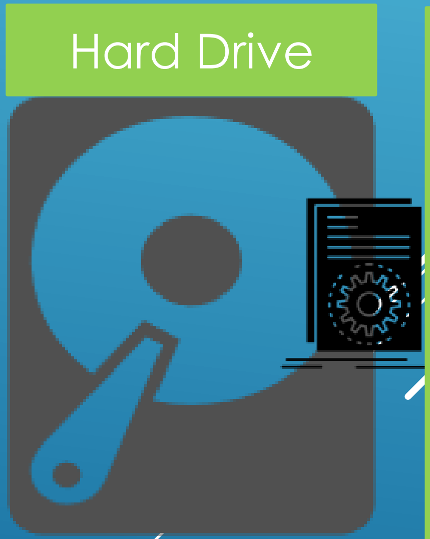
```
Statement1
Statement2
Statement3
```

```
a = 10      (int)
b = 5       (int)
c           (int)
print("Statement1")
print("Statement2")
c = f_add(a,b)
print("Statement3")
print("Statement4")
end
```



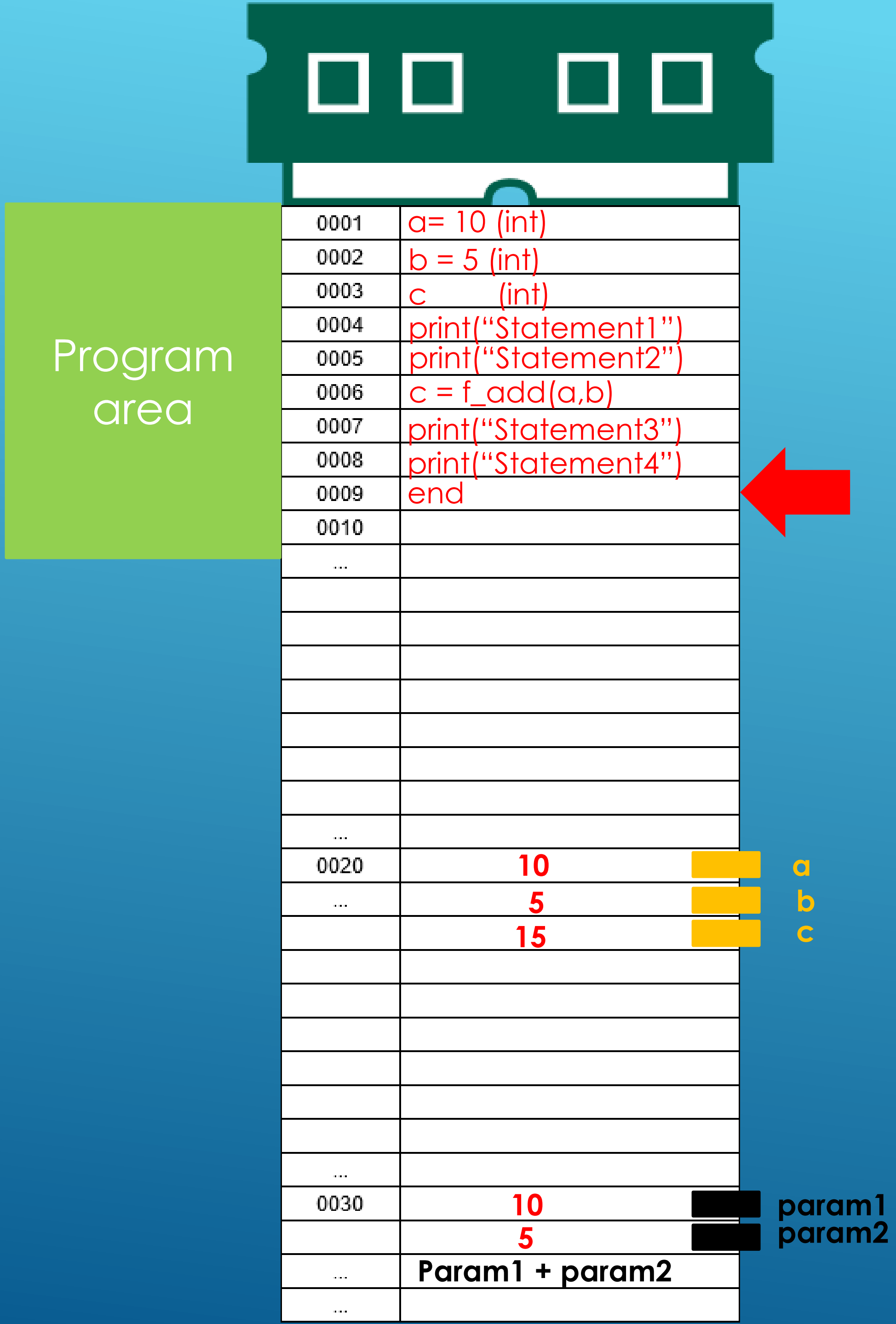


Statement1
Statement2
Statement3
Statement4



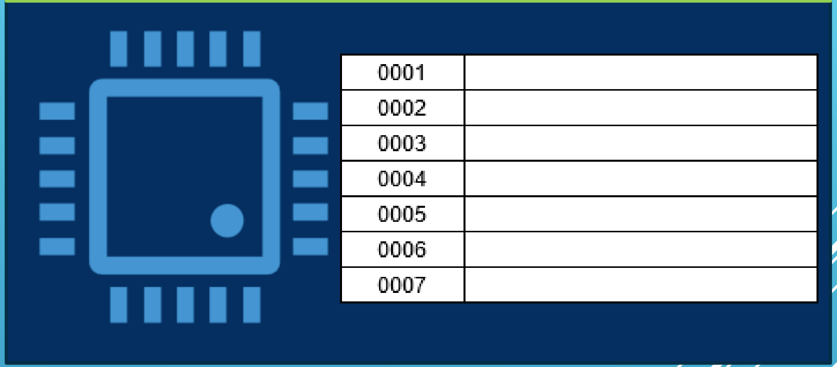
```
a = 10      (int)
b = 5       (int)
c           (int)
print("Statement1")
print("Statement2")
c = f_add(a,b)
print("Statement3")
print("Statement4")
end
```

Program area



0001	a= 10 (int)		
0002	b = 5 (int)		
0003	c (int)		
0004	print(“Statement1”)		
0005	print(“Statement2”)		
0006	c = f_add(a,b)		
0007	print(“Statement3”)		
0008	print(“Statement4”)		
0009	end		
0010			
…			
…			
0020	10	🟨	a
…	5	🟨	b
	15	🟨	c
…			
0030	10	⬛	param1
	5	⬛	param2
…	Param1 + param2		
…			

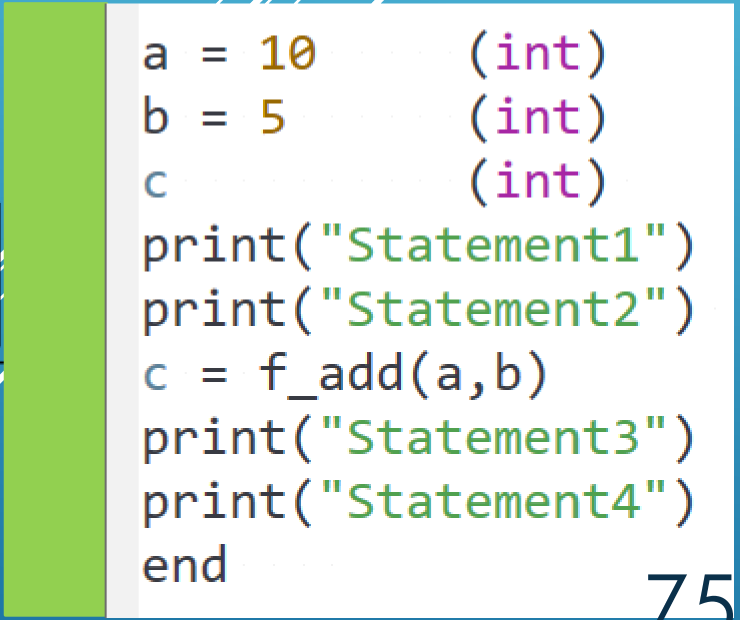
CPU



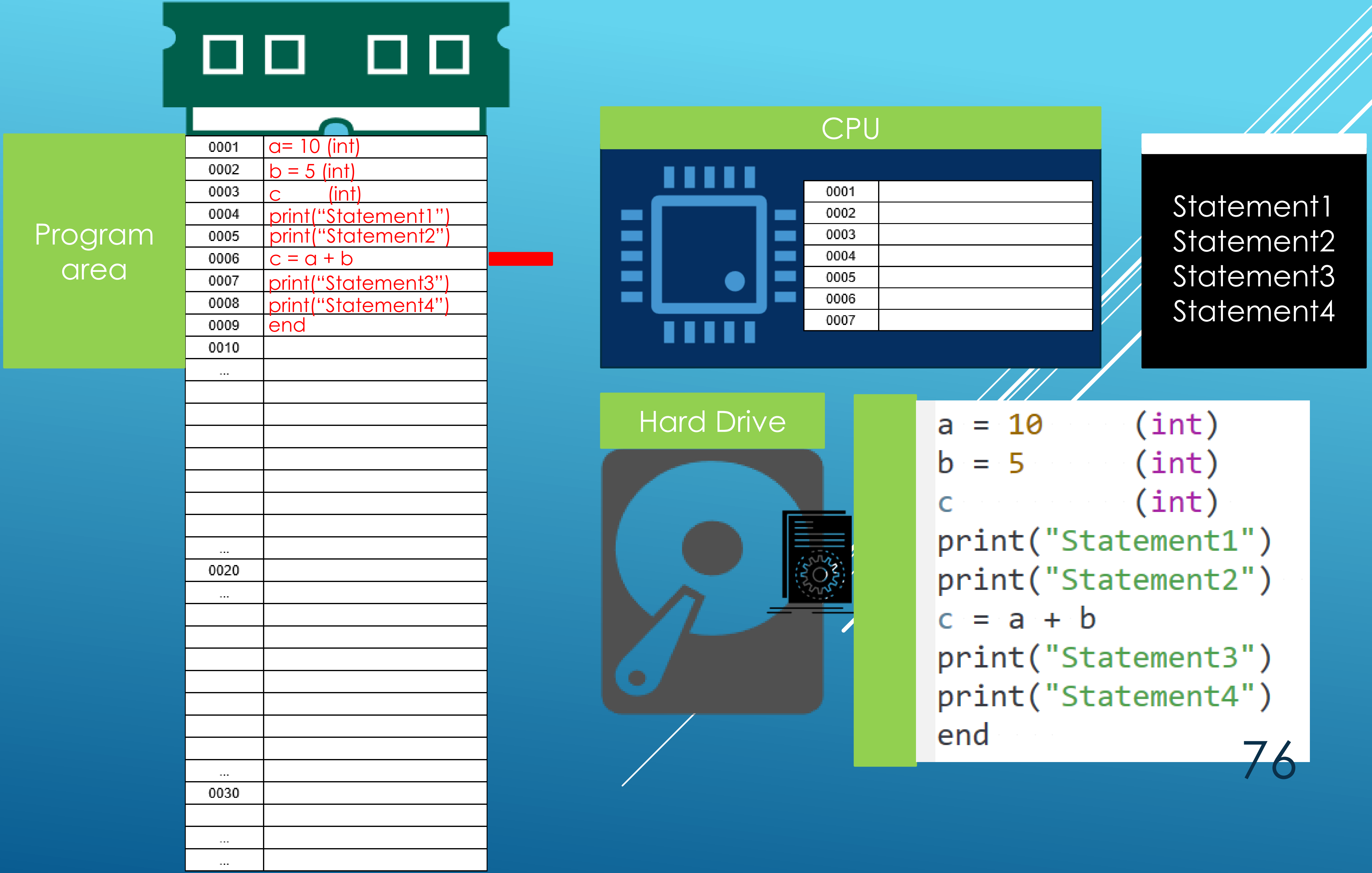
0001	
0002	
0003	
0004	
0005	
0006	
0007	

```
Statement1
Statement2
Statement3
Statement4
```

Hard Drive



```
a = 10       (int)
b = 5        (int)
c            (int)
print("Statement1")
print("Statement2")
c = f_add(a,b)
print("Statement3")
print("Statement4")
end
```



0001	a= 10 (int)
0002	b = 5 (int)
0003	c (int)
0004	print(“Statement1”)
0005	print(“Statement2”)
0006	c = a + b
0007	print(“Statement3”)
0008	print(“Statement4”)
0009	end
0010	
…	
…	
0020	
…	
…	
0030	
…	
…	

0001	
0002	
0003	
0004	
0005	
0006	
0007	

```
Statement1
Statement2
Statement3
Statement4
```

```
a = 10        (int)
b = 5         (int)
c             (int)
print("Statement1")
print("Statement2")
c = a + b
print("Statement3")
print("Statement4")
end
```

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C++ core language Vs Standard library Vs STL

Core features

Standard library

STL

First Steps

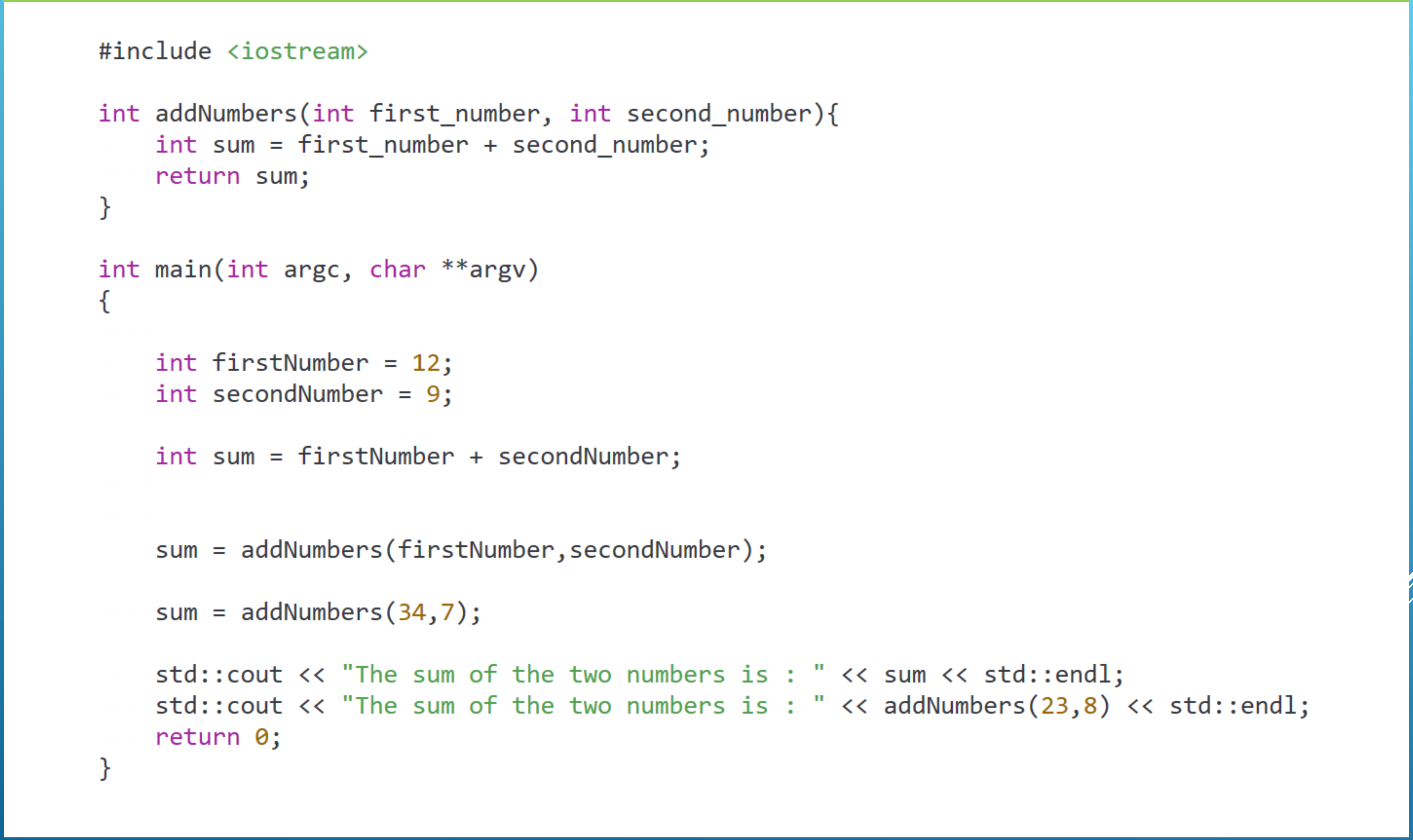
Project template

First C++ Program

Comments

Errors

Statements and functions



```cpp
#include <iostream>

int addNumbers(int first_number, int second_number){
    int sum = first_number + second_number;
    return sum;
}

int main(int argc, char **argv)
{

    int firstNumber = 12;
    int secondNumber = 9;

    int sum = firstNumber + secondNumber;


    sum = addNumbers(firstNumber,secondNumber);

    sum = addNumbers(34,7);

    std::cout << "The sum of the two numbers is : " << sum << std::endl;
    std::cout << "The sum of the two numbers is : " << addNumbers(23,8) << std::endl;
    return 0;
}
```

Data input and output

Execution Model

Core language Vs Standard Library Vs STL

Core features

Standard library

STL

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