



UNIVERSITÀ
DELLA CALABRIA

DIPARTIMENTO DI **MATEMATICA
E INFORMATICA**

Programmazione ad Oggetti

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```
int a = 5;  
cout << a << endl;  
cout << &a << endl;
```

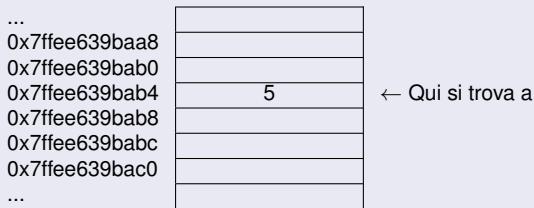
Memoria:

...	
0x7ffee639baa8	
0x7ffee639bab0	
0x7ffee639bab4	
0x7ffee639bab8	
0x7ffee639bab8	
0x7ffee639babc	
0x7ffee639bac0	
...	

Attenzione: gli indirizzi usati non vanno interpretati come reali ma come astrazione per comprendere l'uso dei puntatori.

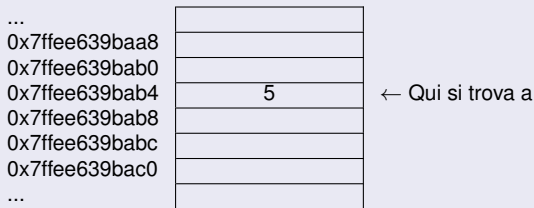
```
int a = 5; //Scrive il valore di a all'indirizzo 0x7ffee639bab4
cout << a << endl;
cout << &a << endl;
```

Memoria:



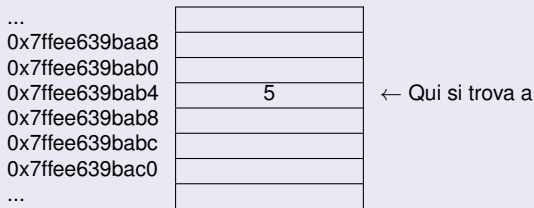
```
int a = 5; //Scrive il valore 5 all'indirizzo 0x7ffee639bab4
cout << a << endl; //Stampa 5
cout << &a << endl;
```

Memoria:



```
int a = 5; //Scrive il valore 5 all'indirizzo 0x7ffee639bab4
cout << a << endl; //Stampa 5
cout << &a << endl; //Stampa 0x7ffee639bab4
```

Memoria:



```
int b[5] = {1,2,3,4,5};  
cout << b << endl;  
cout << &b << endl;  
  
for(int i = 0; i < 5; i++)  
    cout << b[i] << endl;  
  
for(int i = 0; i < 5; i++)  
    cout << &b[i] << endl;
```

Memoria:

...	
0x7ffee639baa8	
0x7ffee639bab0	
0x7ffee639bab4	
0x7ffee639bab8	
0x7ffee639babc	
0x7ffee639bac0	
...	

```
int b[5] = {1,2,3,4,5}; //Scrive i valori
cout << b << endl;
cout << &b << endl;

for(int i = 0; i < 5; i++)
    cout << b[i] << endl;

for(int i = 0; i < 5; i++)
    cout << &b[i] << endl;
```

Memoria:

...		
0x7ffee639baa8	1	← Da qui parte b
0x7ffee639bab0	2	
0x7ffee639bab4	3	
0x7ffee639bab8	4	
0x7ffee639babc	5	
0x7ffee639bac0		
...		

```
int b[5] = {1,2,3,4,5}; //Scrive i valori
cout << b << endl; //Stampa 0x7ffee639baa8
cout << &b << endl; //Stampa 0x7ffee639baa8

for(int i = 0; i < 5; i++)
    cout << b[i] << endl; //Stampa i numeri da 1 a 5

for(int i = 0; i < 5; i++)
    cout << &b[i] << endl; //Stampa da 0x7ffee639baa8 a 0
                             x7ffee639babc
```

Memoria:

...		
0x7ffee639baa8	1	← Da qui parte b
0x7ffee639bab0	2	
0x7ffee639bab4	3	
0x7ffee639bab8	4	
0x7ffee639babc	5	
0x7ffee639bac0		
...		


```
int* b = new int [5];
for(int i = 0; i < 5; i++)
    b[i] = i+1;
cout << b << endl;
cout << &b << endl;

for(int i = 0; i < 5; i++)
    cout << b[i] << endl;

for(int i = 0; i < 5; i++)
    cout << &b[i] << endl;
delete [] b;
```

Memoria:

...	
0x7ffee639baa8	
0x7ffee639bab0	
0x7ffee639bab4	
0x7ffee639bab8	
0x7ffee639babc	
0x7ffee639bac0	
...	
0x7ffee639c2c0	

```
int* b = new int[5]; // Alloca 5 posizioni in memoria
for(int i = 0; i < 5; i++)
    b[i] = i+1;
cout << b << endl;
cout << &b << endl;

for(int i = 0; i < 5; i++)
    cout << b[i] << endl;

for(int i = 0; i < 5; i++)
    cout << &b[i] << endl;
delete [] b;
```

Memoria:

...	
0x7ffee639baa8	Spazio allocato
0x7ffee639bab0	Spazio allocato
0x7ffee639bab4	Spazio allocato
0x7ffee639bab8	Spazio allocato
0x7ffee639babc	Spazio allocato
0x7ffee639bac0	
...	
0x7ffee639c2c0	0x7ffee639baa8 ← qui si trova b

```

int* b = new int[5]; //Alloca 5 posizioni in memoria
for(int i = 0; i < 5; i++)
    b[i] = i+1; //Scrive i valori
cout << b << endl; //Stampa 0x7ffee639baa8
cout << &b << endl; //Stampa 0x7ffee639c2c0

for(int i = 0; i < 5; i++)
    cout << b[i] << endl; //Stampa i numeri da 1 a 5

for(int i = 0; i < 5; i++)
    cout << &b[i] << endl; //Stampa da 0x7ffee639baa8 a 0
                                x7ffee639bab0
delete [] b;

```

Memoria:

...		
0x7ffee639baa8	1	
0x7ffee639bab0	2	
0x7ffee639bab4	3	
0x7ffee639bab8	4	
0x7ffee639babc	5	
0x7ffee639bac0		
...		
0x7ffee639c2c0	0x7ffee639baa8	← qui si trova b

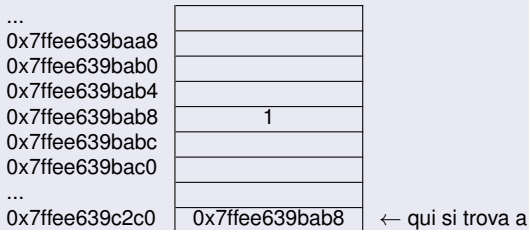
```
int* a = new int(1);  
cout << a << endl;  
cout << &a << endl;  
cout << *a << endl;  
delete a;
```

Memoria:

...	
0x7ffee639baa8	
0x7ffee639bab0	
0x7ffee639bab4	
0x7ffee639bab8	
0x7ffee639babc	
0x7ffee639bac0	
...	
0x7ffee639c2c0	

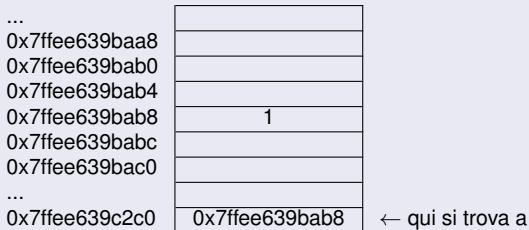
```
int* a = new int(1); //Crea un puntatore ad intero
cout << a << endl;
cout << &a << endl;
cout << *a << endl;
delete a;
```

Memoria:



```
int* a = new int(1); //Crea un puntatore ad intero
cout << a << endl; //Stampa 0x7ffee639bab8
cout << &a << endl; //Stampa 0x7ffee639c2c0
cout << *a << endl; //Stampa 1
delete a;
```

Memoria:



```
int* a = new int(1);  
int* b = new int(2);
```

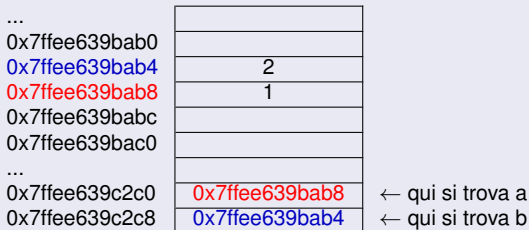
Memoria:

```
...  
0x7ffee639bab0  
0x7ffee639bab4  
0x7ffee639bab8  
0x7ffee639babc  
0x7ffee639bac0  
...  
0x7ffee639c2c0  
0x7ffee639c2c8
```



```
int* a = new int(1);  
int* b = new int(2);
```

Memoria:




```
int* a = new int(1);  
int* b = new int(2);
```

```
int* tmp = a;  
a = b;  
b = tmp;
```

```
delete a;  
delete b;
```

Memoria:

...		
0x7ffee639bab0		
0x7ffee639bab4	2	
0x7ffee639bab8	1	
0x7ffee639bac0		
0x7ffee639bac0		
...		
0x7ffee639c2c0	0x7ffee639bab8	← qui si trova a
0x7ffee639c2c8	0x7ffee639bab4	← qui si trova b

```
int* a = new int(1);  
int* b = new int(2);
```

```
int* tmp = a;  
a = b;  
b = tmp;
```

```
delete a;  
delete b;
```

Memoria:

...		
0x7ffee639bab0		
0x7ffee639bab4	2	
0x7ffee639bab8	1	
0x7ffee639babc		
0x7ffee639bac0		
...		
0x7ffee639c2c0	0x7ffee639bab4	← qui si trova a
0x7ffee639c2c8	0x7ffee639bab8	← qui si trova b

```
int* a = new int(1);  
int* b = new int(2);
```

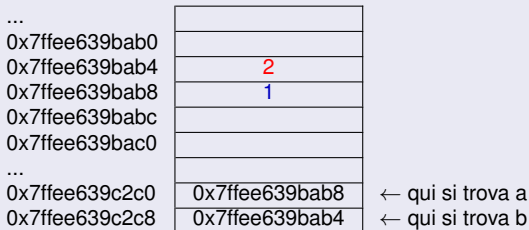
Memoria:

```
...  
0x7ffee639bab0  
0x7ffee639bab4  
0x7ffee639bab8  
0x7ffee639bac  
0x7ffee639bac0  
...  
0x7ffee639c2c0  
0x7ffee639c2c8
```



```
int* a = new int(1);  
int* b = new int(2);
```

Memoria:

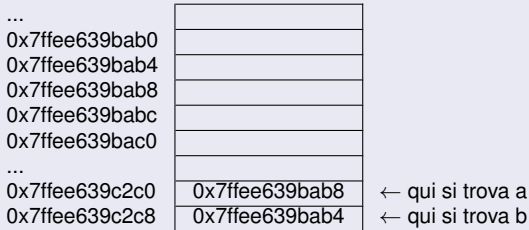


```
int* a = new int(1);  
int* b = new int(2);
```

```
int tmp = *a;  
*a = *b;  
*b = tmp;
```

```
delete a;  
delete b;
```

Memoria:



```
int* a = new int(1);  
int* b = new int(2);
```

```
int tmp = *a;  
*a = *b;  
*b = tmp;
```

```
delete a;  
delete b;
```

Memoria:

...		
0x7ffee639bab0		
0x7ffee639bab4	1	
0x7ffee639bab8	2	
0x7ffee639bac0		
0x7ffee639bac0		
...		
0x7ffee639c2c0	0x7ffee639bab8	← qui si trova a
0x7ffee639c2c8	0x7ffee639bab4	← qui si trova b