Apêndice - Códigos

1 Protótipos

- Protótipo correto: `http://cpp.sh/4sw3`

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

void inc (int &);

int main ()
{
    int a = 2;
    inc(a);
    cout << a << endl;
}

void inc (int & x) { x += 1; }
```

- Protótipo incorreto: `http://cpp.sh/5z2g`

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

void inc ();

int main ()
{
    int a = 2;
    inc(a);
    cout << a << endl;
}

void inc (int & x) { x += 1; }
```

2 Parâmetros *default*

- Protótipos (correto): http://cpp.sh/7pqz6

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

int log_x (int a, int b);

int log_x (int a, int b = 10) {
    if (b == 10) { return log10(a); }
    else if (b == 2) { return log2(a); }
    return log(a);
}

int main ()
{
    int a = log_x(100);
    cout << a << endl;

    a = log_x(8, 2);
    cout << a << endl;
}
```

- Protótipos (incorreto): http://cpp.sh/67btr

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

int log_x (int a, int b = 10);

int log_x (int a, int b = 10) {
    if (b == 10) { return log10(a); }
    else if (b == 2) { return log2(a); }
    return log(a);
}

int main ()
{
    int a = log_x(100);
    cout << a << endl;

    a = log_x(8, 2);
    cout << a << endl;
}
```

– Ordem de definição (correto): http://cpp.sh/77ixy

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

void log_x (int a, int & c, int b);

void log_x (int a, int & c, int b = 10) {
    if (b == 10) { c = log10(a); }
    else if (b == 2) { c = log2(a); }
    c = log(a);
}

int main ()
{
    int a;
    log_x(100, a);
    cout << a << endl;

    log_x(8, a, 2);
    cout << a << endl;
}
```

– Ordem de definição (incorreto): http://cpp.sh/6fx5

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

void log_x (int a, int b, int & c);

void log_x (int a, int b = 10, int & c) {
    if (b == 10) { c = log10(a); }
    else if (b == 2) { c = log2(a); }
    c = log(a);
}

int main ()
{
    int a;
    log_x(100, a);
    cout << a << endl;

    log_x(8, 2, a);
    cout << a << endl;
}
```

- Múltiplos parâmetros *default* (correto): http://cpp.sh/6dbl

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

int f_linear (int x, int a, int b);

int f_linear (int x, int a = 3, int b = 5) {
    return a * x + b;
}

int main ()
{
    cout << "f(x)␣=␣ax␣+␣b" << endl;

    cout << "a␣=␣3,␣b␣=␣5" << endl;
    cout << "\tf(x)␣=␣3x␣+␣5,␣f(10)␣=␣" << f_linear(10) << endl;

    cout << "a␣=␣3,␣b␣=␣7" << endl;
    cout << "\tf(x)␣=␣3x␣+␣7,␣f(10)␣=␣" << f_linear(10, 3, 7) << endl;
}
```

- Múltiplos parâmetros *default* (incorreto): http://cpp.sh/64ncv

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

int f_linear (int x, int a, int b);

int f_linear (int x, int a = 3, int b = 5) {
    return a * x + b;
}

int main ()
{
    cout << "f(x)␣=␣ax␣+␣b" << endl;

    cout << "a␣=␣3,␣b␣=␣5" << endl;
    cout << "\tf(x)␣=␣3x␣+␣5,␣f(10)␣=␣" << f_linear(10) << endl;

    cout << "a␣=␣3,␣b␣=␣7" << endl;
    cout << "\tf(x)␣=␣3x␣+␣7,␣f(10)␣=␣" << f_linear(10, 7) << endl;
}
```

3 Ponteiros

- Como funções independentes: `http://cpp.sh/35dj`

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

void inc (int &);
void dec (int &);

int main ()
{
    int a = 2;
    cout << a << endl;

    void (*funcao)(int&) = &inc;
    funcao(a);
    cout << a << endl;

    funcao = &dec;
    funcao(a);
    cout << a << endl;
}

void inc (int & x) { x += 1; }
void dec (int & x) { x -= 1; }
```

- Como parâmetro: `http://cpp.sh/4qays`

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

void inc (int &);
void dec (int &);
void apply (int & x, void (*f)(int&)) { f(x); }

int main ()
{
    int a = 2;
    cout << a << endl;

    apply(a, &inc);
    cout << a << endl;

    apply(a, &dec);
    cout << a << endl;
}

void inc (int & x) { x += 1; }
void dec (int & x) { x -= 1; }
```

- Com parâmetros default (incorreto): `http://cpp.sh/2mwhj`

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

int log_x (int a, int b);

int log_x (int a, int b = 10) {
    if (b == 10) { return log10(a); }
    else if (b == 2) { return log2(a); }
    return log(a);
}

int main ()
{
    int (*l)(int, int) = &log_x;

    int a = l(100);
    cout << a << endl;

    a = l(8, 2);
    cout << a << endl;

}
```

- Com parâmetros default (correto): `http://cpp.sh/46vfk`

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

int log_x (int a, int b);

int log_x (int a, int b = 10) {
    if (b == 10) { return log10(a); }
    else if (b == 2) { return log2(a); }
    return log(a);
}

int main ()
{
    int (*l)(int, int) = &log_x;

    int a = l(100, 10);
    cout << a << endl;

    a = l(8, 2);
    cout << a << endl;
}
```

4 Sobrecarga

- Argumentos (correto): http://cpp.sh/6xci

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

int soma (int a, int b);
int soma (int a, int b, int & c);

int main ()
{
    int a = soma(2, 3);
    cout << a << endl;

    soma(4, 5, a);
    cout << a << endl;

}

int soma (int a, int b) { return a + b; }
int soma (int a, int b, int & c) { c = a + b; return c; }
```

- Argumentos (incorreto): http://cpp.sh/32ptb

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

int soma (int a, int b);
int soma (int a, int c);

int main ()
{
    int a = soma(2, 3);
    cout << a << endl;

    soma(4, 5);
    cout << a << endl;

}

int soma (int a, int b) { return a + b; }
int soma (int a, int c) { return a + c; }
```

- Argumentos *default* (correto): http://cpp.sh/6jr7y

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

int soma (int a, int b);
void soma (int a, int * c, int b);

int soma (int a, int b = 3) { return a + b; }
void soma (int a, int * c, int b = 5) { *c = a + b; }

int main ()
{
    int a = soma(2);
    cout << a << endl;

    soma(2, &a);
    cout << a << endl;

}
```

- Argumentos *default* (incorreto): http://cpp.sh/6penp

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

int soma (int a, int b);
void soma (int a, int b);

int soma (int a, int b = 3) { return a + b; }
int soma (int a, int b = 5) { return a + b; }

int main ()
{
    int a = soma(2);
    cout << a << endl;

    soma(2);
    cout << a << endl;

}
```

- Tipo de retorno (correto): http://cpp.sh/6c77

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

int soma (int a, int b);
void soma (int a, int b, int & c);

int main ()
{
    int a = soma(2, 3);
    cout << a << endl;

    soma(4, 5, a);
    cout << a << endl;

}

int soma (int a, int b) { return a + b; }
void soma (int a, int b, int & c) { c = a + b; }
```

- Tipo de retorno (incorreto): http://cpp.sh/8ix2s

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

int soma (int a, int b, int & c);
void soma (int a, int b, int & c);

int main ()
{
    int a = soma(2, 3);
    cout << a << endl;

    soma(4, 5, a);
    cout << a << endl;

}

int soma (int a, int b, int & c) { c = a + b; return c; }
void soma (int a, int b, int & c) { c = a + b; }
```