



INSTITUTO TECNOLÓGICO DE AERONÁUTICA

## **CES-29**

Engenharia de Software

### **Tema 3: Código Fonte**

#### **Grupo (COMP19):**

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# 1) Organização do código

Para organizar e melhorar o processo de desenvolvimento de software, facilitar a manutenção e reduzir os custos, e consequentemente aprimorar a qualidade do produto final, dividiu-se o código em pastas e subpastas organizadas da forma abaixo:

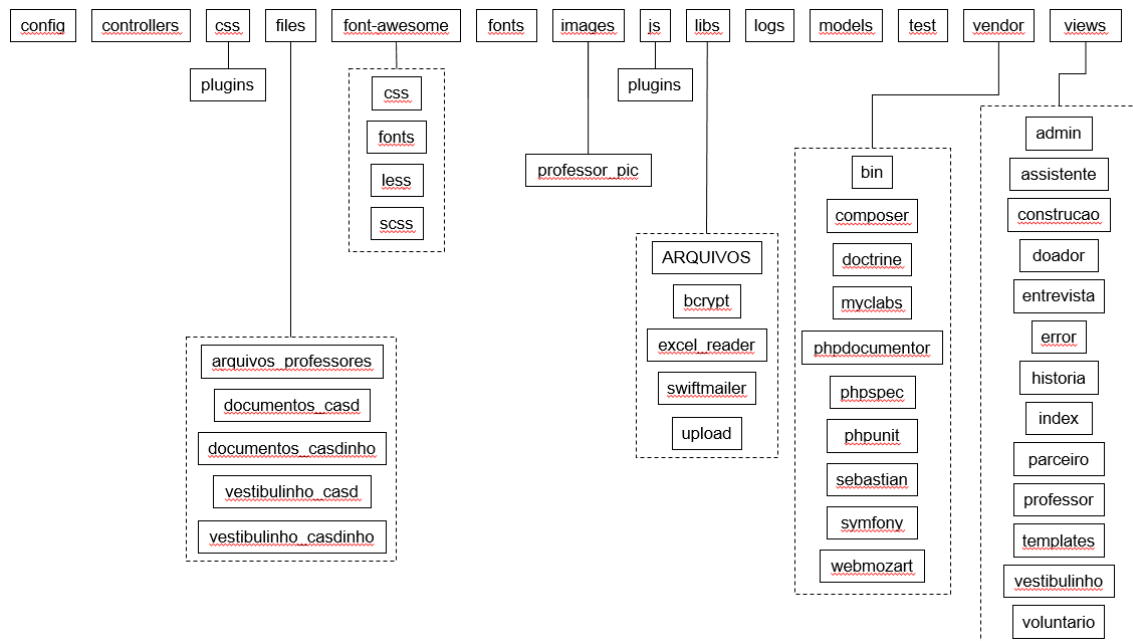


Figura 1 - Divisão de pastas

## 2) Padrões Utilizados

Os designs patterns ajudam os desenvolvedores a manterem um padrão de qualidade em suas criações tornando o processo de criação mais regular e organizado. Com o MVP o desenvolvimento de aplicações voltadas à interface com o usuário pode se beneficiar das vantagens de se separar lógica da apresentação e adicionar um terceiro elemento que torna possível reaproveitar as regras usadas para compor a apresentação dos dados em tipos de projetos distintos.

### Model View Presenter, o padrão utilizado

Uma preocupação constante dos desenvolvedores é reaproveitar o código. Com o surgimento de novas plataformas para suas aplicações como as executadas em browsers e em dispositivos móveis – torna-se muito difícil reusar as regras para apresentação dos dados em cada tipo de interface.

O MVP foi uma das propostas iniciais para promover a separação entre as camadas de apresentação, dados e regras de negócio sendo seguido por outros.

MVP se baseia em três elementos, Model, para a definição da estrutura e comportamento dos dados e eventuais regras aplicadas nestes View – que faz a apresentação dos dados e Presenter – que serve como intermediário entre os dois elementos, estabelecendo alguns padrões para apresentação destes.

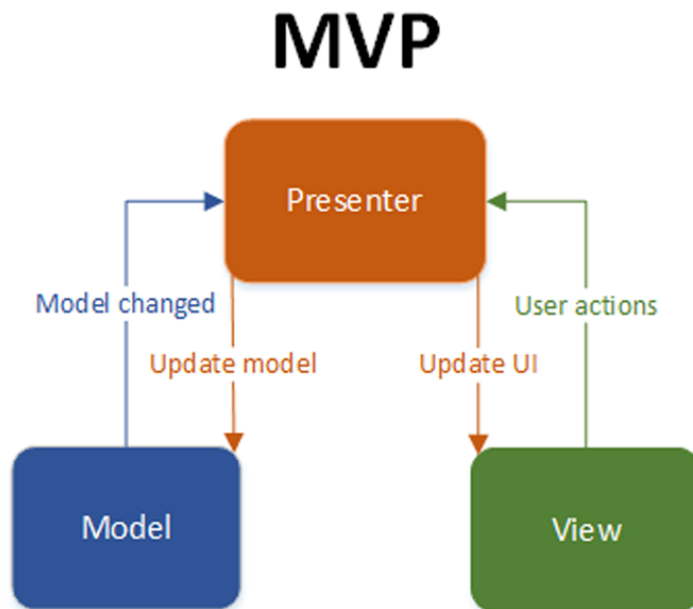


Figura 2 - Diagrama do padrão MVP

Com este design pattern o desenvolvedor deve ser capaz de criar uma aplicação que possa ter tipos de interface distintos como aplicações Windows Forms ou Web.

Uma das principais características é a divisão de parte da responsabilidade de compor a apresentação entre o Presenter e a View através do uso de interfaces. Desta forma, a View pode adaptar as definições do Presenter as suas características.

Não é só de flexibilidade e possibilidade de portar as aplicações para outras plataformas que vive o MVP. Há outras vantagens, por exemplo, aumentar a possibilidade de se executar testes automatizados.

Antes de adotar um design pattern algumas considerações precisam ser feitas como o aumento significativo do tempo de desenvolvimento e dos passos necessários para se ter a aplicação funcionando. Estas considerações serão abordadas juntamente com um exemplo prático demonstrando o uso do MVP em uma aplicação.

### 3) Ferramenta de análise de código

A análise estática de código é uma das práticas que verifica a qualidade do código-fonte. Esta verificação é realizada antes mesmo que haja execução do software.

Dessa forma, para analisar a qualidade do código, utilizou-se como ferramenta o PHP Code Sniffer, cuja finalidade é analisar os padrões presentes, auxiliando na qualidade do código produzido.

Tal ferramenta foi escolhida pelo grupo por ser bastante intuitiva, com a análise estática bem detalhada e clara, como se pode ver na seção adiante, além de apresentar sua instalação e execução bem documentada.

Como saída resultante ao se inserir o arquivo contendo o código a ser analisado, o PHP Code Sniffer apresenta a quantidade de erros encontrados, a linha onde o erro se encontra, a mensagem de ERROR ou WARNING, a descrição do erro encontrado, o tempo decorrido da análise e o total da memória utilizada.

Para a instalação da ferramenta no ambiente Linux, deve-se digitar no terminal o seguinte comando:

```
pear install PHP_CodeSniffer
```

A utilização básica também se dá de forma simples. No terminal Linux, deve-se navegar até a pasta do projeto PHP e executar o seguinte comando:

```
# phpcs
```

Ou ainda, pode-se colocar o caminho completo:

```
# phpcs /var/www/projeto/
```

Na seção seguinte, é apresentada a análise estática do código empregando a ferramenta descrita.

## 4) Análise estática do código

A análise estática do código é mostrada a seguir.

Em primeiro lugar, é referenciada a análise do arquivo principal index.php:

```
FILE: /home/talize/Área de Trabalho/ces-29-casd-vest-master/index.php
-----
FOUND 8 ERRORS AFFECTING 5 LINES
-----
 2 | ERROR | [ ] Missing file doc comment
10 | ERROR | [ ] Expected "if (...) {\n"; found "if(...){\n"
10 | ERROR | [x] There must be a single space between the closing parenthesis
   |       |    and the opening brace of a multi-line IF statement; found 0
   |       |    spaces
11 | ERROR | [x] Spaces must be used to indent lines; tabs are not allowed
11 | ERROR | [x] Line indented incorrectly; expected at least 4 spaces, found
   |       |    1
12 | ERROR | [ ] Expected "} else {\n"; found "}else{\n"
13 | ERROR | [x] Spaces must be used to indent lines; tabs are not allowed
13 | ERROR | [x] Line indented incorrectly; expected at least 4 spaces, found
   |       |    1
-----
PHPCBF CAN FIX THE 5 MARKED SNIFF VIOLATIONS AUTOMATICALLY
-----

Time: 394ms; Memory: 4Mb
```

Em segundo lugar, é referenciada a análise do Model.php:

```
FILE: /home/talize/Área de Trabalho/ces-29-casd-vest-master/libs/Model.php
-----
FOUND 30 ERRORS AND 1 WARNING AFFECTING 20 LINES
-----
 2 | ERROR   | [ ] Missing file doc comment
 5 | ERROR   | [ ] Missing doc comment for class Model
 7 | ERROR   | [x] Spaces must be used to indent lines; tabs are not allowed
 8 | ERROR   | [x] Spaces must be used to indent lines; tabs are not allowed
 8 | ERROR   | [x] Line indented incorrectly; expected 4 spaces, found 1
 8 | ERROR   | [ ] Missing doc comment for function __construct()
 9 | ERROR   | [x] Spaces must be used to indent lines; tabs are not allowed
 9 | ERROR   | [x] Line indented incorrectly; expected at least 4 spaces, found 1
10 | ERROR   | [x] Spaces must be used to indent lines; tabs are not allowed
10 | ERROR   | [x] Line indented incorrectly; expected 4 spaces, found 1
12 | ERROR   | [x] Spaces must be used to indent lines; tabs are not allowed
12 | ERROR   | [x] Line indented incorrectly; expected 4 spaces, found 1
12 | ERROR   | [ ] Missing doc comment for function writeLog()
12 | ERROR   | [x] Opening brace should be on a new line
13 | WARNING | [ ] Line exceeds 85 characters; contains 117 characters
14 | ERROR   | [x] Closing brace indented incorrectly; expected 1 spaces, found 4
16 | ERROR   | [ ] Protected method name "Model::test_input" is not in camel caps format
16 | ERROR   | [ ] Missing doc comment for function test_input()
16 | ERROR   | [x] Opening brace should be on a new line
17 | ERROR   | [x] Line indented incorrectly; expected at least 8 spaces, found 6
18 | ERROR   | [x] Line indented incorrectly; expected at least 8 spaces, found 6
19 | ERROR   | [x] Line indented incorrectly; expected at least 8 spaces, found 6
20 | ERROR   | [x] Line indented incorrectly; expected at least 8 spaces, found 6
21 | ERROR   | [x] Line indented incorrectly; expected at least 8 spaces, found 6
24 | ERROR   | [ ] Protected method name "Model::test_input_login" is not in camel caps format
24 | ERROR   | [ ] Missing doc comment for function test_input_login()
24 | ERROR   | [x] Opening brace should be on a new line
25 | ERROR   | [x] Line indented incorrectly; expected at least 8 spaces, found 6
26 | ERROR   | [x] Line indented incorrectly; expected at least 8 spaces, found 6
27 | ERROR   | [x] Line indented incorrectly; expected at least 8 spaces, found 6
28 | ERROR   | [x] Line indented incorrectly; expected at least 8 spaces, found 6
-----
PHPCBF CAN FIX THE 22 MARKED SNIFF VIOLATIONS AUTOMATICALLY
-----

Time: 88ms; Memory: 4Mb
```

Em terceiro lugar, é referenciada a análise do View.php:

```
talize@talize-VirtualBox:~/Área de Trabalho/ces-29-casd-vest-master/libs$ phpcs View.php
FILE: /home/talize/Área de Trabalho/ces-29-casd-vest-master/libs/View.php
-----
FOUND 81 ERRORS AFFECTING 31 LINES
-----
 2 | ERROR   | [ ] Missing file doc comment
 3 | ERROR   | [ ] Missing doc comment for class View
 5 | ERROR   | [x] Spaces must be used to indent lines; tabs are not allowed
 6 | ERROR   | [x] Spaces must be used to indent lines; tabs are not allowed
 6 | ERROR   | [x] Line indented incorrectly; expected 4 spaces, found 1
 7 | ERROR   | [ ] Missing doc comment for function __construct()
 7 | ERROR   | [x] Spaces must be used to indent lines; tabs are not allowed
 7 | ERROR   | [x] Line indented incorrectly; expected at least 4 spaces, found 1
 8 | ERROR   | [x] Spaces must be used to indent lines; tabs are not allowed
 8 | ERROR   | [x] Line indented incorrectly; expected 4 spaces, found 1
 9 | ERROR   | [x] Spaces must be used to indent lines; tabs are not allowed
10 | ERROR   | [x] Spaces must be used to indent lines; tabs are not allowed
10 | ERROR   | [x] Line indented incorrectly; expected 4 spaces, found 1
10 | ERROR   | [ ] Missing doc comment for function render()
11 | ERROR   | [x] Spaces must be used to indent lines; tabs are not allowed
11 | ERROR   | [x] Line indented incorrectly; expected at least 4 spaces, found 1
12 | ERROR   | [x] Spaces must be used to indent lines; tabs are not allowed
12 | ERROR   | [x] Line indented incorrectly; expected 8 spaces, found 2
12 | ERROR   | [ ] Expected "if (...) {\n"; found "if(...)\n\t{\n"
12 | ERROR   | [x] There must be a single space between the closing parenthesis and the opening brace of a multi-line IF statement; found
    |         | newline
13 | ERROR   | [x] Spaces must be used to indent lines; tabs are not allowed
13 | ERROR   | [x] Line indented incorrectly; expected at least 8 spaces, found 2
14 | ERROR   | [x] Spaces must be used to indent lines; tabs are not allowed
14 | ERROR   | [x] Line indented incorrectly; expected at least 12 spaces, found 3
14 | ERROR   | [x] File is being conditionally included; use "include_once" instead
15 | ERROR   | [x] Spaces must be used to indent lines; tabs are not allowed
15 | ERROR   | [x] Line indented incorrectly; expected at least 12 spaces, found 3
15 | ERROR   | [x] File is being conditionally included; use "include_once" instead
16 | ERROR   | [x] Spaces must be used to indent lines; tabs are not allowed
16 | ERROR   | [x] Line indented incorrectly; expected at least 12 spaces, found 3
16 | ERROR   | [x] File is being conditionally included; use "include_once" instead
17 | ERROR   | [x] Spaces must be used for alignment; tabs are not allowed
17 | ERROR   | [x] Spaces must be used to indent lines; tabs are not allowed
17 | ERROR   | [x] Line indented incorrectly; expected 8 spaces, found 2
-----
```

```

21 | ERROR | [X] Line indented incorrectly; expected at least 12 spaces, found 3
21 | ERROR | [X] File is being conditionally included; use "include_once" instead
22 | ERROR | [X] Spaces must be used to indent lines; tabs are not allowed
22 | ERROR | [X] Line indented incorrectly; expected at least 12 spaces, found 3
22 | ERROR | [X] File is being conditionally included; use "include_once" instead
23 | ERROR | [X] Spaces must be used to indent lines; tabs are not allowed
23 | ERROR | [X] Line indented incorrectly; expected at least 12 spaces, found 3
23 | ERROR | [X] File is being conditionally included; use "include_once" instead
23 | ERROR | [X] Spaces must be used for alignment; tabs are not allowed
24 | ERROR | [X] Spaces must be used to indent lines; tabs are not allowed
24 | ERROR | [X] Line indented incorrectly; expected 8 spaces, found 2
25 | ERROR | [X] Spaces must be used to indent lines; tabs are not allowed
25 | ERROR | [X] Line indented incorrectly; expected 8 spaces, found 2
25 | ERROR | [ ] Expected "}" else {"n"; found "}"\n\t\telse\n\t\tf\n"
26 | ERROR | [X] Spaces must be used to indent lines; tabs are not allowed
26 | ERROR | [X] Line indented incorrectly; expected at least 8 spaces, found 2
27 | ERROR | [X] Spaces must be used to indent lines; tabs are not allowed
27 | ERROR | [X] Line indented incorrectly; expected at least 12 spaces, found 3
27 | ERROR | [X] File is being conditionally included; use "include_once" instead
28 | ERROR | [X] Spaces must be used to indent lines; tabs are not allowed
28 | ERROR | [X] Line indented incorrectly; expected at least 12 spaces, found 3
28 | ERROR | [X] File is being conditionally included; use "include_once" instead
29 | ERROR | [X] Spaces must be used to indent lines; tabs are not allowed
29 | ERROR | [X] Line indented incorrectly; expected at least 12 spaces, found 3
29 | ERROR | [X] File is being conditionally included; use "include_once" instead
30 | ERROR | [X] Spaces must be used to indent lines; tabs are not allowed
30 | ERROR | [X] Line indented incorrectly; expected at least 12 spaces, found 3
30 | ERROR | [X] File is being conditionally included; use "include_once" instead
31 | ERROR | [X] Spaces must be used to indent lines; tabs are not allowed
31 | ERROR | [X] Line indented incorrectly; expected at least 12 spaces, found 3
31 | ERROR | [X] File is being conditionally included; use "include_once" instead
31 | ERROR | [X] Spaces must be used for alignment; tabs are not allowed
32 | ERROR | [X] Spaces must be used to indent lines; tabs are not allowed
32 | ERROR | [X] Line indented incorrectly; expected 8 spaces, found 2
33 | ERROR | [X] Spaces must be used to indent lines; tabs are not allowed
33 | ERROR | [X] Line indented incorrectly; expected 4 spaces, found 1
-----
PHPCBF CAN FIX THE 73 MARKED SNIFF VIOLATIONS AUTOMATICALLY
-----
Time: 84ms; Memory: 4Mb

```

Em quarto lugar, é referenciada a análise do Controller.php:

```

FILE: /home/talze/Área de Trabalho/ces-29-casd-vest-master/lbbs/Controller.php
-----
FOUND 81 ERRORS AND 4 WARNINGS AFFECTING 46 LINES
-----
 2 | ERROR | [ ] Missing file doc comment
 3 | ERROR | [ ] Missing doc comment for class Controller
 5 | ERROR | [X] Spaces must be used to indent lines; tabs are not allowed
 6 | ERROR | [X] Spaces must be used to indent lines; tabs are not allowed
 6 | ERROR | [X] Line indented incorrectly; expected 4 spaces, found 1
 6 | ERROR | [ ] Missing doc comment for function __construct()
 7 | ERROR | [X] Spaces must be used to indent lines; tabs are not allowed
 7 | ERROR | [X] Line indented incorrectly; expected at least 4 spaces, found 1
 8 | ERROR | [X] Spaces must be used to indent lines; tabs are not allowed
 8 | ERROR | [X] Line indented incorrectly; expected at least 8 spaces, found 2
12 | ERROR | [X] Spaces must be used to indent lines; tabs are not allowed
12 | ERROR | [X] Line indented incorrectly; expected 4 spaces, found 1
14 | ERROR | [X] Spaces must be used to indent lines; tabs are not allowed
14 | ERROR | [X] Line indented incorrectly; expected 4 spaces, found 1
14 | ERROR | [ ] Missing doc comment for function loadModel()
15 | ERROR | [X] Spaces must be used to indent lines; tabs are not allowed
15 | ERROR | [X] Line indented incorrectly; expected at least 4 spaces, found 1
16 | ERROR | [X] Spaces must be used to indent lines; tabs are not allowed
16 | ERROR | [X] Line indented incorrectly; expected at least 8 spaces, found 2
18 | ERROR | [X] Spaces must be used to indent lines; tabs are not allowed
18 | ERROR | [X] Line indented incorrectly; expected 8 spaces, found 2
18 | ERROR | [ ] Expected "if (...) {"\n"; found "if(...) \n\t\tf\n"
18 | ERROR | [X] There must be a single space between the closing parenthesis and the opening brace of a multi-line IF statement; found
    newline
19 | ERROR | [X] Spaces must be used to indent lines; tabs are not allowed
19 | ERROR | [X] Line indented incorrectly; expected at least 8 spaces, found 2
20 | ERROR | [X] Spaces must be used to indent lines; tabs are not allowed
20 | ERROR | [X] Line indented incorrectly; expected at least 12 spaces, found 3
20 | ERROR | [X] File is being conditionally included; use "include" instead
22 | ERROR | [X] Spaces must be used to indent lines; tabs are not allowed
22 | ERROR | [X] Line indented incorrectly; expected at least 12 spaces, found 3
23 | ERROR | [X] Spaces must be used to indent lines; tabs are not allowed
23 | ERROR | [X] Line indented incorrectly; expected at least 12 spaces, found 3
24 | ERROR | [X] Spaces must be used to indent lines; tabs are not allowed
24 | ERROR | [X] Line indented incorrectly; expected 8 spaces, found 2
25 | ERROR | [X] Spaces must be used to indent lines; tabs are not allowed

```

```

56 | ERROR | [x] Spaces must be used to indent lines; tabs are not allowed
56 | ERROR | [x] Line indented incorrectly; expected at least 8 spaces, found 5
57 | ERROR | [ ] Expected "if (...) {\n"; found "if(...) {\n"
57 | ERROR | [x] There must be a single space between the closing parenthesis and the opening brace of a multi-line IF statement; found 0
   |       | spaces
58 | ERROR | [x] Spaces must be used to indent lines; tabs are not allowed
58 | ERROR | [x] Line indented incorrectly; expected at least 12 spaces, found 9
63 | ERROR | [ ] Missing doc comment for function tirarAcentos()
63 | ERROR | [x] Opening brace should be on a new line
65 | ERROR | [x] Line indented incorrectly; expected at least 8 spaces, found 4
65 | ERROR | [x] No space found after comma in function call
65 | ERROR | [x] No space found after comma in function call
65 | ERROR | [x] No space found after comma in function call
65 | WARNING | [ ] Line exceeds 85 characters; contains 243 characters
68 | ERROR | [ ] Protected method name "Controller::test_input" is not in camel caps format
68 | ERROR | [ ] Missing doc comment for function test_input()
68 | ERROR | [x] Opening brace should be on a new line
69 | ERROR | [x] Line indented incorrectly; expected at least 8 spaces, found 6
70 | ERROR | [x] Line indented incorrectly; expected at least 8 spaces, found 6
71 | ERROR | [x] Line indented incorrectly; expected at least 8 spaces, found 6
72 | ERROR | [x] Line indented incorrectly; expected at least 8 spaces, found 6
75 | ERROR | [ ] Missing doc comment for function getFilesFromFolder()
79 | ERROR | [x] Line indented incorrectly; expected 12 spaces, found 10
80 | ERROR | [x] Line indented incorrectly; expected at least 16 spaces, found 14
81 | ERROR | [x] Line indented incorrectly; expected 12 spaces, found 10
86 | ERROR | [ ] Missing doc comment for function downloadFile()
103 | ERROR | [ ] Missing doc comment for function uploadFile()
107 | ERROR | [ ] Expected "if (...) {\n"; found "if (...) \n { \n"
107 | ERROR | [x] There must be a single space between the closing parenthesis and the opening brace of a multi-line IF statement; found
   |       | newline
114 | ERROR | [ ] Missing doc comment for function saveImageUpload()
114 | ERROR | [ ] Arguments with default values must be at the end of the argument list
114 | WARNING | [ ] Line exceeds 85 characters; contains 122 characters
114 | ERROR | [x] Opening brace should be on a new line
115 | ERROR | [x] File is being conditionally included; use "include_once" instead
141 | ERROR | [ ] Expected "]" else {\n"; found "}else{\n"
-----
PHPCBF CAN FIX THE 60 MARKED SNIFF VIOLATIONS AUTOMATICALLY
-----

```

Como pode-se perceber pelos resultados acima, a saída que a ferramenta fornece é bastante objetiva e detalhada, o que contribui para a adequada correção e consequentemente para a qualidade do código.