

# list でない array の末尾を探す

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# 自己紹介

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# 配列の末尾挿入

---

```
<?php
```

```
$xs = [1, 2, 3];
```

```
$xs[] = 42;
```

```
assert($xs[3] === 42);
```

# PHP クイズ

---

```
<?php
```

```
$xs = [  
    "a" => 1,  
    "b" => 2,  
    "c" => 3,  
];  
$xs[] = 42;
```

# PHP クイズ

---

```
<?php
```

```
$xs = [  
    "a" => 1,  
    "b" => 2,  
    "c" => 3,  
];  
$xs[] = 42;  
assert($xs[0] === 42);
```

# PHP クイズ

---

```
<?php
```

```
$xs = [  
    0 => 1,  
    1 => 2,  
    3 => 4,  
];  
$xs[] = 42;
```

# PHP クイズ

---

```
<?php
```

```
$xs = [  
    0 => 1,  
    1 => 2,  
    3 => 4,  
];  
$xs[] = 42;  
assert($xs[4] === 42);
```

# PHP クイズ

---

```
<?php
```

```
$xs = [  
    -10 => 1,  
    -7  => 2,  
    -5  => 4,  
];  
$xs[] = 42;
```



# PHP クイズ

---

```
<?php
```

```
$xs = [  
    -10 => 1,  
    -7  => 2,  
    -5  => 4,  
];  
$xs[] = 42;  
assert($xs[-4] === 42);
```

# PHP クイズ

---

```
<?php
```

```
$xs = [];  
$xs[10] = 1;  
$xs[] = 42;  
$xs[5] = 2;  
$xs[] = 57;
```

# PHP クイズ

---

```
<?php
```

```
$xs = [];  
$xs[10] = 1;  
$xs[] = 42;  
$xs[5] = 2;  
$xs[] = 57;  
assert($xs[11] === 42);  
assert($xs[12] === 57);
```

**php-src を読む**

# ZEND\_ASSIGN\_DIM

---

- Zend/zend\_vm\_opcodes.h
  - PHP の VM (virtual machine) の opcode (operation code) 一覧

# ZEND\_ASSIGN\_DIM

---

- Zend/zend\_vm\_opcodes.h
  - PHP の VM (virtual machine) の opcode (operation code) 一覧
- ZEND\_ASSIGN\_DIM
  - 配列への代入 (assign dimensional)

# ZEND\_ASSIGN\_DIM

---

- Zend/zend\_vm\_opcodes.h
  - PHP の VM (virtual machine) の opcode (operation code) 一覧
- ZEND\_ASSIGN\_DIM
  - 配列への代入 (assign dimensional)
- Zend/zend\_vm\_def.h
  - 各 opcode のハンドラが定義されている

# php-src を読むヒント

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- EXPECTED
  - よく通るパス。最も一般的なケース
- UNEXPECTED
  - ほとんど通らないパス。エラー処理など



# zend\_hash\_next\_index\_insert

---

```
value = zend_hash_next_index_insert(  
    Z_ARRVAL_P(object_ptr),  
    value  
);
```

※ 説明のためやや改変

# zend\_hash\_next\_index\_insert

---

```
zval* zend_hash_next_index_insert(  
    HashTable *ht,  
    zval *pData  
) {  
    return _zend_hash_index_add_or_update_i(  
        ht,  
        ht->nNextFreeElement, /* 挿入先のインデックス */  
        pData,  
        HASH_ADD | HASH_ADD_NEXT  
    );  
}
```

※ 説明のためやや改変

# nNextFreeElement

---

- `Zend/zend_hash.c`
- `_zend_hash_index_add_or_update_i()`

# nNextFreeElement

---

- `Zend/zend_hash.c`
- `_zend_hash_index_add_or_update_i()`

`array` に数値のキーで代入したとき、そのキーが `nNextFreeElement` 以上なら、その値 +1 になる

# PHP クイズ

---

```
<?php
```

```
$xs = [  
    "a" => 1,  
    "b" => 2,  
    "c" => 3,  
];  
$xs[] = 42;  
assert($xs[0] === 42);
```

# PHP クイズ

---

```
<?php
```

```
$xs = [  
    0 => 1,  
    1 => 2,  
    3 => 4,  
];  
$xs[] = 42;  
assert($xs[4] === 42);
```

# PHP クイズ

---

```
<?php
```

```
$xs = [  
    -10 => 1,  
    -7  => 2,  
    -5  => 4,  
];  
$xs[] = 42;  
assert($xs[-4] === 42);
```

# PHP クイズ

---

```
<?php
```

```
$xs = [];  
$xs[10] = 1;  
$xs[] = 42;  
$xs[5] = 2;  
$xs[] = 57;  
assert($xs[11] === 42);  
assert($xs[12] === 57);
```



# おまけ

---

```
<?php  
$xs = [1, 2, 3];  
$xs[] += 10;
```

末尾代入と複合代入演算子は同時に使える