The Memento pattern is classified as Creational/Structural/Behavioural.

Selected Answer: ✅ Behavioural

Correct Answer:

Evaluation Method

✅ *Exact Match*

Using a prototype design pattern can help in avoiding large parallels of factories and products

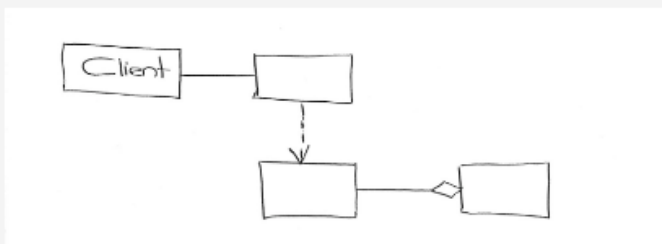Selected Answer: ✅ True

Answers: ✅ True

False

Which pattern is best described bu the statement:

Creates an object by making a copy of an existing object.

Selected Answer: ✅ Prototype

Correct Answer:

Identify the pattern the following skeletal class diagram represents.

Selected Answer: ✅ Memento

Correct Answer:

Study the code snippet below and answer the questions that follow:

```
class A {
    public:
        virtual ~A()
        \\ ...

    private:
        friend class B;
        A()
        \\ ...
};
```

a) Which design pattern would this code snippet possibly be part of? [i]

b) Class A is the [ii] participant for this pattern.

c) Class B would be the [iii] participant of this pattern.

Specified Answer for: i   ❌ Factory
Specified Answer for: ii ❌ concrete
Specified Answer for: iii ❌ abstract

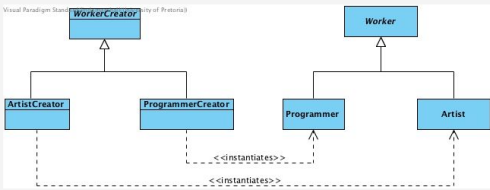**Correct Answers for: i**

Evaluation Method	Correct Answer
✅ Contains	Memento

Correct Answers for: ii

Evaluation Method	Correct Answer
✅ Exact Match	Memento

Correct Answers for: iii

Evaluation Method	Correct Answer
✅ Exact Match	Originator

Consider the class diagram below and answer the questions that follow.

a) Which pattern would you use to persist instances of the derived classes in the Worker hierarchy? **[i]**

b) What participant of the pattern would the Worker hierarchy form? **[ii]**

c) The **[iii]** participant would be associated with the Worker hierarchy.

Specified Answer for: i   ✔ Memento
Specified Answer for: ii   ✖ Product
Specified Answer for: iii ✖ WorkCreator

Correct Answers for: i

Evaluation Method	Correct Answer
✔ Contains	Memento

Correct Answers for: ii

Evaluation Method	Correct Answer
✔ Exact Match	Originator

Correct Answers for: iii

Evaluation Method	Correct Answer
✔ Exact Match	Memento

Consider the following hierarchy of classes which implement different sorting algorithms:

```cpp
class Sorter {

public :
    void sort(vector<int> array, int length) {
       int lastIndex = determineLastIndex(length );
       for(int i = determineFirstIndex (); i < lastIndex ; ++i ) {
          compareCurrent(i ,array ,length); output(array , length );
       }
    }
    //Outputs the array , implementation in the .cpp file
    void output(vector<int> array , int length );

protected :
    virtual void compareCurrent(int i, vector<int> array, int length) = 0;
    virtual int determineFirstIndex () = 0;
    virtual int determineLastIndex(int length) = 0;
};

class InsertionSorter : public Sorter {
    //Implementation in the .cpp file
    void compareCurrent(int i , vector<int> array , int length );
    int determineFirstIndex (); //Implementation in the .C file
    int determineLastIndex(int length );
};

class SelectionSorter : public Sorter {

    // Swaps elements at indices i and j in the array , implementation in the .cpp file
    void swap(vector<int> array, int i , int j );

    // Implementation in the .cpp file
    void compareCurrent(int i , vector<int> array , int length );
    int determineFirstIndex ();
    int determineLastIndex(int length );
};
```

a. Identify the abstract class. [i]

b. Identify the design pattern. [ii]

c. Identify the participants represented by each of the following classes

    i. Sorter [iii]

    ii. SelectionSorter [iv]

Specified Answer for: i   ✅ Sorter

Specified Answer for: ii   ✅ Template method
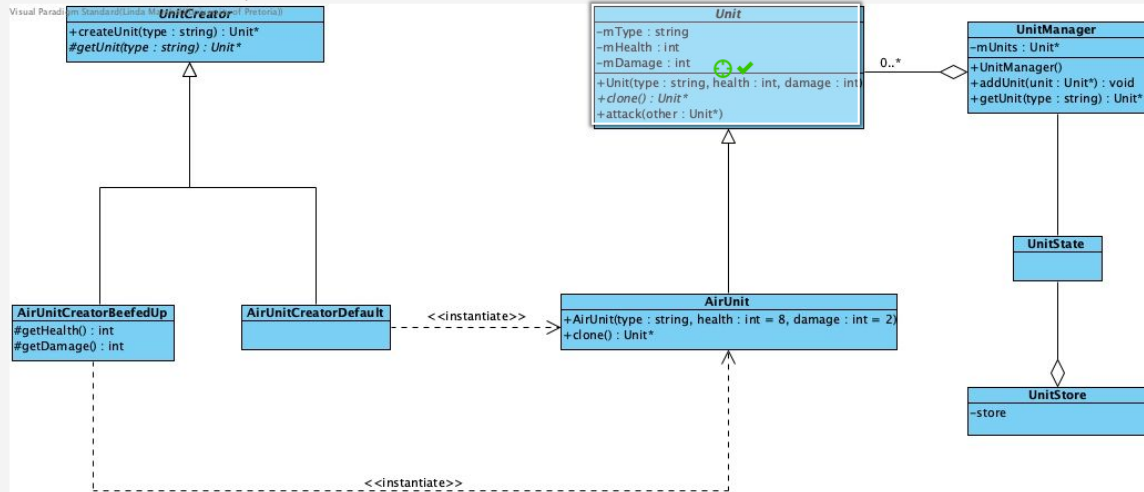
Specified Answer for: iii   ❌ abstract class

Specified Answer for: iv   ❌ concrete class

Identify the Product participant of the Factory Method design pattern on the given class diagram.

Selected Answer: ✅ 644, 57
Correct Answer: ✅ Top Left Coordinates (525, 0) Bottom Right Coordinates (767, 109)
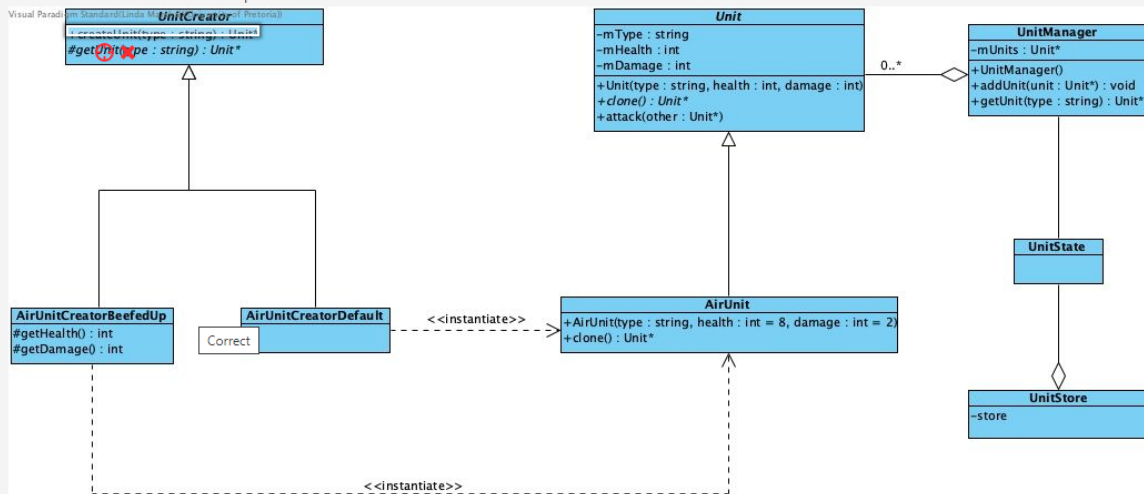Instructor selection and student response

Identify the template method operation on the given class diagram.

Selected Answer: ❌ 87, 40
Correct Answer: ✅ Top Left Coordinates (52, 17) Bottom Right Coordinates (226, 27)
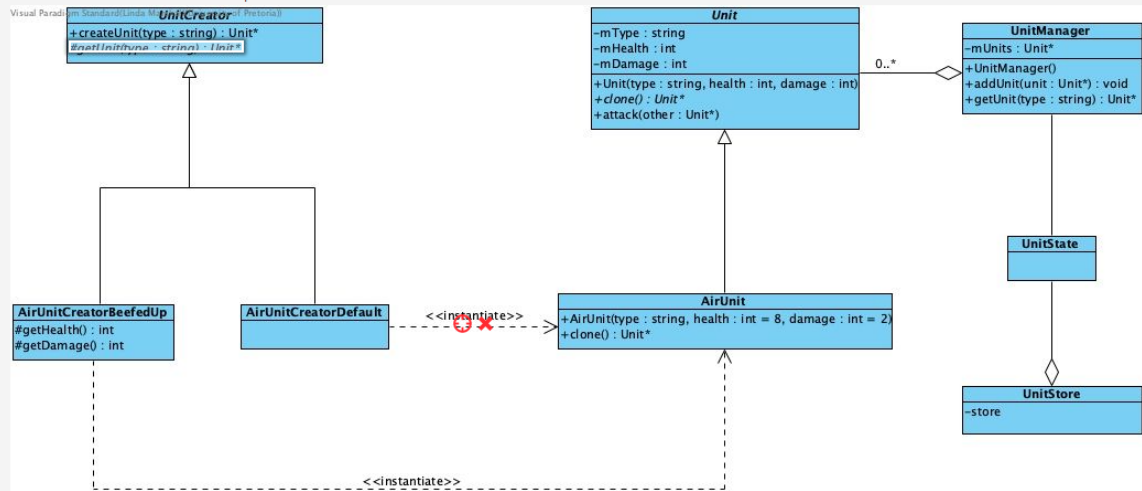Instructor selection and student response

Identify the factory method operation of the Factory Method design pattern on the given class diagram.

Selected Answer: ❌ 411, 287

Correct Answer: ✅ Top Left Coordinates (53, 32) Bottom Right Coordinates (212, 43)
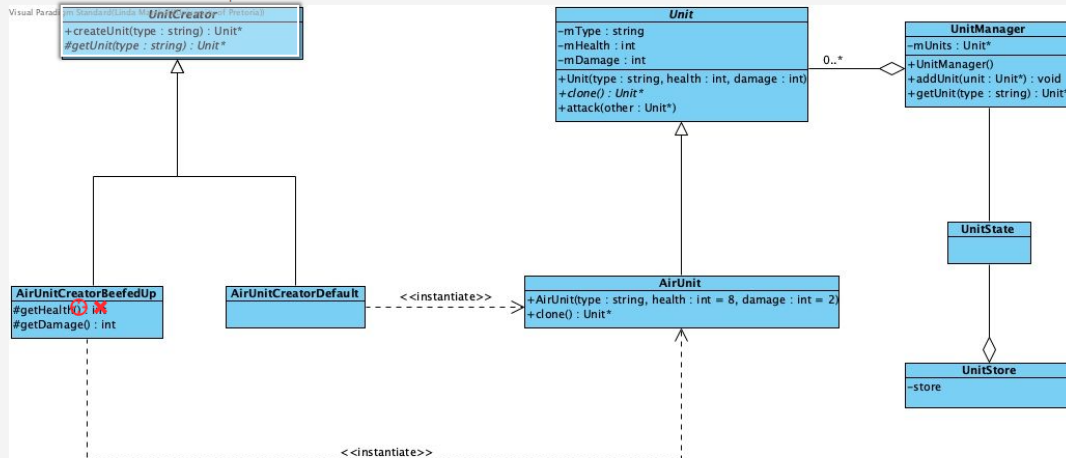
Instructor selection and student response

Identify the Creator participant of the Factory Method design pattern on the given class diagram.

Selected Answer: ❌ 68, 290

Correct Answer: ✅ Top Left Coordinates (50, 0) Bottom Right Coordinates (280, 50)

Instructor selection and student response

Between which classes of the Memento design pattern is there a wide interface. Click on the association between the classes in the given class diagram.

Selected Answer: ❌ 841, 60
Correct Answer: ✅ Top Left Coordinates (934, 99) Bottom Right Coordinates (951, 206)
Instructor selection and student response

Match the pattern to the given intent.

Define the skeleton of an algorithm in an operation, deferring some steps to subclasses. Subclasses redefine certain steps of an algorithm without changing the algorithm's structure.

Selected Answer: ✅ Template Method

Answers: ✅ Template Method

Which pattern is best described bu the statement:

Creates an object by making a copy of an existing object.

Selected Answer: ✅ Prototype

Correct Answer:

Consider the following hierarchy of classes which implement different sorting algorithms:

```cpp
class Sorter {

public :
    void sort(vector<int> array, int length) {
        int lastIndex = determineLastIndex(length );
        for(int i = determineFirstIndex (); i < lastIndex ; ++i ) {
            compareCurrent(i ,array ,length); output(array , length );
        }
    }
    //Outputs the array , implementation in the .cpp file
    void output(vector<int> array , int length );

protected :
    virtual void compareCurrent(int i, vector<int> array, int length) = 0;
    virtual int determineFirstIndex () = 0;
    virtual int determineLastIndex(int length) = 0;
};

class InsertionSorter : public Sorter {
    //Implementation in the .cpp file
    void compareCurrent(int i , vector<int> array , int length );
    int determineFirstIndex (); //Implementation in the .C file
    int determineLastIndex(int length );
};

class SelectionSorter : public Sorter {

    // Swaps elements at indices i and j in the array , implementation in the .cpp file
    void swap(vector<int> array, int i , int j );

    // Implementation in the .cpp file
    void compareCurrent(int i , vector<int> array , int length );
    int determineFirstIndex ();
    int determineLastIndex(int length );
};
```
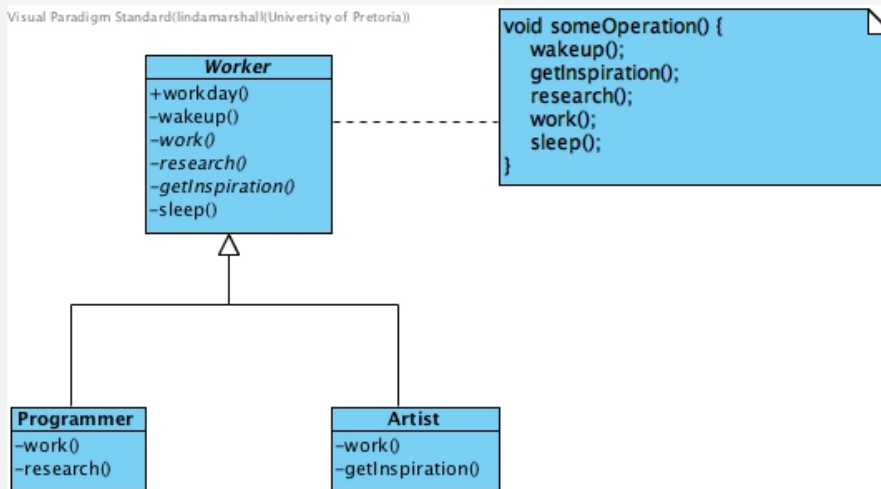
a. Identify the abstract class. **[i]**

b. Identify the design pattern. **[ii]**

c. Identify the participants represented by each of the following classes

   i. Sorter **[iii]**

   ii. SelectionSorter **[iv]**

Consider the class diagram given below and answer the questions that follow

Worker

+workday()
–wakeup()
–*work()*
–*research()*
–*getInspiration()*
–sleep()

```
void someOperation() {
    wakeup();
    getInspiration();
    research();
    work();
    sleep();
}
```

Programmer

–work()
–research()

Artist

–work()
–getInspiration()

a) Name the design pattern shown the diagram. **[i]**

b) List the participants of the design pattern, and the class names that correspond to each participant in the diagram.

Worker - **[ii]**
Programmer and Artist - **[iii]**

c) Name one invariant operation and one optional operation.

Invariant operation - **[iv]**
Optional operation - **[v]**

Specified Answer for: i ✓ Template method
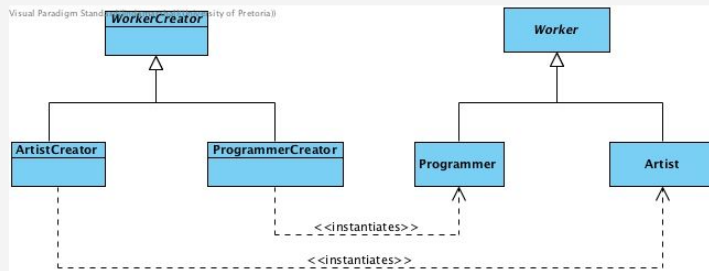
Specified Answer for: ii ✗ Abstract Class

Specified Answer for: iii ✗ Concrete Class

Specified Answer for: iv ✗ work

Specified Answer for: v ✓ research

Consider the class diagram below and answer the questions that follow.

a) Which pattern would you use to persist instances of the derived classes in the Worker hierarchy? [i]

b) What participant of the pattern would the Worker hierarchy form? [ii]

c) The [iii] participant would be associated with the Worker hierarchy.

Specified Answer for: i   ✗ Template method
Specified Answer for: ii   ✗ Factory method
Specified Answer for: iii ✗ concrete product

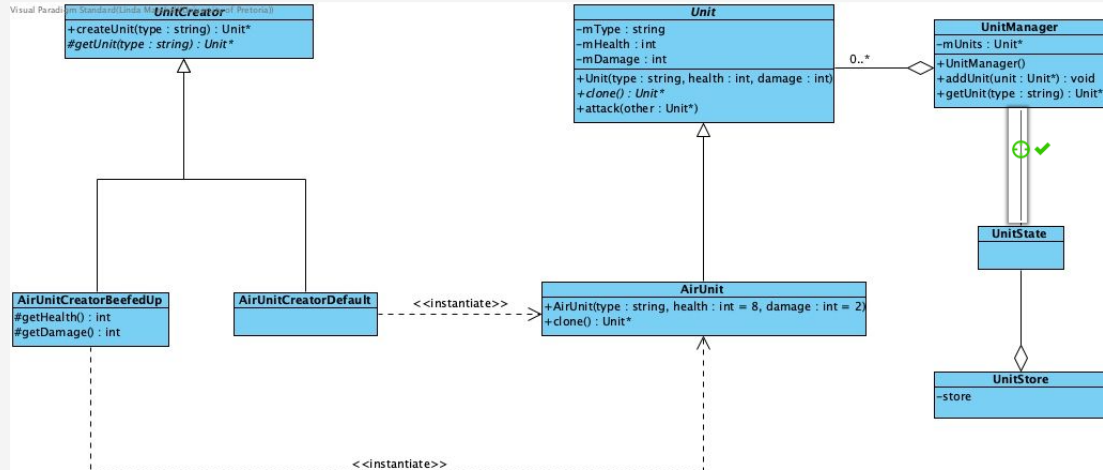| Correct Answers for: i	
Evaluation Method	Correct Answer
✓ Contains	Memento
Correct Answers for: ii	
Evaluation Method	Correct Answer
✓ Exact Match	Originator
Correct Answers for: iii	
Evaluation Method	Correct Answer
✓ Exact Match	Memento

Between which classes of the Memento design pattern is there a wide interface. Click on the association between the classes in the given class diagram.

Selected Answer: ✓ 946, 136
Correct Answer: ✓ Top Left Coordinates (934, 99) Bottom Right Coordinates (951, 206)
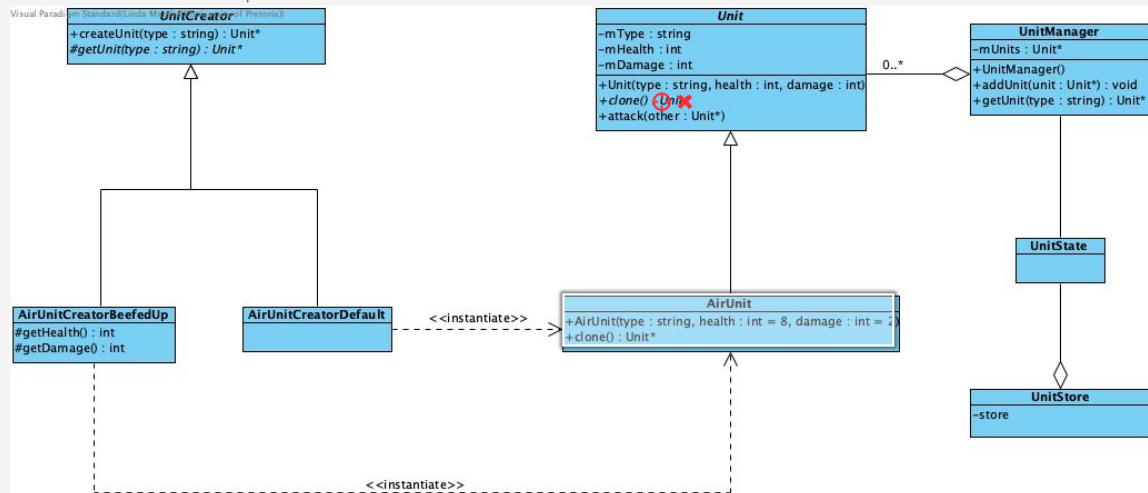Instructor selection and student response

Identify the ConcretePrototype participant on the given class diagram.

Selected Answer: ❌ 587, 85
Correct Answer: ✔ Top Left Coordinates (497, 259) Bottom Right Coordinates (796, 307)
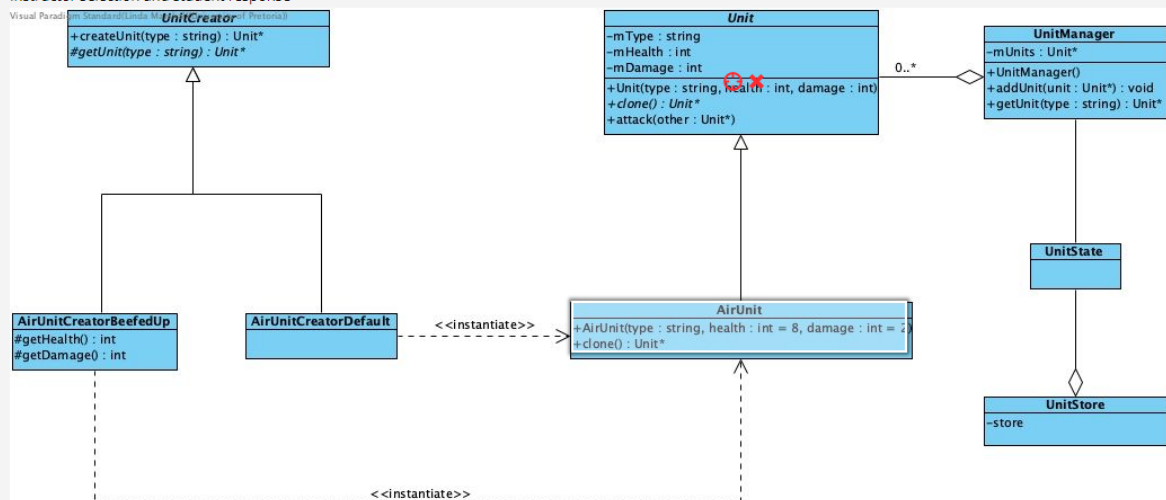Instructor selection and student response

Identify the ConcreteProduct participant of the Factory Method design pattern on the given class diagram.

Selected Answer: ❌ 642, 64
Correct Answer: ✔ Top Left Coordinates (498, 260) Bottom Right Coordinates (796, 306)
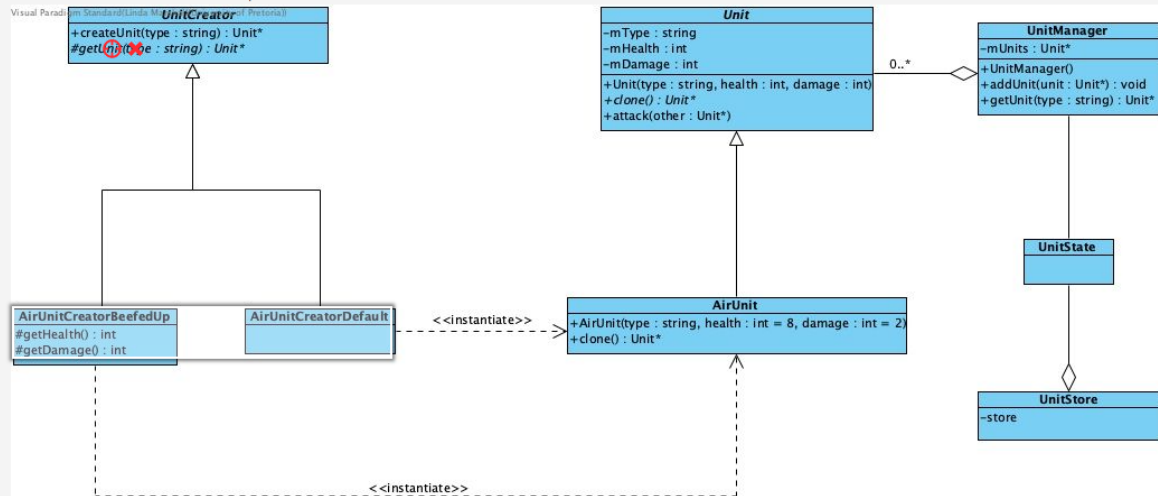Instructor selection and student response

Identify a ConcreteCreator participant of the Factory Method design pattern on the given class diagram.

Selected Answer: ✗ 91, 38

Correct Answer: ✓ Top Left Coordinates (1, 269) Bottom Right Coordinates (341, 316)

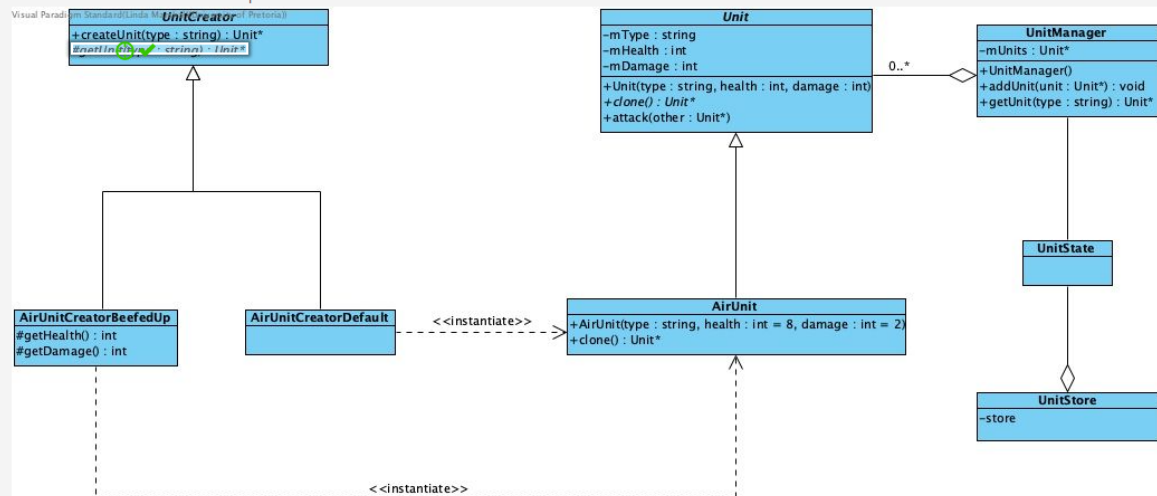Instructor selection and student response

Identify the factory method operation of the Factory Method design pattern on the given class diagram.

Selected Answer: ✓ 102, 38

Correct Answer: ✓ Top Left Coordinates (53, 32) Bottom Right Coordinates (212, 43)

Instructor selection and student response

Match the intent given below to the pattern.

Without violating encapsulation, capture and externalise an object?s internal state so that the object can be restored to this state later.

Selected Answer: ✓ Memento

Answers: Composite

               ✓ Memento

               State

               Prototype

A famous actress needs a number of different outfits, each suited to a particular occasion:

- Casual wear for everyday activities in public. A personal stylist who follows fashion trends closely is responsible for this type of outfit.
- A costume to wear while shooting her current movie. The costume department on a movie set is responsible for producing the correct costume.
- A formal evening dresses to wear to an awards ceremony.

A fashion designer takes responsibility for producing an evening dress. Assume you are tasked with producing an application which simulates an actress obtaining different types of outfits. Answer the following:

a. Identify the design pattern. **[i]**

b, Which participant of the pattern best corresponds to the roles from the given scenario?

The actress: **[ii]**

Fashion designer: **[iii]**

Stylist: **[iv]**

Evening dress: **[v]**

Outfit: **[vi]**

Specified Answer for: i   ✅ Factory Method

Specified Answer for: ii   ✅ Client

Specified Answer for: iii   ❌ Creator

Specified Answer for: iv   ❌ Concrete Creator

Specified Answer for: v   ❌ Concrete Product

Specified Answer for: vi   ✅ Product

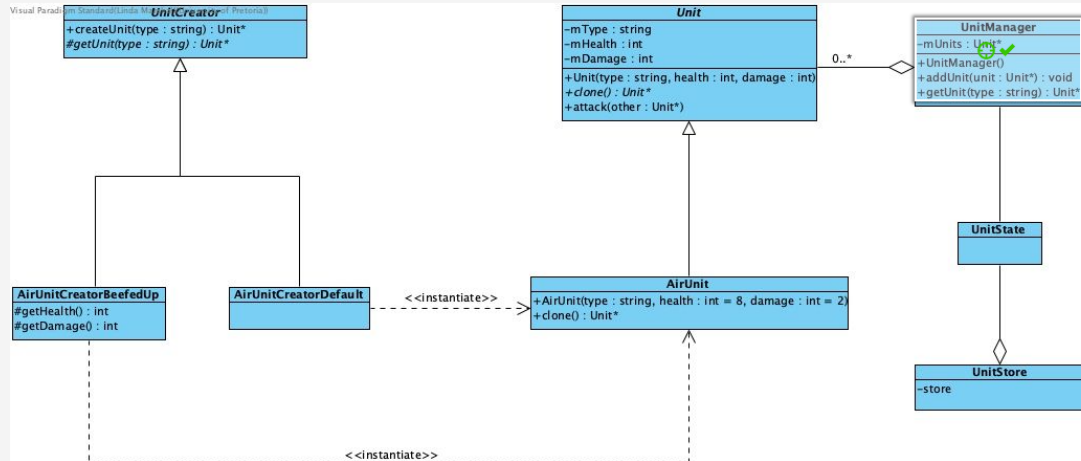| Correct Answers for: i	
Evaluation Method	**Correct Answer**
✅ Contains	Factory Method
Correct Answers for: ii	
Evaluation Method	**Correct Answer**
✅ Exact Match	Client
Correct Answers for: iii	
Evaluation Method	**Correct Answer**
✅ Exact Match	ConcreteCreator
Correct Answers for: iv	
Evaluation Method	**Correct Answer**
✅ Exact Match	ConcreteCreator
Correct Answers for: v	
Evaluation Method	**Correct Answer**
✅ Exact Match	ConcreteProduct
Correct Answers for: vi	
Evaluation Method	**Correct Answer**

Identify the class that will act of the Originator participant of the Memento design pattern on the given class diagram.

Selected Answer: ✅ 933, 44

Correct Answer: ✅ Top Left Coordinates (864, 14) Bottom Right Coordinates (1024, 94)
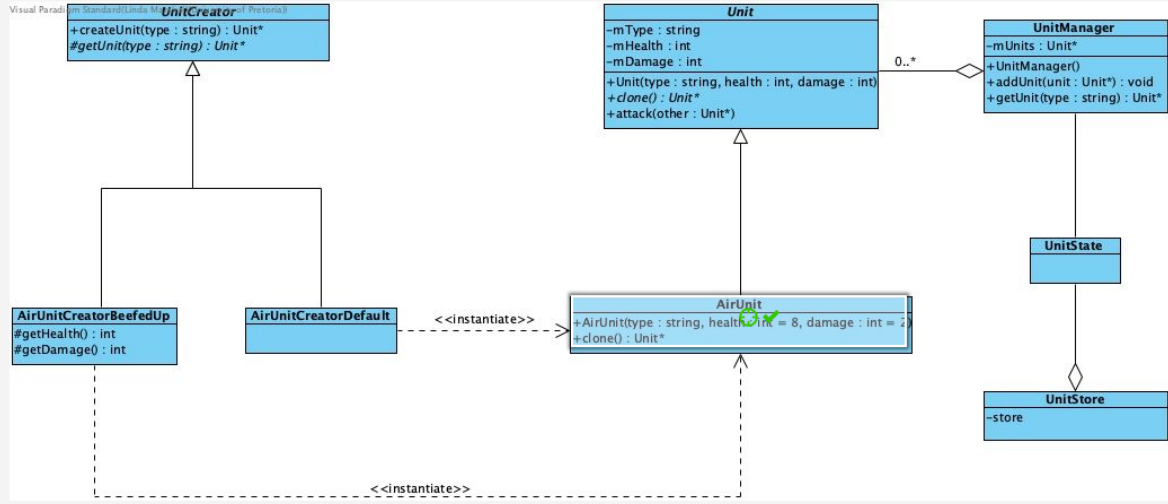
Instructor selection and student response

Identify the ConcreteProduct participant of the Factory Method design pattern on the given class diagram.

Selected Answer: ✅ 656, 278
Correct Answer: ✅ Top Left Coordinates (498, 260) Bottom Right Coordinates (796, 306)
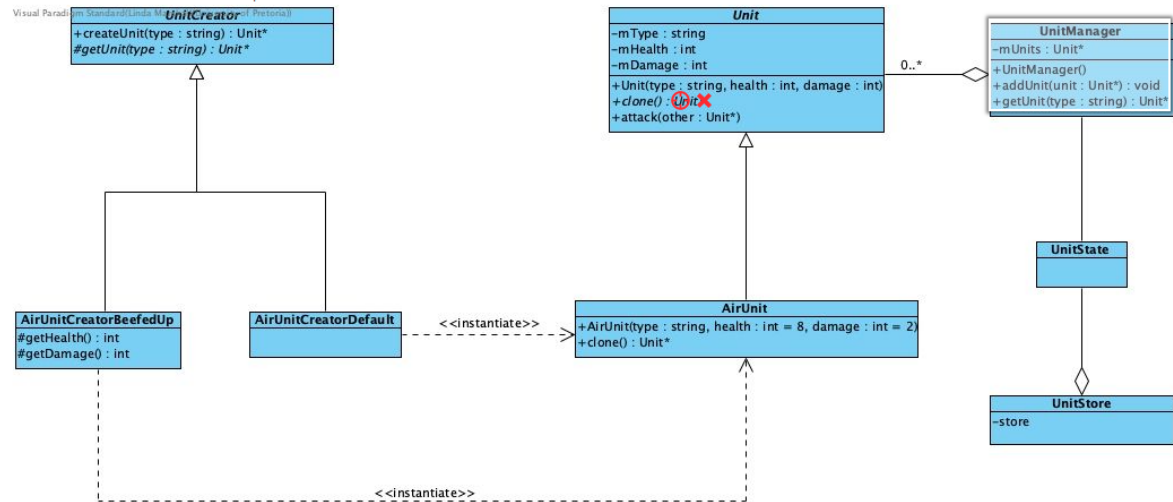Instructor selection and student response

Identify the "Client" of the Prototype design pattern on the given class diagram.

Selected Answer: ❌ 591, 83
Correct Answer: ✅ Top Left Coordinates (863, 12) Bottom Right Coordinates (1024, 94)
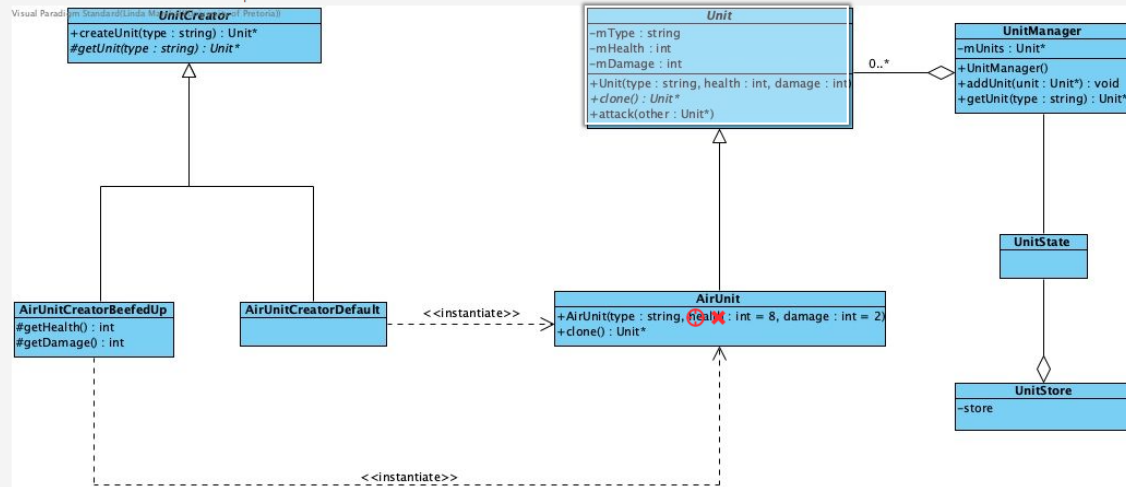Instructor selection and student response

Identify the Product participant of the Factory Method design pattern on the given class diagram.

Selected Answer: ❌ 627, 284

Correct Answer: ✅ Top Left Coordinates (525, 0) Bottom Right Coordinates (767, 109)

Instructor selection and student response

Identify a ConcreteCreator participant of the Factory Method design pattern on the given class diagram.

Selected Answer: ✅ 45, 287

Correct Answer: ✅ Top Left Coordinates (1, 269) Bottom Right Coordinates (341, 316)

Instructor selection and student response