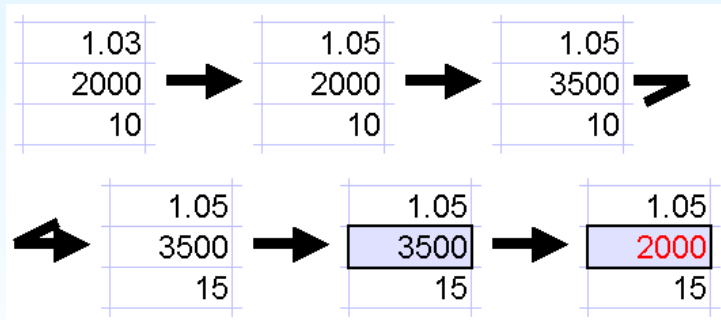


Regional Undo for Spreadsheets

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Change B3 from "" to "112362"

Change B4 from "" to "89820"

Change B5 from "" to "102648"

Change B4 from "89820" to "z"

Change A1 from "" to "user study result"

Insert row b

Change B6

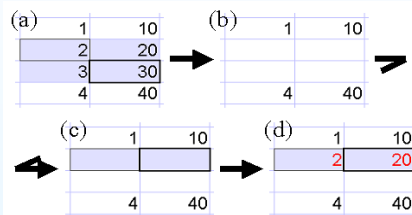
112362	108096	220458
z	60888	150708
102648	20690	123338
98111	26959	125070

Fix an error by directly designating a region

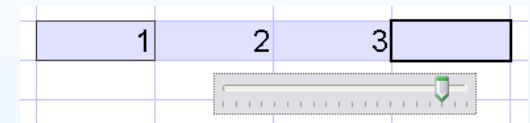
The user who realizes that an error has been made need only specify the region, and perform a "regional undo". Then, the user gets the desired document state. Once the user designates a region, the system automatically selects an operation that affects the specified region and undoes the operation.

Temporal vs. spatial information

The traditional selective undo requires the user to find the target operation in a history, while our regional undo allows the user to specify it directly on the screen.



1		10
2		
3		30
4		50



Partial undo

In some cases, an operation affects items inside and outside a specified region. Our solution is a partial undo, splitting such an operation into two operations, those inside and outside the region.

Clue

It is difficult for the user to specify the proper region when there are hidden rows or columns. The ability to visualize past operations is supported to help the user in such situations. The marks are shown as red lines between headers or as red cell borders

Slider

The undo and redo can be controlled using a slider. After the user selects a region, the slider appears when the right mouse button is clicked. Then, the user can perform regional undos and redos continuously by moving the slider back and forth.