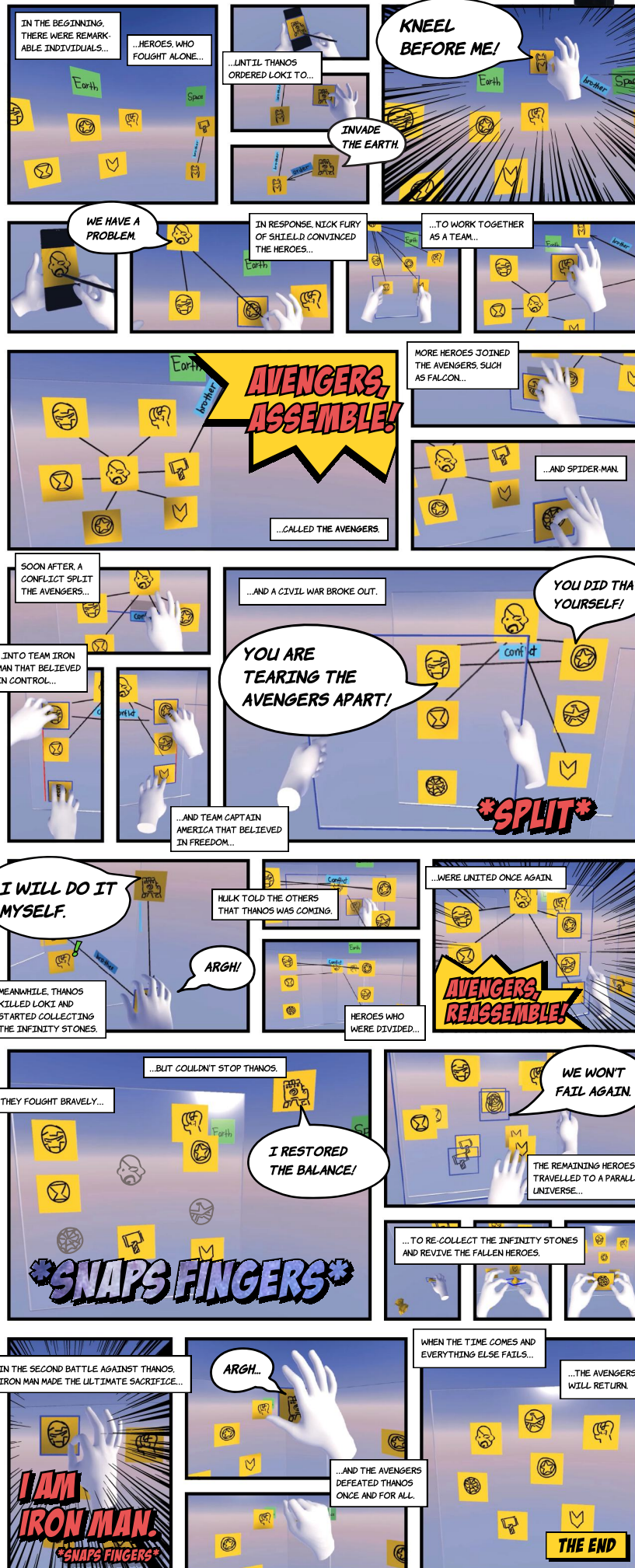


"THE AVENGERS" IN ONE PAGE



Post-Post-it:

A Spatial Ideation System in VR for Overcoming Limitations of Physical Post-it Notes

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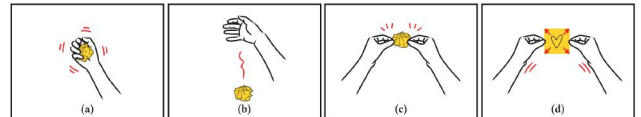
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Post-it notes are great problem-solving tools. However, physical Post-it notes have limitations: surfaces for attaching them can run out; rearranging them can be labor-intensive; documenting and storing them can be cumbersome. We present Post-Post-it, a novel VR interaction system that overcomes these physical limitations. We derived design requirements from a formative study involving a problem-solving meeting using Post-it notes. Then, through physical prototyping, using physical materials such as Post-it notes, transparent acrylic panels, and masking tape, we designed a set of lifelike VR interactions based on hand gestures that the user can perform easily and intuitively. With our system, the user can create and place Post-it notes in an immersive space that is large enough to ideate freely, quickly move, copy, or delete many Post-it notes at once, and easily manage the results.



Note creation & placement

(a) The user holds a stack of notes in the non-dominant hand and the stylus in the dominant hand, and writes on the uppermost note. (b) The user pinches near the note, it attaches to the hand. (c) After moving the note to the desired position and orientation, (d) the user unpinches to place the note.



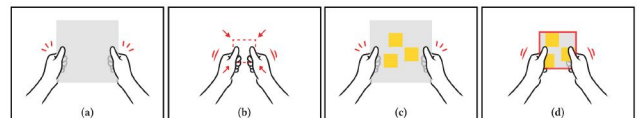
Note deletion & recovery

(a) When the user grabs an unwanted note, the note is crumpled. (b) When the user releases the crumpled note, it falls to the floor. (c) After picking up a crumpled note by pinching it with one hand, pinching and (d) pulling it sideways with another hand uncrumples and restores the note.



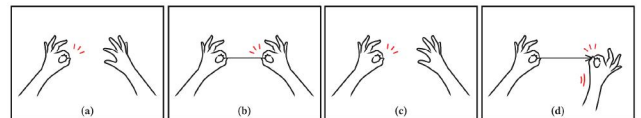
Layer creation & placement

(a) By bringing the hands close together, grabbing, and moving the hands as if spreading a parchment, (b) the user creates and resizes a layer. (c) The user grabs and moves the layer with one or two hands, and (d) releases the layer to place it at the desired position and orientation.



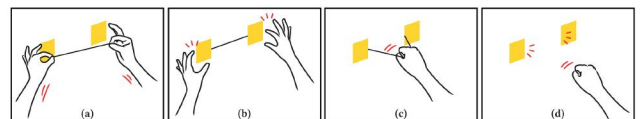
Layer deletion

(a) The user grabs both sides of the layer and reduces the space between the hands to decrease the layer size. (b) When the layer's size falls below a certain threshold, the layer is deleted. (c) However, if there are notes attached to the layer, (d) the layer's size is constrained by the bounds of the notes.



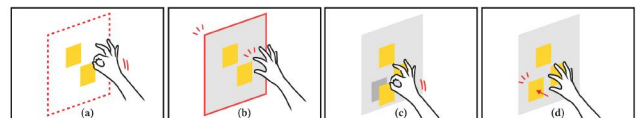
Link creation

The user creates a non-directional link by (a) pinching the air with one hand, then (b) the other sequentially. The user creates a directional link by (c) pinching the air with one hand, then (d) the other hand, while moving the second hand in the direction of the arrowhead.



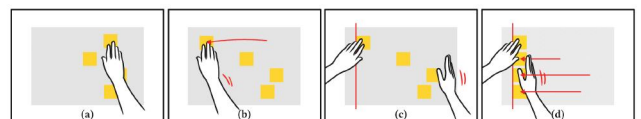
Link attachment & deletion

(a) The user places each of the two ends of the link near a desired note, and (b) unpinches to connect them with a link. The user deletes the link by (c) grabbing the link with one hand and then (d) pulling the hand away to a sufficient distance from the attached notes to tear the link from them.



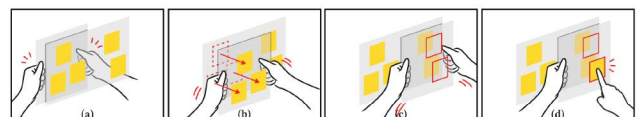
Layer inference

(a) When a note is placed close to another and the two are nearly coplanar, (b) a layer containing the two notes is automatically created. (c) When the user brings a note closer to a layer, a shadow is cast on the layer as feedforward, and (d) when the user releases it, it snaps onto the corresponding position on the layer.



Note alignment

The user moves around any note that belongs to a layer (a) by touching it and (b) sweeping it. The user aligns notes (c) by touching a note to set the reference of alignment with the NDH and (d) simultaneously sweeping multiple notes to it with the DH. Here, the direction of sweeping determines the direction of alignment.



Note transfer & duplication

(a) When the user moves a layer behind another layer, and (b) pulls the layer forward, notes within the intersecting region are transferred. (c) When the user moves a layer in front of another layer, (d) notes within the intersecting region are projected, and as the user touches the desired ones, they are copied.