

(一) 目前台灣將「u-Taiwan」規劃成爲國家發展重點之一，世界各國正積極的推動 U 化生活科技，這個趨勢可以回溯到 90 年代初期，Xerox Parc 前計算機科學實驗室主任韋斯特 (Mark Weiser) 首先提出的 Ubiquitous Computing 願景，以下是取自 Mark Weiser 文章【The Computer for the 21st Century】的部份內容。

The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it. Such a disappearance is a fundamental consequence not of technology but of human psychology. Whenever people learn something sufficiently well, they cease to be aware of it. When you look at a street sign, for example, you absorb its information without consciously performing the act of reading. In essence, the only when things disappear in this way are we freed to use them without thinking and so to focus beyond them on new goals.

The idea of integrating computers seamlessly into the world at large runs counter to a number of present-day trends. "Ubiquitous computing" in this context does not mean just computers that can be carried to the beach, jungle or airport. Even the most powerful notebook computer, with access to a worldwide information network, still focuses attention on a single box. Today's multimedia machine makes the computer screen into a demanding focus of attention rather than allowing it to fade into the background.

How do technologies *disappear into the background*? We have found two issues of crucial importance: *location* and *scale*. Little is more basic to human perception than physical juxtaposition, and so ubiquitous computers must know where they are. Today's computers, in contrast, have no idea of their location and surroundings. Ubiquitous computers will also come in different sizes, each suited to a particular task. My colleagues and I have built what we call tabs, pads and boards: inch-scale machines that approximate active Post-It notes, foot-scale ones that behave something like a sheet of paper (or a book or a magazine), and yard-scale displays that are the equivalent of a blackboard or bulletin board.

Ubiquitous computing will gradually emerge as the dominant mode of computer access over the next 20 years. Like the personal computer, ubiquitous computing will produce nothing fundamentally new, but by making everything faster and *easier to do*, with less strain and fewer mental gymnastics; it will transform what is apparently possible.

請針對以上的描述，(1) 試以 location 與 scale 二方面，解釋『電腦科技如何消失於背景中？How do technologies *disappear into the background*?』；(2) 表達你個人對於 Ubiquitous Computing 對於未來生活空間發展的影響，可以列舉曾經參與的研究案或自身經驗爲例。(50%)

(背面仍有題目,請繼續作答)

本試題是否可以使用計算機： 可使用， 不可使用（請命題老師勾選）

考試日期：0302，節次：3

(二) 人機互動(Human-Computer Interaction)的領域中，傳統電腦的「圖形化使用介面」(Graphical User Interface, GUI)逐漸有被「實體使用介面」(Tangible User Interface, TUI)取代的趨勢，著名的 TUI 例子如 MIT Media Lab 的 Hiroshi Ishii 教授所發展的 I/O Brush 與 Illuminating Light，參考下圖：



I/O Brush

I/O Brush is a new drawing tool to explore colors, textures, and movements found in everyday materials by "picking up" and drawing with them. I/O Brush looks like a regular physical paintbrush but has a small video camera with lights and touch sensors embedded inside. Outside of the drawing canvas, the brush can pick up color, texture, and movement of a brushed surface. On the canvas, artists can draw with the special "ink" they just picked up from their immediate environment. (<http://tangible.media.mit.edu/projects/iobrush/>)



Illuminating Light

"Illuminating Light" is a general-purpose optics simulator, in which models of lasers, mirrors, lenses, and so on come to life, apparently projecting, reflecting, and refracting beams of light; while "Urp" is an urban planning workbench in which simple architectural models cast accurate shadows, pedestrian-level wind patterns can be observed and tested for different arrangements of buildings, inter-structure distances are automatically calculated and displayed around the models, reflections off the surfaces of glass buildings onto surrounding terrain made visible, etc. (<http://tangible.media.mit.edu/projects/luminousroom/>)

本試題是否可以使用計算機： 可使用， 不可使用 (請命題老師勾選)

考試日期： 0302，節次： 3

請針對以上的背景描述，請依照下圖 Hiroshi Ishii 教授對「圖形化使用介面」(Graphical User Interface, GUI)與「實體使用介面」(Tangible User Interface, TUI)二者所提出的圖解，解釋 GUI 與 TUI 二者之異同及其優缺點。(50%)

