

# 二進位博物館電腦文物展 見證資訊科技發展軌跡

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近代科技日新月異，眾多劃時代的發明伴隨高速發展的學識和技術誕生於世，造福人類社會的同時，滿足各式日常生活所需。談起資訊科技發展史，電腦這項發明和其後續發展，皆在其中扮演著舉足輕重的開創地位。今年五月十三日至六月十三日這段期間，本學院協同新竹市文化局共同策劃「二進位博物館電腦文物展」於新竹市青少年館展出，從體積龐大的迪吉多電腦，到全國第一台大學聯考用讀卡機，帶領觀展者藉由歷代電腦文物的引領，遨遊於資訊科技發展之歷史迴廊。

綜觀我國科技發展史，新竹地區之所以會成為高科技產業重鎮，可將時光追溯至日本殖民政府於新竹州設立天然瓦斯研究所、海軍第六燃料廠，該設施所留下的廠房設備、技術人才後續由中油公司接收，併入經濟部聯合工業研究所。本校亦於 1958 年，在旅美校友大力支持下，於博愛校區成立第一間電子研究所，並於後續引入 IBM 650 磁鼓數據處理機，培育第一代電腦科學人才。緊接著伴隨工研院、新竹科學園區成立，新竹因學術研究與產業交織有了「台灣矽谷」的美稱，這些科技人才也成為帶動台灣產業結構轉型的重要關鍵。

曾任中華電信基金會執行長，同時為本校資訊工程學系校友的林三元先生在採訪中提到，當時政府需大量處理資料，需要適當的機器進行訓練，除了 IBM 外亦可選擇 Control Data Cyber (CDC) 之大型主機用以處理如財稅等常規商業訊息。儘管這些「古董」運算速度不及現在手機的萬分之一，但以當代的觀點出發，將人腦之責

委以電腦已是跨時代的認知衝擊，是件「很了不起」的事。此外，同為本校資工系校友的前數位通國際總經理吳國棟先生也談到，當時航空、陸地和海上的交通的即時管控、模擬運算、電腦輔助設計與製造和工程設計皆屬 PDP11 大型電腦主機承攬範疇，可見電腦科技應用範圍之廣，觸及各大領域。電腦設備被引入交通大學校園的同時，內部所含的工程軟體更進一步造福師生，使學術和技術的提升進入另一個層次。

工研院總營運長余孝先先生，以資工系校友的角度出發，提及四十幾年前冷氣尚未普及，體積大到可以放超過一間教室的迪吉多電腦 DEC10 卻可以享受此一福利，學生只能汗流浹背與酷暑搏鬥的趣事。儘管後來迪吉多電腦地位逐漸被其他工程電腦取代，但仍無法動搖其開創先鋒之地位。當時因電腦效能成本要價不斐，須設立分時系統供多人共用電腦；同時程式碼須打在卡片上，因其更改次數有所限制，在編寫、修改程式碼要格外嚴謹。隨著發展時間線向後推移，在我國相關產業界、學術界的努力和協助下，電腦生產、使用成本降低，使用習慣已全然轉變，個人電腦的出現亦顛覆過往對於電腦體積極大的刻板印象，在提升便利性和效能的同時，開創全新的市場和發展藍圖。

時至今日，伴隨智慧型手機的出現，網際網路住民量急速成長已為必然之趨勢，電腦功能定位隨其有所異動。本院彭文志副院長於訪談中提到對電腦文物保存的重要性，正所謂鑑往知來，透過適當地保存並回顧其發展歷史，相信對於追尋未來資訊科技之發展方向定能有所助益。如同鴻梅文創志業陳添順董事長於受訪時所述，身處現代回首望去，或許會覺得當代的硬體設備、應用方法很原始，但若非眾前輩花費心力、貢獻所學，一步一腳印踏實地演進和累積，資訊科技發展著實難以一次到位。

「組裝第一台電腦的挑戰精神需被傳承並保存。」以宏觀的視角鳥瞰資訊科技發展史，站在巨人的肩膀上的莘莘學子將身攜想像力和創造力，以其為主幹，蘗露並延伸那繁茂的新芽。

## The Binary Museum of Antique Computer Exhibition Displays the Development of Science and Technology Development

Due to the rapid technological changes, many products across generations have been invented along with advancing knowledge and technology to bring convenience to daily life. There is no doubt that the invention and development of computers play a significant role in the history of science technology. The Binary Museum of Antique Computer Exhibition organized by the Department of Computer Science at National Yang Ming Chiao Tung University (NYCU) and the Hsinchu Cultural Affairs Bureau was held from the 13th of May to the 13th of June, 2021 at the Youth Center of Cultural Affairs Bureau.

The reason why Hsinchu became the center of industrial and computer technology development was because of its unique history. During the Japanese colonial period, the Natural Gas Research Center and Former Imperial Japanese Navy Sixth Fuel were established in Hsinchu. Later on, the equipment and staff were taken over by CPC Cooperation, Taiwan under the Union Industrial Research Institute. National Yang Ming Chiao Tung University (NYCU), located in Hsinchu established the first Institute of Electronics in 1958 with the support of alumni from overseas. It introduced IBM 650 Magnetic Drum Data-Processing Machine to cultivate the first generation of digital computer professionals. After graduation, these well-trained technological professionals usually worked for Industrial Technology Research Institute or companies in Hsinchu Science Park which were just starting to develop. It was also very crucial for the industrial structural transformation in Taiwan. Hsinchu soon had the new nickname, the Taiwan version of Silicon Valley.

NYCU alumni also shared their stories when they were at school. San-Yuan Lin, who was the former executive director of Chungwa Telecom Foundation, mentioned that during that time our government needed machines to process a great amount of data. Other than IBM machines, Control Data Cyber (CDC) was also very capable of handling business data such as finance and tax documents, and it was very amazing to witness computers operating human duties. Kuo-Tung Wu, the previous general manager of eASPN Taiwan Inc. also said that the PDP-11 computer was used to manage various transportation systems such as real-time control, analog computation, computer-

aided designing and manufacturing, and engineering design. While professors and students were getting familiar with using a variety of computer equipment, their academic knowledge and technology skills were also elevated by the engineering software within those machines. Shiao-Shian Yu, Chief Operating Officer of Industrial Technology Research Institute, added on the fun fact that the size of DEC-10 took up the space for nearly a classroom. It also needed to be stored in a room with air-conditioning turned on while most of the other students did not have the privilege to stay in the air-conditioned classroom. There were also some other strict rules when using DEC-10 because it was very expensive. For example, a time-sharing system needed to be built to provide availability for multi-users. Also coding needed to be typed on cards, so there was a limit for revising codes. Therefore, people were cautious when writing and editing codes. DEC-10 was the classic initial product of that time although it eventually got replaced by other machines.

Light-weighted personal computers appeared on the market with the development from industries and academia, and it changed the way people use the computer while the production of IBM dropped eventually over time. Until recently, smartphones were gaining popularity among netizens and thus might also change the market trend of personal computers. During the interview, Wen-Chih Peng, Associate Dean of the Computer Science Department mentioned that it is important to learn from the past, so preserving these antique computers is necessary. Also learning about its history will be beneficial for anyone who would like to further pursue a career in computer science and technology. As the president of Grand View Culture and Art Foundation Tien-Shun Chen said, although these machines may look outdated, it is worthwhile to look back at the history because people could realize things take time to learn and develop over time.

The quote, "the spirit of assembling the first computer in history should be preserved and carried on," should be kept in students' minds. They are encouraged to view things from a broader view and stand on the giant's shoulder to have imagination and creation on the learning journey.