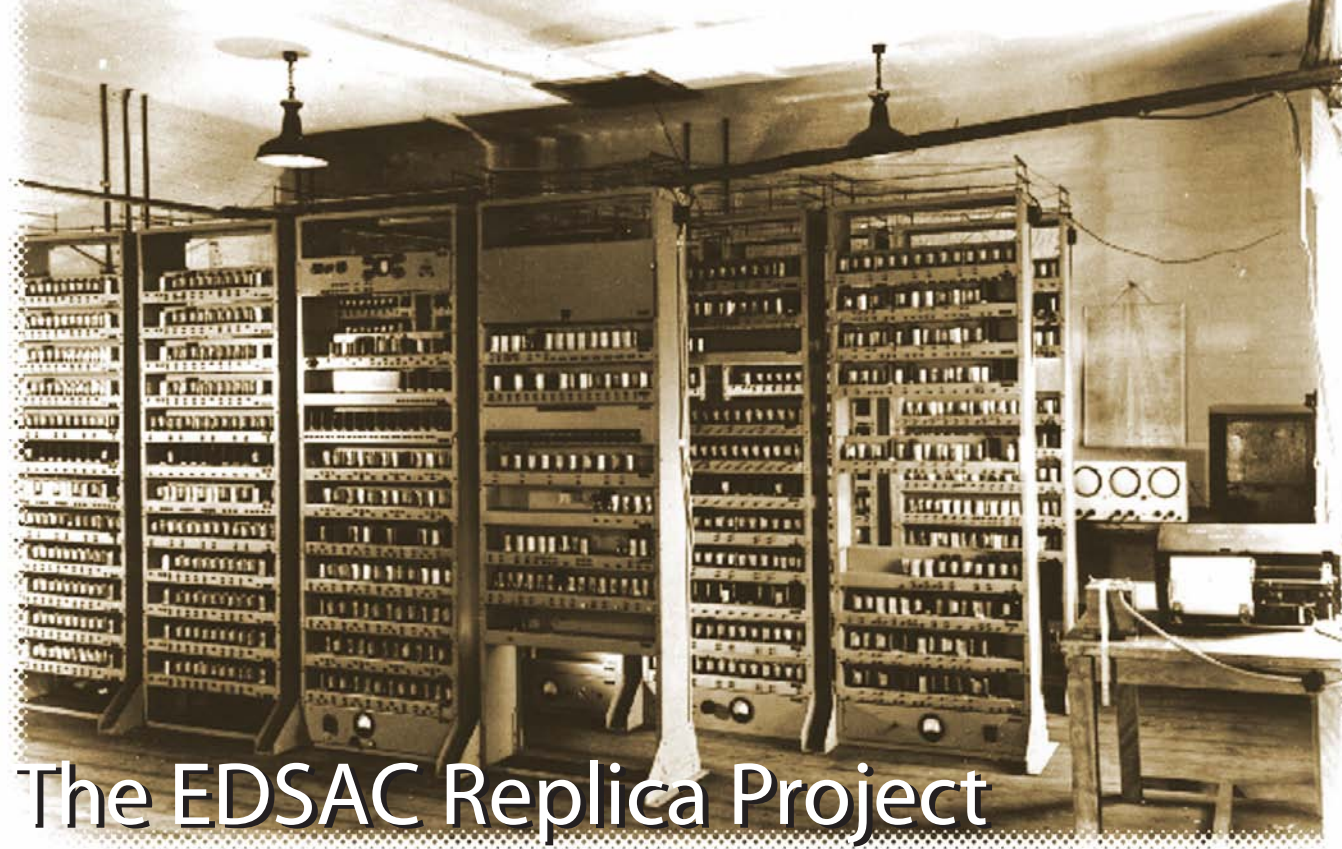


WHY, WHAT AND HOW.



The EDSAC Replica Project

Why this project is so important ?

The goal of the project is to build an authentic working replica of the EDSAC computer and to run a program on it as was done when the original machine was demonstrated in May 1949.

The project would have the following supporting objectives.

- To provide a tangible demonstration of the achievements of the Cambridge pioneers following the Second World War.
- To celebrate the achievements of British scientific and technological contributions to the early development of computing.
- To bring together extant archive material relating to this historic machine, supplemented by capturing the knowledge of those few remaining persons who developed and used it.
- To build as authentic a replica as possible taking into account the availability of components and materials and restrictions imposed by current legislation.
- To undertake the work within the spirit of the designers and technology of the time.
- To produce a working artifact of exceptional educational value to students and the general public, and an exemplar of British engineering encouraging new students into computing and engineering.

What was EDSAC ?

The EDSAC (Electronic Delay Storage Automatic Calculator) was originally built in the University of Cambridge Mathematical Laboratory by a team led by the late Professor Sir Maurice Wilkes immediately following the Second World War. It is claimed, and generally accepted, that the EDSAC was the first ever practical stored program electronic computer.

The machine ran its first program on 6 May 1949 being immediately pressed into service in support of research in the university. Wilkes had observed the labours of research workers in doing computations with the aid of mechanical desk calculators and mathematical tables. His prime motive was to provide them with faster and better facilities.

The EDSAC provided service for over nine years when it was superseded by the EDSAC 2, built by the same team. During that period a substantial number of users had their research transformed and their horizons extended, not least two winners of Nobel Prizes in molecular biology and radio astronomy.

The EDSAC and its many uses won recognition and financial support from outside sources. In particular funds were provided by the catering company J. Lyons. Lyons went on to build the LEO computer, the world's first business computer, based on the EDSAC design.

EDSAC was modest in terms of modern-day technology. There were 18 operation codes and instructions were executed at a rate of approximately 650 per second. Input was by punched paper-tape and output by teleprinter.

But this power was substantially more than was hitherto available, namely human calculators using mechanical desk machines. It has been estimated that EDSAC introduced a 1,500 factor productivity increase, thereby transforming the progress of research across Cambridge. Put simply, academic research was enabled to solve problems that were previously considered either impractical or impossible.

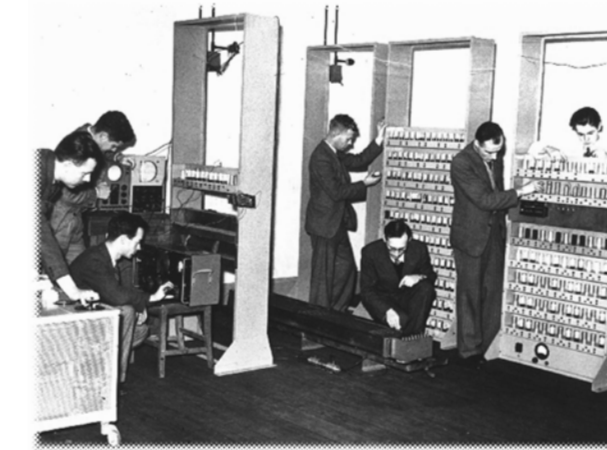
How is the replica to be constructed?

Research

Information about the EDSAC has been located in the libraries of the University Library and the Computer Laboratory in Cambridge as well as some in the possession of individuals.

It is intended to build a working replica using authentic materials and components with, possibly, only one exception. The memory of the EDSAC was constructed from tubes filled with mercury, and exploited the relatively slow speed of a sound wave in the liquid metal. It is likely that modern safety constraints will prohibit an authentic reconstruction of these tubes.

An alternative is to use a ferrous solid metal, a technique employed in early computers that followed the EDSAC, thus preserving the technique of delay-storage.



EDSAC under construction in 1948

Development

The development of the replica will require project leadership, adequate skilled manpower and suitable accommodation. It is assumed that the majority of the manpower will be voluntary (as with most CCS restoration and rebuild projects).

A project manager will be identified in the near future. The role is likely to be 50% of full-time, and will require dedication to project objectives, and the ability to manage volunteers with patience and tact.

Volunteers

The team of volunteers should above all have enthusiasm, and preferably be at least comfortable with if not competent with the old technology. It may be necessary to consider training younger people who may never have met a vacuum tube in anger.

Time-scale and costs

Information has been assembled to enable an understanding of the design and structure of EDSAC, and the number of assemblies, sub-assemblies and components likely to be involved have been estimated. It is forecast that the work will take about three years.

Cost estimates assume the project takes place at the National Museum of Computing at Bletchley Park.

They include an allowance of a nominal fee for the Project Manager and have a number of contingencies built-in.

Further refinement (resulting from the first three quarters' work) may reveal the need for adjustments.

