QUALITY OF COMPUTER SOFTWARE AND MEASUREMENTS

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ABSTRACT

We live today in society in which the computer plays an ever-increasing role, computer becoming increasingly important in industrial products and machinery. The aim of this paper is to give to the reader the important information about the growth using of Computer to improve Quality Control which is the problem of every day life.

1. INTRODUCTION

The implementation of various Statistical Quality Control methods in industry was enhanced by the use of Computer, in the Middle to the Late 1970s computer had come to be used in automated testing, in Computer-Aided Design, in Computer-Aided Manufacturing, in Computer-Aided Process Control, and in data acquisition, storage and analysis. Computer-Aided Quality represents the totality of the application of computer to quality control, integrates the engineering database that designs the part and the product and guided its manufacture with the inspection and testing of the part and product. Could be operated from the same database.

2. BASIC CONCEPTS

A computer system is defined as an external environment combined with a collection of interacting pieces of Hardware and Software components assembled to solve a problems, the environment interacts with the Hardware and Software through a series of Inputs and Outputs. Quality is considered to be vital in improving productivity and is a key to economic survival in a competitive environment, as they trying to improve productivity, many firms are faced with the challenge of making their employees conscious of quality related subjects, quality training, roles and responsibilities, and cost of quality. Fig.1 shows the computer system.

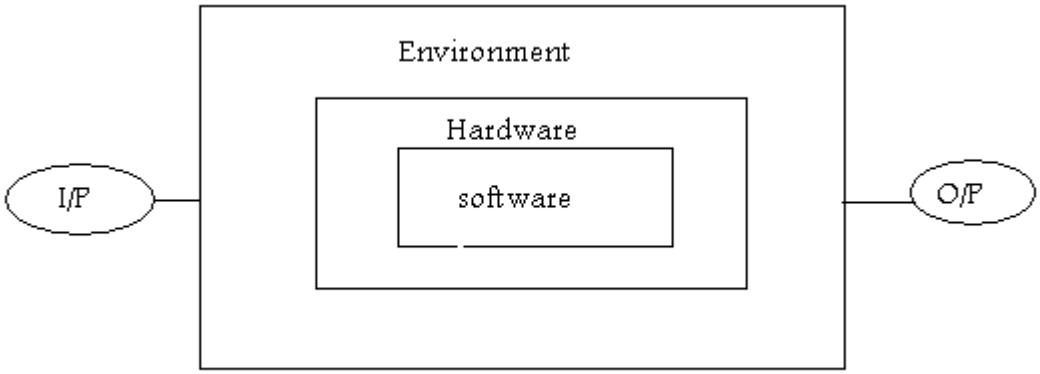

Fig. 1: *Computer system*

3. COMPUTERIZATION OF QUALITY OF SYSTEM

The system can provide much more than the duplication of manual system. For example, computer can watch thousands of control charts, sounding alarms, paging personnel throughout the plant automatically when a trend is observed. A human can not be nearly as effective because the mind is limited in terms of what can be stored, processed, and interpreted at one point in time. This is not to say that, the human should be eliminated from the loop, the human manager can perform the logical deduction and reasoning needed to make these determinations, possibly avoiding a catastrophe. Quality Control Software Vendors attempt to market systems that are automatically shut down a process when a type of error occurs. Evidently, the Software Vendors believe that the age of the Quality Control Program has arrived.

4. INPUTS AND OUTPUTS

The old process of reading a gage, writing the result on a form, and either making some calculations or passing the data to a specialist are long gone. This procedure has been replaced by keying the observation in to a computer, which then does the processing, this procedure is time-consuming, and errors are possible, several advances in gagging, electronic data collection and electronic data transfer have revolutionized data collection and analysis. The Micrometer or Caliper that was virtually unchanged for ages has been replaced by the digital indicator, the modern Micrometer or Caliper has a computer chip and the capability to convert from one measurement system to another, change scales are possible. The following characteristic are important when selecting a gage for use in Statistical Quality Control (**SQC**):-

- High resolution variable data: SQC requires high resolution to detect small changes.
- Repeatability and Reproducibility: SQC requires precision, if the same individual measures a part twice, the same reading should be occur, if two persons measure the same part, the same reading should occur.
- Efficiency: SQC requires much data the gage should produce data rapidly and without undue effort.

- Supportiveness: most SQC applications on the shop floor, groups of data are collected the gage most be able to support the data collection effort.

5. SOFTWARE AND PRODUCTIVITY

If we want to increase productivity we aim to:

- Develop systems faster.
- Develop systems which yield a better return on investment.
- Develop systems with better quality.

There are three aspects of productivity in connection with software development; time, return on investment and quality.

The first aspect points to a reduction in calendar time for the development of a software product. The second aspect can be formulated to say that a computing organization simply wants to spend less money on the development and maintenance of software products with unchanged requirements. The third aspect is concerned with quality assurance and is frequently mentioned in connection with the first aspects as one of the goals for a development organization, to reach these three goals, it's necessary to measure development productivity. Present acceptable productivity measurements are based on units delivered, lines of code per unit time or function points unit time.

When calculating, the following application parameters are taken in to account: number of input, number of user outputs, number of user queries, number of files or databases and number of interfaces to related applications or to other systems.

Function points arrived at in this way is: weighted by additional complexity parameter of the application and empirical constants at the development process.

The most frequently used productivity measures are:

$$P_1 = \frac{CSI}{PY} \qquad P_2 = \frac{Cost}{CSI} \qquad P_3 = \frac{FP}{PM} \qquad (1)$$

Where: *CSI* is the changed source instructions (new and modified lines code), *PY* is person year, *PM* is person month and *FP* is function points.

The question is how the determined values are to be utilized. Should P_1 or P_3 values of a developer group be compared with those of another? Should management use these measurements also for evaluation of individual developer or groups of developer? The answer of this question is definite "no".

Boehm: defines productivity as follows:

$$P = \frac{produced\ result\ in\ the\ development\ process}{cost}$$

This guide us to the fact that, we can improve the productivity of the development process if we increase its results or lower its cost, or do both simultaneously.

6. CONCLUSION

As mentioned above, the growth using of software in business, industry and public administration strongly needs to pay attention to quality of software and to use appropriate principles, methods and tool, these principles lead to realization that production of software must be systematic and carried out by professional engineers and the quality must be a development goal.

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