

DEVELOPMENT STUDY OF SWAT SOFTWARE (*SUBJECTIVE WORKLOAD ASSESSMENT TECHNIQUE*) TO THE OPERATING SYSTEM WINDOWS-BASED 64-BIT (CASE STUDY AT ERGONOMIC LABS INDUSTRIAL ENGINEERING BANDUNG PASUNDAN UNIVERSITY)

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ABSTRACT

SWAT (Subjective Workload Assessment Technique) are subjective workload measurement tools that are used to measure mental workload in a real environment (real world environment) which is scientifically and base on qualitative data sources. This method was developed by Reid and Nygran at Armstrong Medical Research Laboratory USA. In SWAT models, human work performance were comprised in three-dimensional workload; Time Load (T), Mental Effort Load (E), and Psychological Stress Load (S).

The application SWAT procedures which is used to measure the mental workload now is version 3.1. This version is an improved version of the previous versions. But in this case, the basic tools needed to implement the SWAT 3.1 version can be said is not in accordance with the present conditions, it is related to the operational computer programs; the personal computer operating systems should have the MS DOS with an internal memory 512K with two floppy disk pheriperal or a hard disk or with a floppy disk. so we can say, that's operating system are now is a DOS Version.

Thus, in order to facilitate and help run the application SWAT version 3.1 on windows based operating system 64-bit (on 16-bit) can use a DOS emulator. Emulator is defined as a program or software created by a computer system to run in a dedicated system or can be run in a computer system that is completely different. So with the use of the emulator, the system are uses a floppy disk or a floppy disk in order to run the SWAT applications (in DOS Version) can be replaced by the flash disk or other types of data storage are often used today. So make it easy and more user friendly anyway.

As for the DOSBox emulator is intended to run a variety of applications in 16-bit to 64-bit Windows. DOSBox emulator is software licensed under the GPL (General Public License) which is open source and can be obtained free of charge. In addition to Windows, the DOS emulator available on various platforms such as Mac and Linux that allows users to run applications based on platforms such third operating system. The reliability of the emulator does not change the authenticity of the results of scaling (the substance of the program) so that the function as well as the essence of the basic usability of the application SWAT are still can be maintained.

Keywords: Ergonomic, SWAT Program, Emulator, DOSBox

1. INTRODUCTION

"Work is human activity changing the particular circumstances of the natural environment which is intended to maintain and preserve the continuity of life." This is the definition given by W.S Neff about work. Definition appears very broad but reflects the basic thrust of workers, in order to maintain and maintaining human survival.

Toole gave another definition, namely "Work is an activity to produce something useful for others". The impression that

emerges from this statement is the social aspect of the work. this is a gift from one person to another. However, if it can be understood more deeply with the implied meaning that a person working for another person likely to get the credit for his work. Appreciation of other people here who, among others, sought also by someone and this not only in the form of matter but also in the form of recognition, praise, honor, and other psychological and sociological aspect.

"Ergonomics" is more expressing how humans have abilities in the face of the work

situation and the things that need to be considered in relation to the matters to design a good working system. There are several definitions of "Ergonomics":

1. Ergonomics is the study of the interaction between humans and other elements in a system, and the profession who practice the theory, principles, data and methods in the design to optimize the system to fit the needs, weaknesses, and human skills.
2. Ergonomics is derived from two Greek words; ergos and nomos. Ergos meaning work, and nomos meaning rule or principle.
3. Another opinion expressed by Sutalaksana (1979); Ergonomics is the science which studies human or rules as a component of a working system that's include physical and non-physical characteristics, human limitations, and capabilities in order to design a system that is effective, safe, healthy, comfortable, and efficient.
4. In the Indonesian Dictionary (KBI), ergonomics is:
 - a. Harmonization between workers, type of work, and working procedures of the environment.
 - b. The science of the relationships between humans, machines used, and the work environment.

From the explanation above it can be said that the work is related with ergonomics. is can not be separate the workload received with workers in doing their jobs. Broadly speaking, it can be said that the workload experienced by workers are divided into two kinds, namely workload is influenced by physiological factors and workload is influenced by psychological factors. Psychological workload can be said to be subjective workload (related to feelings and consciousness).

One of the tools that can be used is SWAT (Subjektif Workload Assesment Technique). SWAT was developed because of the emergence of the needs of the subjective measurements that can be used in the actual environment. This method was developed by Reid and Nygren at Armstrong Medical Research Laboratory on the basis of conjoint scaling method. SWAT is made such that the response is only given through 3 descriptors for each dimension includes time load, mental effort load, and psychological

stress load. This approach reduces the level of difficulty of the amount of time required given the number and complexity descriptors provided by the subject at the time of testing. But in terms of implementation, the basic tools needed to implement this SWAT can be said is not in accordance with the current, includes personal computer operating systems MS DOS 512K internal memory along with two floppy disk or a hard disk or a floppy disk.

2. FORMULATION OF THE PROBLEM

The fundamental problem that has been explained in the background is related to ergonomics. The formulation of the problem to be addressed regarding how to implement the SWAT software development in a windows based operating system is 64-bit.

3. FLOWCHART

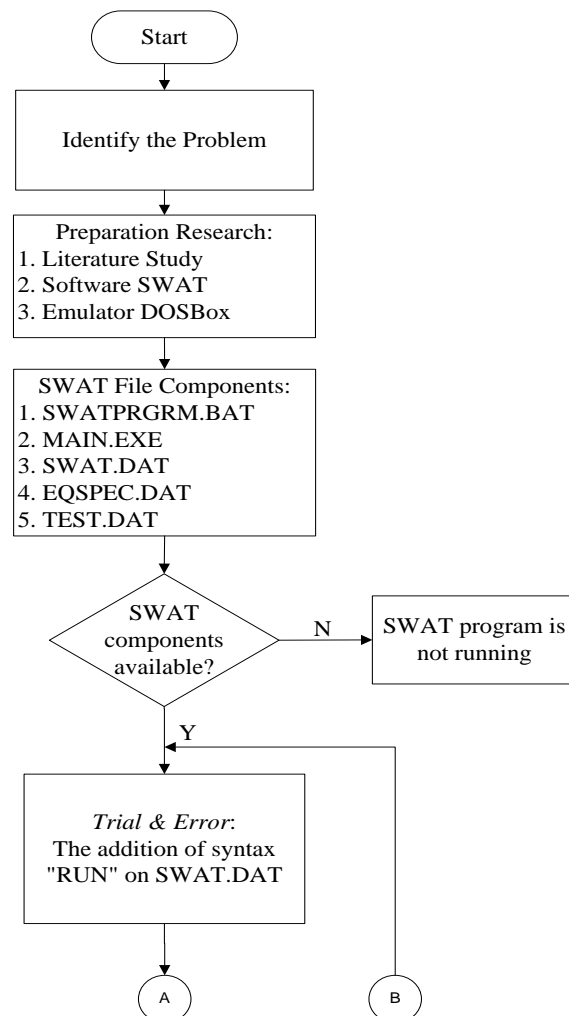


Figure 1. Methodology

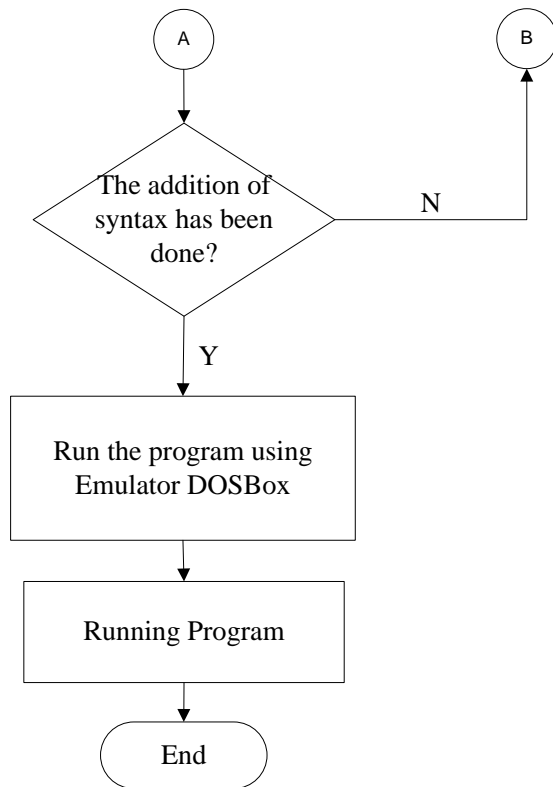


Figure 1. Methodology (cont.)

4. DISCUSSION AND ANALYSIS

SWAT (Subjective Workload Assessment Technique) is a tool used to measure mental workload in real world environment scientifically and objectively than qualitative data sources developed by Reid and Nygran at Armstrong Medical Research Laboratory.

In this case, the application SWAT procedure used to measure the mental workload is version 3.1. This version is an improved version of the previous versions. The components of SWAT are available to run this program is SWATPRGRM.BAT, main.exe, SWAT.DAT, test.dat and EQSPEC.DAT. The first of four files which consists of executable programs should be kept in the same file, while the fifth file is a sample data set that includes instructional and testing.

Before the SWAT program is executed, the next step is the addition of syntax in the file SWAT.DAT a "RUN" by opening the file in the form SWAT.DAT into notepad, then save the results of the syntax changes. More detail can be seen in Figure 1:

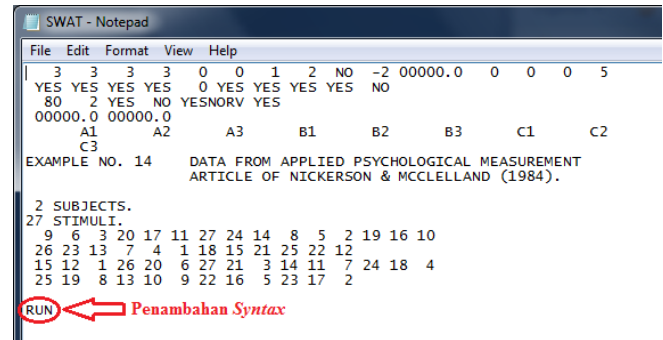


Figure 2. Appearance of Change Method Syntax Using Notepad

In this case, the basic tools needed to implement version 3.1 can be said is not in accordance with the current conditions, includes personal computer operating systems MS DOS with an internal memory with two 512K floppy disk or a hard disk or a floppy disk it self

In order to facilitate and help run the SWAT application version 3.1 on windows based operating system 64-bit (above 16-bit) can be used in the form of a DOS emulator DOSBox. Emulator is defined as a program or software created by a computer system to run in a dedicated system or can be run in a computer system that is completely different. As for the DOSBox emulator is intended to run a variety of applications in 16-bit to 64-bit Windows. DOSBox emulator is software licensed under the GPL (General Public License) which is open source so it can be obtained for free. The steps use is as follows:

Place a SWAT application in the Local Disk (C :) in order to facilitate the process of "mounting a drive" is done manually by using the DOSBox emulator. DOSBox emulator can be in www.dosbox.com. After getting the emulator DOSBox, run the emulator program so that the display appears as follows:

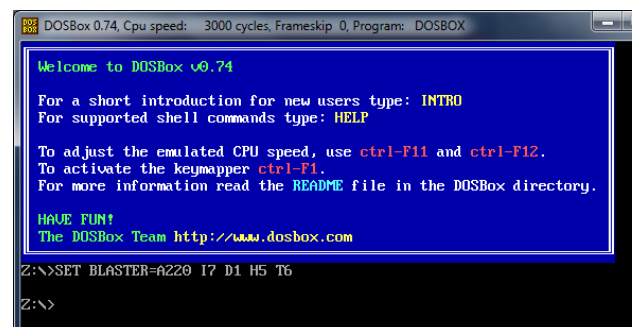


Figure 2. Initial Appearance of Emulator DOSBox

At first there were only a drive Z: in DOSBox. In order to access the drives on the computer, then the next step is to make the process of "mounting a drive" manually with the syntax:

```
mount [name of the drive][name of the drive+path which will be mounting] (1)
```

In this case the process will be mounting the folder C:\Applications on the computer to the A: drive in DOSBox, then the next step is to type syntax:

```
mount a: c:\swat (2)
```

More detail can be seen in Figure 3 below:

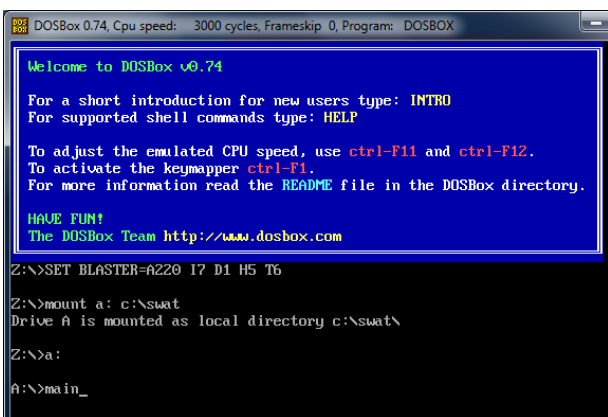


Figure 3. Appearance of DOSBox When Entering Syntax

After these steps are executed, for the initial the original SWAT program only runs on MS DOS operating systems 16-bit, can now be used on windows based operating system 64-bit.

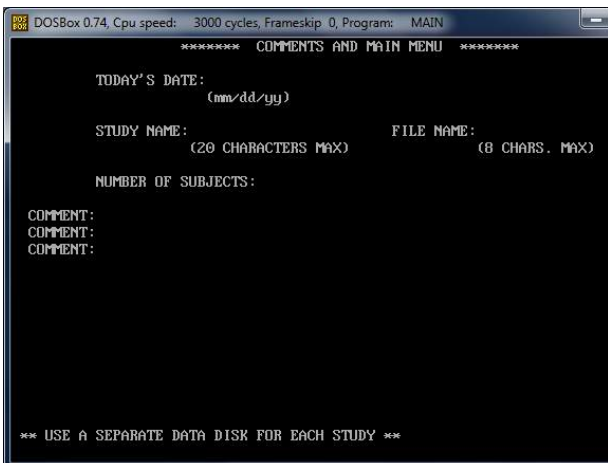


Figure 4. Initial Appearance of SWAT Program

5. CONCLUSIONS

Based on the analysis and discussion that has been presented, it can be concluded that in order to run the SWAT software development into a windows based operating system 64-bit, some things that should be done is to run the SWAT program using DOSBox emulator to make a small change to the syntax file SWAT.DAT a "RUN" so that SWAT program can be run as an application that is used for the needs of subjective measurements of the actual environment.

6. REFERENCES

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