

# Development of *Bleep Test Team* Software

Muhammad Zaki Waluya, Fajar Agni Fauzan and Rosadi Turjamil

*Sport Education Program, Postgraduate School, Universitas Pendidikan Indonesia, Jln. Dr. Setiabudhi No. 229, Bandung, Indonesia*  
Mochzaki4@gmail.com

**Keywords:** Bleep Test, VO<sub>2</sub>max.

**Abstract:** Bleep test team software development research was motivated by the implementation of bleep test which is only guided by the audio CD recording without automatic recording, then the development of domestic software that is easier, practical, effective, and efficient in running its process was needed. With the domestic bleep test software, it will be easier for testees to monitor the running of test, easily and practically. The purpose of this research is to produce bleep test team software product or in other language that is, 20m multi stage fitness. Bleep test is one of the tests to measure the prediction of maximum aerobic abruption or VO<sub>2</sub>max. The main function of this software is to guide the way bleep test that facilitates the testee in monitoring the tester with automatic record value. The research method used is adapted from research method of Research and development Sugiyono that is with stages: (1) Potential and Problem (2) Information Collection (3) Product Design (4) Design Validation (5) Design Repairing (6) The trials product. The result of validation test and trials performed, starting from simulated bleep test software and field experiments, show that it generally worked well, and software programs are aligned in accordance with the bleep test rules created by experts.

## 1 INTRODUCTION

In modern times today, it is undeniable that science and technology (science and technology) have many roles and help in improving the quality of human life, especially in learning and achievement in sports. The development of science and technology is very necessary. Every innovation is created to provide positive benefits for human life (Kurniawan, 2004). Providing many conveniences, as well as a new way of doing human activities. Technology, especially in data collection and analysis techniques by computerization, will help the athletes and their coaching staff to achieve faster and more precise targets (Fox, 2003). For example, by adopting data analysis techniques that have been frequently used by office companies, to improve performance and measure employee satisfaction, into the world of sports with the intended target by athletes and coaches that can be achieved.

In general, sports require a good physical condition for an athlete to excel in each sporting branch of each. One of the most important physical elements of exercise is the endurance of cardiorespiration (Armstrong, 2006). Basically, there

are two kinds of cardiorespiratory resistance, aerobic and anaerobic. During exercise in general, anaerobic resistance is required to perform explosive movements that require an explosion of energy (Rodrigues, 2006). However, for the game in general, movement patterns, as well as recovery time, aerobic resistance is needed. Measurements of cardiorespiratory resistance to aerobic capacity can be performed by measuring maximal oxygen consumption (VO<sub>2</sub>max). VO<sub>2</sub>max is the maximum amount of oxygen that can be consumed during intense physical activity until eventually fatigue occurs (Astorin, 2000). Measurement of VO<sub>2</sub>max values can be used to analyze the effects of a physical exercise program.

One of the VO<sub>2</sub>max measurement tests is bleep test, according to Iztok (2012) The multi-stage 20-m shuttle run test (MSRT) is one of the most popular field tests of the maximum speed for an indirect estimation of maximal oxygen uptake (VO<sub>2</sub>max). From the above statement, it can be concluded that a multi-stage 20-m shuttle run test or also called bleep test is one of the popular field tests used to find the estimated value of VO<sub>2</sub>max. The VO<sub>2</sub>max value data is used as an evaluation for athletes, both in

training evaluations and as parameters of exercise attainment (Uliyandari, 2009).

Based on the author's observations after searching the source on the internet at the end of July 2014 from the number of websites that write about the bleep test, also was reinforced by the statement of sports experts in one of the colleges of sports in Indonesia, that there is no software bleep test in release from Indonesia. Other problems that occur is that most of the test bleep in Indonesia are only done with cassettes containing beep sound (Audio CD) to guide the bleep test and the tapes are overseas products that recording the results are still done manually, and it also requires a lot of testee (people who do testing) to monitor the course of the bleep test which is miscalculation likely to happen due to human error and it will affect the lack of accuracy of the estimated results of test bleep conducted. Maybe this is happening because in Indonesia there is no collaboration to innovate between sports experts with IT experts to develop a software in sports that helps to support athlete's performance (Mulyanto, 2008).

Then after the author observed some of its functions, there are still weaknesses in the software that storage recording results must be done one by one, then the absence of indicator bleep time test shown to be shown to the testee for the tester to test bleep with maximum. The results of tests and statistics that complicate the reader and then input data tester amounted to 41 people and the absence of a number indicator to adjust to the tester, thus will complicate the testee in supervision bleep test team (Brian, 2005). Therefore, the authors conclude that the need for the manufacture of domestic software that developed the software test bleep by looking at some of the deficiencies of foreign software that has been the author to describe, as well as for more efficient software with affordable prices.

## 2 METHODS

### 2.1 Participants

The population in this research is the students of Sport Science, and the sample in this research were 10 students of Sport Science. The sampling technique used was purposive sampling technique because at this time of testing, it was only conducted to see the work of software.

### 2.2 Procedures

In this study, the method of R & D for the final results of this research will produce Bleep Software Test Team. Research methods Research and Development (R & D) is a research method that is used to produce a specific product and test the effectiveness of the product. To produce a specific product, research that needs analysis and to test the effectiveness of these products in order to function in the wider community is used. It is a necessary research to test the effectiveness of these products, Sugiyono (2013).

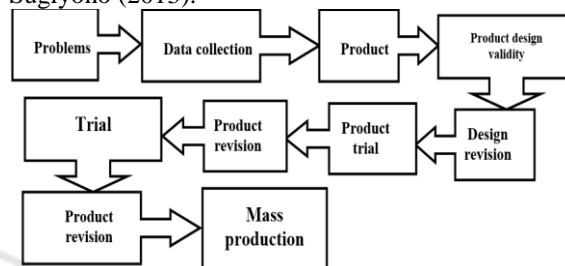


Figure 1: Diagram of R & D Research Procedure.

From 10 steps developed by Sugiyono (2013), only 6 steps will be adapted in this research that is step 1 to 6, here is a diagram of research flow used in this research can see in figure 2:

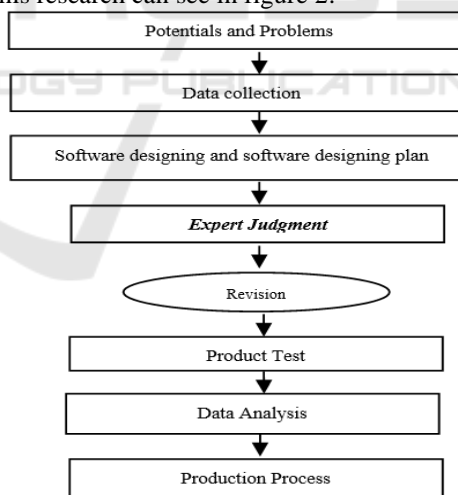


Figure 2: diagram of research flow.

### 2.3 Second Section

Instruments used in this research in order to test the perform of Bleep Test Team Software:

- One Personal Computer or laptop;
- Open field, minimum 30 m X 30 m;
- Cones;
- Speaker.

Each column must be 7,5-centimeter wide with a column spacing of 0,8-centimeter.

The section text must be set to 10-point, justified and line space single.

Section, subsection and sub subsection first paragraph should not have the first line indent, other paragraphs should have a first line indent of 0,5-centimeter.

### 3 RESULTS AND DISCUSSION

#### 3.1 Results of Bleep Test Team Software

The test is performed by using the software for testing the Bleep test, then testing the suitability of commands or functions present in the software and comparing the VO2max results in the Software with the VO2max table created by the experts. Then do a comparison with other Bleep test software that is Bit Work Bleep Test with audio CD. The following stages in this trial process include the following:

##### 3.1.1 Software Simulation

This simulation is carried out by running the Software and taking some Bleep test software output performed by IT experts from Maranatha Christian University and a sports measurement expert, which is its own supervisor to assess the suitability of Bleep test rules. In general, this simulation aims to determine whether the commands in the software works well or not, then to find out whether the software has been programmed in accordance with the rules of Bleep test or not, such as setting program level, feedback and VO2max estimates. Here are the scoring table results:

Table 1: Assessment Tool and Software Menu.

SECTION / BUTTON / MENU	ASSESSMENT
Start	Works
Number Button	Works
Done	Works
Files	Works
Fill in the Data	Works
Test Results	Works
Statistics	Works
Print	Works
Export	Works
Can be installed on any computer	Works
Beep's voice	Works

Table 2: Assessment of functions in software with bleep test rules.

PART	ASSESSMENT
Beep's voice	Corresponding
Level	Corresponding
Reverse	Corresponding
Time level	Corresponding
Total Time	Corresponding

The following table 3 is the result of some Bleep test software output from the Software simulation performed, and the comparison with the VO2max table data According to Leger (1982).

Table 3: Comparison Table of VO2max Results.

Software Bleep Test			MSF VO2max Data Source Table (Brian, 2005)			VO2max Value Differences
Level	Reverse	VO2max	Level	Reverse	VO2max	
4	2	27,1	4	2	26,8	0,3
5	2	30,2	5	2	30,2	0,0
6	2	33,6	6	2	33,6	0,0
7	2	36,9	7	2	37,1	-0,2
8	2	40,4	8	2	40,5	-0,1
9	2	43,8	9	2	43,9	-0,1
10	2	47,2	10	2	47,4	-0,2
11	2	50,8	11	2	50,8	0,0
12	2	54,2	12	2	54,3	-0,1
13	2	57,9	13	2	57,6	0,3

Table 4 shows when compared to the value of VO2max produced by Software Bleep Test with MSF Table values (Multi Stage Fitness, error up to ± 0.3 ml / kg / min. It is because the data above needs to be compared whether there is difference or not between result of VO2max using software and result of VO2max according to Leger (1982), hence T test was done by using independent T test in SPSS because in above data, it was said there were 2 groups and one data. Here's the result.

Table 4: Comparison Table of VO2max Results.

	t-test for Equality of Means			
	F	Sig.	t	df
vo2max	.439	.516	-.690	18
Equal variances assumed			-.702	17.950
Equal variances not assumed				

The significance value in the table above shows the number 0,516. If the significance <0.05 then the data stated there is said to have a difference, if significance > 0.05 then the data is said to not have a difference. Since the comparison of VO2max above has a significance value of 0.516 > 0.05 then the above comparison data shows that there is no difference in the mean results of VO2max in the bleep test software team in accordance with the estimation of the calculations of experts.

The table 5 shows the timing specified by the author, the maranatha IT state that it is difficult to equate the millisecond in the test bleep formula into the software. Then there is time adaptation for seconds.

Table 5: Comparison of time in software by the formula.

Level	Time in Software	Time in Table Leger (1982)
1	9	9
2	8	8
3	8	7,58
4	7	7,2
5	7	6,86
6	7	6,55
7	6	6,26
8	6	6
9	6	5,76
10	6	5,54
11	5	5,33
12	5	5,14
13	5	4,97
14	5	4,8
15	5	4,65
16	5	4,5
17	4	4,36
18	4	4,24
19	4	4,11
20	4	4
21	3	3,89

Since the data above wants to compare whether there is difference or not between time adapted into software with time according to Leger (1982) then T test is done using independent T test in SPSS because above data are said 2 groups and one data. Here's the result can see in figure 6.

Table 6: Non-parametric Test.

Test Statistics <sup>a</sup>	
	TIME
Asymp. Sig. (2-tailed)	.890

Since the data is not normal, (data attached) then the non parametrik test was conducted, the above table is the result of non-parametric test. Visible to the significance value of data above  $0.890 > 0.05$  it means that there is no significant difference between time in software with bleep time test according Leger (1982).

#### 4 CONCLUSIONS

Software bleep test team is made starting from the stage of data collection, software design, coding or coding stage is done to translate design into the

program language understood by the computer according to function, data and bleep test rules that have been made by experts. This team's bleep test software serves as a computerized application that will make it easier to guide test bleep tests on a team basis by generating more effective records and acting as an intermediary between the tester and the teste to perform activities with commands to be performed in computer software.

This software will work automatically to guide the way bleep test when a user pressing the start button then the time indicator in the software will run and the beep sound will come out of the speakers that have been installed with the computer device, the beep sound will be in accordance with the time level specified thus the tester performs a test bleep or runs a distance of 20 meters back and forth following the bleep rhythm coming out of the loudspeaker. If the testee is unable to follow the prescribed beep rhythm or is considered unable to run again then the user must press the number button to stop the test. Results will exit if all the testing has been stopped with the finished button. If the result is finished the user will be given the choice of whether the result of the document will be printed directly or the result is exported to Ms Word. Ms Excel and Adobe Reader. It can be concluded that only need to input data then press start button to start, number button to stop the test per individual, and finish to stop the process, eat result of VO2max already can be assessed and analyzed.

#### REFERENCES

Uliyandari, A., 2009. *Pengaruh Latihan Fisik Terprogram Terhadap Perubahan Nilai Konsumsi Oksigen Maksimal (Vo2max) Pada Siswi Sekolah Bola Voli Tugu Muda Semarang Usia 11-13 Tahun*, Karya Tulis Ilmiah, Universitas Diponegoro.

Kurniawan A., Adnan R., Aryaputra P., Sasono N., Heryana A. A., Rahman M. F., Saryada I. W., Wirasta A., 2004. *Pengenalan Bahasa C#*, Project Otak. Jakarta.

Astorin, T., Robergs, R., Ghiasvand, S., Marks, D., Burns, S., 2000. Incidence of the Oxygen Plateauat VO2max during Exercise Testing to Volitional Fatigue. *Journal of The American Society of Exercise Physiologist*. 3: 2.

Armstrong, N., 2006. Aerobic fitness of children and adolescents. *Jornal de pediatria*. 82(6), 406-408.

Mulyanto A. R., 2008. *Rekayasa Perangkat Lunak Jilid 1*, Direktorat Pembinaan Sekolah Menengah Kejuruan.

Brian, M., 2005. *101 Performance Evaluation Test*, Electric Word Plc. London.

- Fox SI. (2003). Muscle : Mechanism of Contraction and Neural Control. In : Fox SI. Human Physiology, 8nd ed. Kota : McGraw-Hill. p. 343.
- Iztok Kavcic (2012) Comparative study of measured And predicted vo2max during a multi-stage Fitness test with junior soccer players. comparative study of measured and predicted. Kinesiology 4(2012) 1:18-23
- Leger, L. A., & Lambert, J. (1982). A maximal multistage 20-m shuttle run test to predict VO2 max. European journal of applied physiology and occupational physiology, 49(1), 1-12.
- Brian, Mackenzie. (2005) Multi-Stage Fitness Test Table [WWW] Available from: <http://www.brianmac.co.uk/msftable.htm> [Accessed 13/8/2014]
- Rodrigues, A. N., Perez, A. J., Carletti, L., Bissoli, N. S., & Abreu, G. R. (2006). Maximum oxygen uptake in adolescents as measured by cardiopulmonary exercise testing: a classification proposal. Jornal de Pediatria, 82(6), 426-430.
- Sugiyono (2013). Metode Penelitian Kuantitatif, Kualitatif dan R&D. Bandung: ALFABETA.

