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Pauli testing tool application design

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ABSTRACT

The Pauli test in the field of psychology is a tool for tests used to measure individual psychological aspects. The series of activities in the Pauli test are carried out to determine the description of cognitive abilities, emotional conditions, attitude tendencies, and things that affect a person's attitude tendencies. The current Pauli test tool is still conventional, namely paper and pencil, after the test is carried out, the examiner manually analyzes the results of the respondent's activities. This requires a long time and the possibility of human error is large, therefore in our research a software application was designed that can replace conventional methods. The software is made using Visual Basic.NET. The design of the Pauli test software application is made similar to the existing conventional tools. The results obtained from the Pauli test software application are very helpful for psychologist examiners. The final results can be more easily obtained and the time required is more effective, because it is immediately obtained after the test takes place.

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1. INTRODUCTION

In the 20th century, almost all activities are carried out digitally, because data can be easily transmitted, processed and stored for further use. This greatly streamlines work, so that work activities can be done faster, more efficiently.

Psychology test tools in general are still conventional because they still use pencil and paper media (paper and pencil test), but along with technological developments, currently the use of Psychology tests is starting to be carried out with computer-based tests (CBT) online. With this method, the psychological test tools used are still the same as the psychological test tools in general, but the implementation is more practical because the problem no longer uses paper but can be directly seen and done through the computer. The scoring system also becomes much easier because it is directly processed by the computer. Computerization helps the institution in conducting tests, calculating test results and storing test results. This speeds up the processing of results and reduces the error rate in calculating test results (Dwiantoro, 2016). This will certainly be

beneficial for Psychology practitioners in conducting Psychology examinations because it saves time and makes it easier to carry out its administration.

Several previous studies have attempted to develop test tools that resemble the Pauli test, such as the convergence and divergence of the Kraeplin and Pauli Tests (Pradipta & Hidayat, 2019), new methods for calculating Pauli and Kraeplin tests (Haryadi & California, 2018), relationship between Work Attitude Analysis and Cumulative Performance Index Consensus (Tirandha et al., 2017), contradictions in understanding and practice of using the Pauli test among psychologists (Febrianto & Hidayat, 2019), social representations of psychologists regarding the Pauli Test (Hidayat, 2021), analysis of work speed and thoroughness tests (Herliansyah, 2016), research to identify stress to changes through cognitive measurement (Lufityanto et al., 2020), Kraeplin Test Using Linear Congruential Method (Nada et al., 2022) and . Other studies have also examined the relationship between the Pauli Test and other test tools such as (Kustimah et al., 2006), research that looked at the influence of vocal and tempo of pop music on work permormancy with the Pauli test (Simatupang & W, 2017) and The relationship between personality and intelligence with speed of work. (Butarbutar & Pasaribu, 2010)

There is also the development of digital-based Psychological test tools, such as Design and build an android-based Psychological test training application (B Munandar, 2019), Design a website-based Kraeplin Test (Pane et al., 2018; Sahyadi & Harsanti, 2018), Pauli Test Simulation Design using Computer Based Test (Putra et al., 2022), Desktop-based Pauli test result processing application (Aji, 2016), but there has been no research that has designed a complete Pauli test build using software.

Visual Basic can be widely used for a variety of applications, such as implementation of CTR daily model for application language of Microsoft Excel (Ahmadi et al., 2018), harmonic oscillation characteristic using visual basic application (Kareth et al., 2018), overview of obfuscation technique used by malware in visual basic for application script (Lupascu et al., 2018), forest monitoring system implementation using visual basic and android application (Othman et al., 2018), animated media design based on visual basic application microsoft powerpoint (Rohaeti et al., 2020), visual Basic is also used as a robot plotter interface to draw batik motifs (Ratnadewi et al., 2022), and utilization visual basic.net application for determination of individual drug disease (Usman & Zebua, 2018).

One of the psychological test tools that is often used in the field of work is the Pauli test. The Pauli test was created by Prof. Dr. Richard Pauli to improve the Kraeplin test so that it can describe a person's personality. How to do the Pauli test is quite simple because it is only a task of adding two numbers.

According to psychologists who use web-based applications, there are constraints when the signal is not good, so the testing time does not match reality. Internet signal is very influential on web-based applications, while this test is strongly influenced by the time of the test. This is what underlies this research to make applications without web-based. So it is expected that the Pauli test will be more accurate in terms of time, because it is not affected by internet signals, but directly installed on a laptop or personal computer.

The test tool created is the Pauli test. In designing the Pauli application, the Visual Basic.NET programming language is used. The Pauli test is a personality test that measures work attitude. The Pauli test is actually an improvement and refinement of the Kraepelin test compiled by Emil Kraepelin. The main principle of the Pauli test is that every human being is capable of practicing and learning. The Pauli test aims to see work results that are influenced by accuracy, endurance, and perseverance. Speed in calculating also measures accuracy, concentration, and emotional stability at work. Work results from a person's motivation and ability (Putra et al., 2022).

The conventional administration of this test is usually done by a tester who gives instructions on how to take the test and guides the test. The tester will show a piece of paper full of numbers, the individual's task is to add up the numbers according to the tester's explanation. This test lasts for +- 60 minutes with the tester will give regular signals to the testee to draw a line at some time.

The test results will then be scored by the tester. This scoring process requires a long process until it can finally show a graph and psychogram which will then be interpreted by a psychologist.

Pauli test has been used by (Adiyanto & Sahara, 2018) on the promotion system at PT KMK Global Sport. The matching of candidate profiles and available positions needs to be harmonized so that the company will progress. Profile matching and gap analysis are obtained from data available at the company and use 3 variables, namely intellectual, attitude and behavior. Pauli test results are used as recommendations for decision makers. This research have new implication and contribution for the participants in doing Pauli test with software application and also help tester to analyse the result more efficiently.

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2. RESEARCH METHOD

In designing the Pauli application, the Visual Basic.NET programming language is used because it can be installed directly through the page on the web and this programming language is widely used by engineers. The use of Visual basic.NET programming language is used by: (Darmawan et al., 2023) on the wireless robot plotter interface, (Andiyani et al., 2020) on managing Richeese product data at Indomaret and Alfamart, and by (Gusrion, 2018) on data storage and processing applications.

2.1 Application Design

The Pauli test is done by adding a number with the number below it, then adding a number with the next number below it, and so on until 1 hour. The summation process starts from the first leftmost column, after summing in the first column is completed, it continues in the second, third column and so on. The test sheet is made in 50 columns by 80 rows. For 3 minutes the working limit is marked in red. The application will check the number of correct answers and the number of wrong answers. The program design can be seen in the flow chart in Figure 1 below.

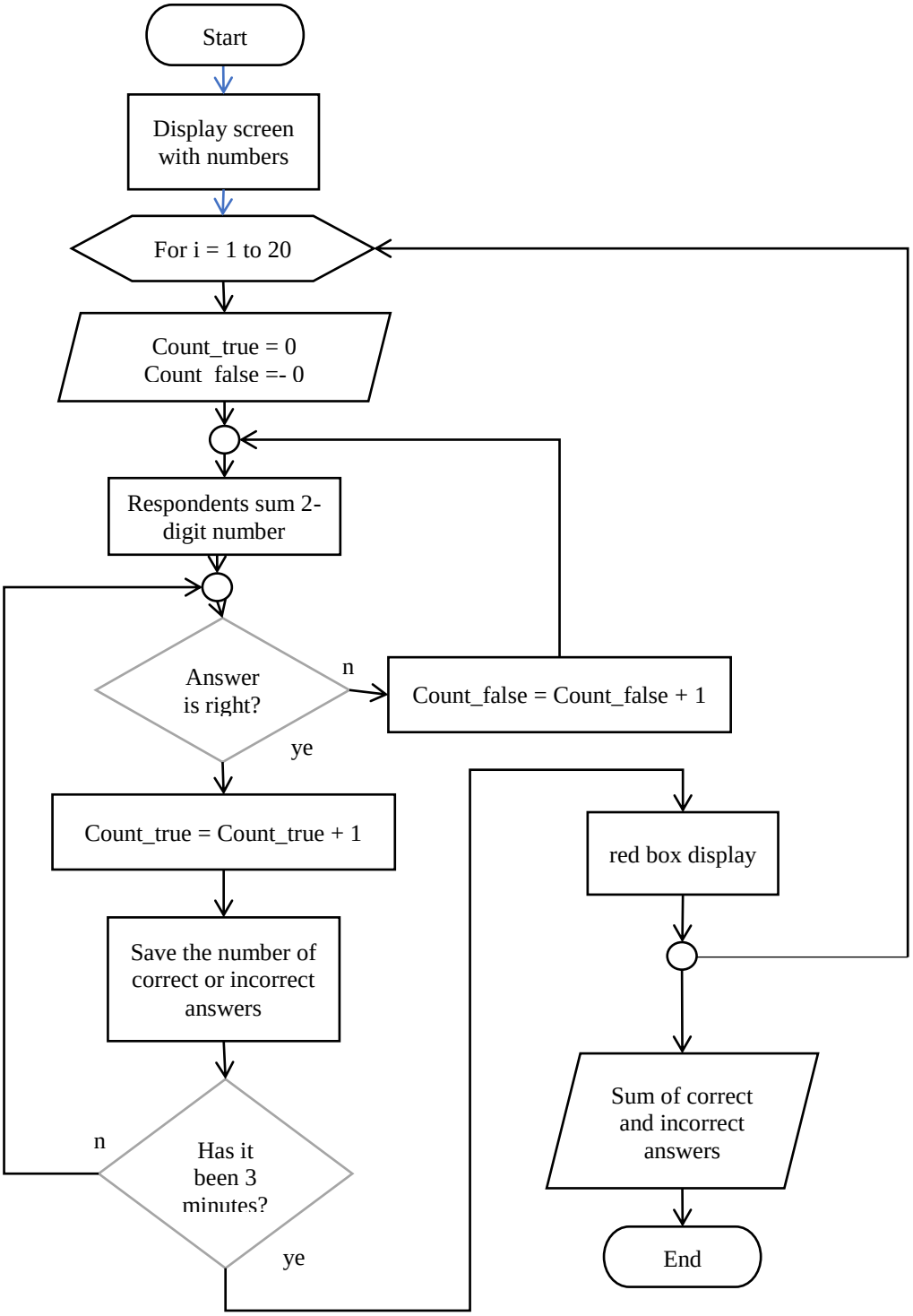

Figure 1. Flowchart of Pauli test application program design
Source: Ratnadewi, 2023

2.2 Interface design

This initial interface contains random numbers from 0 to 9. Respondents are asked to add two consecutive numbers from top to bottom, the result of the addition is typed in the empty box to the right of the two numbers. After one column is complete, proceed to the second column and so on.

Figure 2 Initial view
Source: Michael, 2023

When the respondent has filled in for 3 minutes, the application will mark the filled box in red, the respondent does not need to respond to the red color, because it will be used by the examiner later (Figure 3).

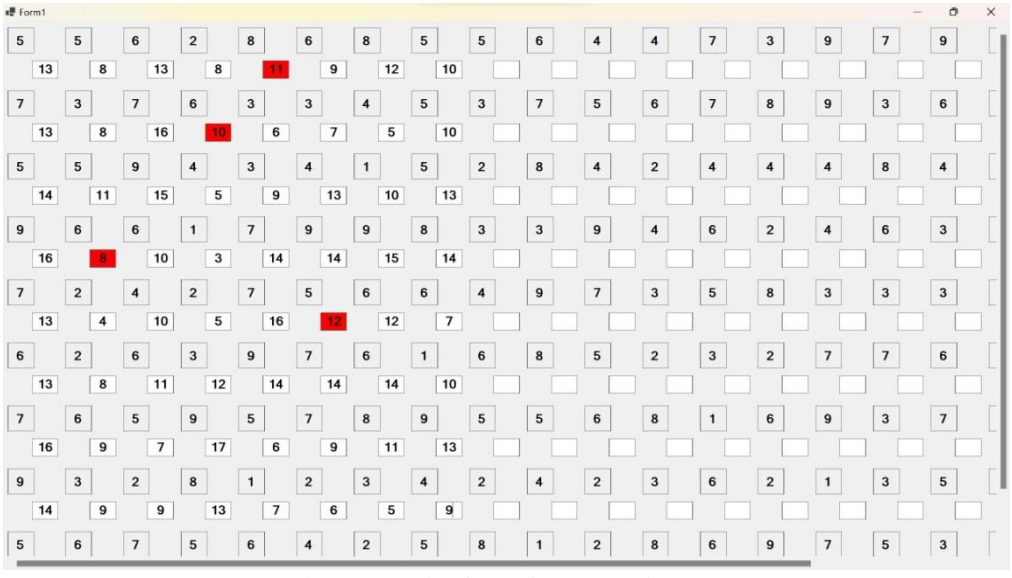

Figure 3 Display after 12 minutes
Source: Michael, 2023

After one hour, a summary of the number of inputs per session every 3 minutes will be displayed along with the number of correct and incorrect as shown in Figure 4. This number will later be used by psychologists to analyze a person's energy exertion, motivation, fighting power, perseverance, endurance, accuracy, and emotional stability.

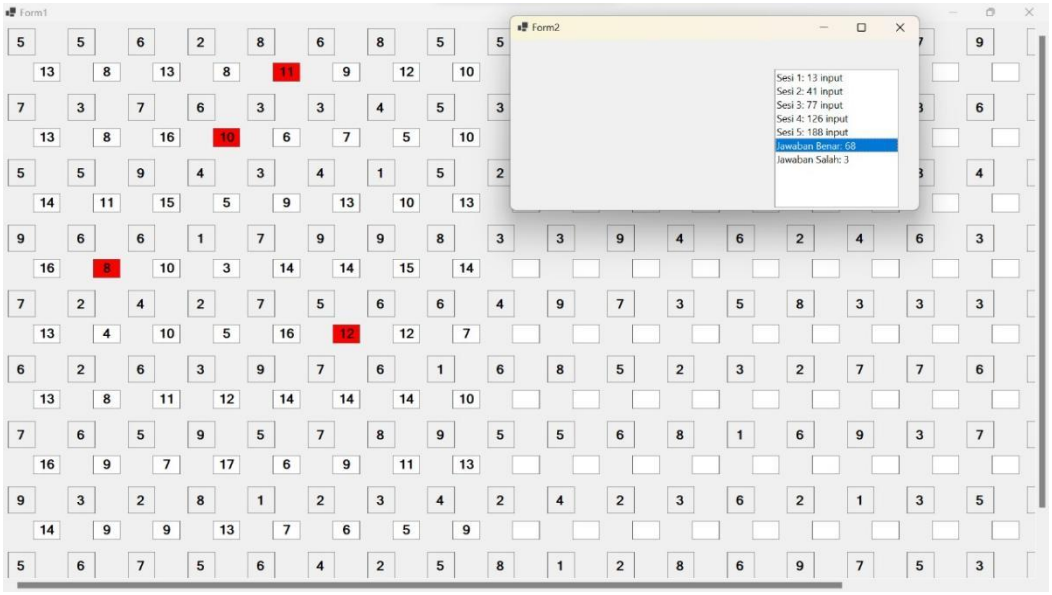

Figure 4 Display after completion
Source: Michael, 2023

3. RESULTS AND DISCUSSIONS

Software applications allow for the automation of various testing processes. Automation is essential for executing repetitive and time-consuming test cases efficiently. It reduces the chances of human error and enables faster feedback on the software's performance (Whittaker & Johnson, 2003). The use of software applications perceived by psychologists is that this application is felt to be very helpful for psychologists' work, especially in administering and scoring the Pauli test. Because conventionally, the implementation of the Pauli test is carried out with the guidance of a tester who must follow and give a "line" signal to mark the amount of work per 3 minutes. This is done for 60 minutes until the test ends. With this software, the Pauli test can be performed independently without the need to be accompanied by a tester. Software applications provide a controlled environment for testing, ensuring that tests can be reproduced consistently. Reproducibility is crucial for verifying the correctness of software behavior and for tracking down and fixing bugs (Felderer et al, 2016).

In the conventional scoring process, the Pauli test requires a lengthy scoring process with many steps involved. Starting from counting the total number of work results every 3 minutes, counting the number of errors, deviations, then making work charts, and filling in psychograms based on norms to then be submitted to a psychologist to interpret the results. By using the application, the results obtained can be more accurate, fast and automatic, after completion of testing, individual test results can be displayed directly in the form of work charts and psychograms. Psychologically, using software applications for testing provides a structured and objective approach to evaluating software. Testers can rely on tools to collect and analyze data without being influenced by subjective biases that may arise during manual testing (Tullis & Albert,

2013). When compared to the results of previous studies, this software application is most similar to the conventional Pauli test because it uses same basic principles as the original test. The previous studies only used Pauli Test Simulation Design using Computer Based Test (Putra et al., 2022), and Desktop-based Pauli test result processing application (Aji, 2016). Pauli test simulation, only measures the consistency and the sum of the true or false response. It will have different result in Pauli test analysis. When using desktop-based Pauli test result processing application, the participants still have to doing Pauli test manually using paper and pencil test but, the application can help the tester to process the result faster using the application. This research have new implication and contribution for the participants in doing Pauli test with software application and also help tester to analyse the result more efficiently.

Table 1 shows the difference between the conventional Pauli test and the Pauli test with the software application.

Table 1. Difference between conventional and software application Pauli test

No	Conventional	Software application
	One sheet of test paper is A3 in size, contains 50 rows x 40 columns and the reverse contains 50 rows x 40 columns. So a total of 50 rows x 80 columns.	One screen contains 50 rows x 80 columns. Due to the limitation of the monitor screen, the number display needs to be scrolled down and sideways.
2	The respondents may miss filling in sum 2 numbers	The respondents cannot miss filling in the sum of 2 numbers.
3	The respondents can correct the previous answers.	The respondent was unable to correct the previous answers.
4	The psychologists must manually check which answers are correct and which are incorrect	The psychologists does not need to check which answers are correct and which are incorrect, because it is automatically done by the application.
5	The psychologists should count the number of numbers worked every 3 minutes.	The psychologists does not need to count the number of numbers done every 3 minutes, because it is automatically done by the application.
6	The psychologists must count the total number of correct and the total number of incorrect counts.	The psychologists does not have to calculate the total number of correct and total number of incorrect, because it is automatically done by the application.
7	The test should be waited for by the psychologists to give a signal every 3 minutes, so that the respondent gives a line.	There is no need for the psychologists to wait for the test as the application will automatically red flag the screen every 3 minutes.
8	The possibility of test scoring errors due to human error is greater.	There is less chance of test scoring errors due to human error.
9	The test result checking time is long, needing to be checked manually.	The time to check the test results is fast, obtained immediately when the test is completed.
10	Paper test results require more space.	Test results are stored digitally, so there is no need for large space.

From Table 1, it can be seen that the Pauli test software application is very efficient in terms of time, place, accuracy, and the analysis process.

4. CONCLUSION

The realization of the Pauli test application software was successfully carried out, and it was very helpful for psychologists when calculating the correct and incorrect results of

the respondent's answers, because before the existence of the tester application it took a long time to calculate and check the respondent's correct or incorrect answers. Now with the application the examiner does not need to check the correct or incorrect answers because it has been automatically assisted by the Pauli test software application. The integration of software applications into the testing process is supported by both technological and psychological principles. These tools enhance efficiency, reliability, and scalability, providing a systematic and objective approach to evaluating software systems. The number of answers for each session can also be obtained. Data analysis can be done immediately. Respondents benefit because test results can be obtained immediately. This research have new implication and contribution for the participants in doing Pauli test with software application and also help tester to analyse the result more efficiently. This research also the most similar application that uses same basic principles as the original Pauli test.

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