TESTING THE RANDOM WALK STOCK ANALYSIS AS EFFECTIVE FOR IMPROVING LEARNING MEDIA ANALYSIS CAPABILITIES

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ABSTRACT

Software testing is a critical element that ensures that the software in this case random walk stock analysis software meets the quality standards in the study of the subject matter of media, media technical specifications, media design and coding and coding. The importance of testing and its implications refers to the quality of the software in its ability to communicate visually and audio visually with users that not all users understand the technology. Object-oriented testing on the application system is done through black box test. The overall goal of the black box test is to find the maximum number of errors with the minimum amount of effort, this is identical to the target on conventional software testing, which distinguishes the technique and strategy. Meanwhile, to assess whether the material presented in random walk stock analysis software has met the standard of learning materials and practice, the testing is done by a good material expert with a background of lecturers and practitioners. Material testing is carried out through detailed theoretical studies and in the form of structured questionnaires so that random walk stock analysis software is expected to meet material standards for learning purposes for students and lecturers as well as practical goals for investors and investment analysts.

Key Word: *Random Walk Stock Analysis, Software Program, Investment*

Introduction

Designing and building applications for the purpose of instructional media is very important. However, the optimization of learning media both in the effectiveness of the achievement of learning objectives, technical function of media and efficiency of media utilization is an aspect that is not less important. The existence of media is said to succeed if the media optimally able to achieve learning objectives. Therefore, in order for the media to succeed in achieving the learning objectives, the quality of the entire system and the content of the media must be tested. This is to meet both material standards and media standards through software testing by media experts, materials experts, and media users.

Aside from being a learning medium, random walk stock analysis software is also aimed at investors and capital market analysts. The provision of random walk stock analysis software program is adaptive from the actual market situation will help novice investors in investment practices before making a real investment. The random walk stock analysis software also assists in estimating risk and return on investment portfolio. It is expected that random walk stock analysis software will increase students' ability in fundamental and technical analysis to make investment decision in capital market. As for investors and capital market analysts, software media random walk stock analysis will facilitate in conducting investment portfolio analysis.

The random walk stock analysis software is built through the collaboration of Navqat MySql software, Adobe Dreamweaver CS 5, Adobe Photoshop Cs 5 image processing and notepad where the software is Object Oriented with UML notation using Software Development Life Cycle (SDLC) approach. The Object Oriented Approach (with UML notation) and Software Development Life Cycle (SDLC) build learning media that has the ability to transform users (students) to act as investors and investment analysts like in the real world. So far there is no random walk stock analysis software prototype built in the form of constructive learning media where students play an active role in solving macromultimedia analysis calculation models both quantitative and graphic formulas using Object Oriented approach (with UML notation) and Software Development Life Cycle (SDLC).

The research design used in this study is based on the development research design proposed by Borg & Gall (1983) and for software construction collaborated with the Software Development Life Cycle (SDLC) approach initiated by McLoead-Jr et al. (2009). Software Development Life Cycle (SDLC) in accordance with the purpose of random walk stock analysis software is to transform the role of investors and investment analysts in the real world to the user so as if the users enter the world of investors and the world of analysts.

There have been many random walk analysis studies such as Abraham (2002) testing the random walk model in three capital markets namely Saudi Arabia, Kuwait and Bahrain. The results showed that the weak form efficiency hypothesis was rejected. Lim, Liew and Wong (2003) tested the weak capital market efficiency in Kuala Lumpur and the results indicate that capital markets in Kuala Lumpur are not yet efficient in weak form. Omran and Farrar (2006) tested a random walk model on five capital markets in the Middle East namely Jordan, Morocco, Egypt, Israel and Turkey. Meilani (2010) from the research results stated that the 16 stock price indexes are IHSG, LQ45, JII, MBX, DBX, Kompas 100, Agriculture, Basic Industry and Chemical, Consumer Goods Industry, Finance, Infrastructure, Manufacturing, Mining, Miscellaneous Industry , Property and Trade do not

follow the random walk pattern which shows that the capital market in Indonesia after the merger of BEJ-BES still not fulfill the efficiency of weak form.

Nevertheless, even though random walk stock analysis software has been designed, the limitations of this random walk stock analysis software are not yet through the testing process. Software testing is a critical element that ensures that the software in this case random walk stock analysis software meets the quality standards in the study of the subject matter of media, media technical specifications, media design and coding and coding. The importance of testing and its implications refers to the quality of the software in its ability to communicate visually and audiovisually with users that not all users understand the technology. Therefore the precision of technical functions in meeting the demands of ease for the user by not reducing the quality of the material content requires quality assurance so demanding doing thorough and comprehensive testing. According to Sadiman (2010) whatever media made in the form of audio movies, video, games / simulations need to be assessed first before widespread use to determine whether the media can achieve the goals that have been established or not

Appropriate testing for media quality is object-oriented testing conducted by media experts. Object-oriented testing on the application system is done through black box test. The overall goal of the black box test is to find the maximum number of errors with the minimum amount of effort, this is identical to the target on conventional software testing, which distinguishes the technique and strategy. Black box tests are based on faults, random tests, and partition testing. Each method uses operations encapsulated by that class. The test sequence is designed to ascertain whether relevant operations have been performed. The whole process of object-oriented testing is done software random walk stock analysis that has been completed in the first stage really meet the media qualification standards.

Meanwhile, to assess whether the material presented in random walk stock analysis software has met the standard of learning materials and practice, the testing is done by a good material expert with a background of lecturers and practitioners. Material testing is carried out through detailed theoretical studies and in the form of structured questionnaires so that random walk stock analysis software is expected to meet material standards for learning purposes for students and lecturers as well as practical goals for investors and investment analysts.

Therefore, this article focuses on the validity and reliability of random walk stock analysis software that has been developed so that it can be guaranteed the quality of program control structure for the entire domain of software information along with media material.

Theoritical Review

Learning Media

Media is a tool that has the function of conveying the message (Bovee, 1997). Learning media is a tool that serves to convey the message of learning. Learning is a process of communication between learners, teachers and teaching materials. Communication will not work without the aid of messengers or media. The forms of stimulus can be used as a medium such as human relationships or interactions; reality; moving pictures or not; writings and sounds recorded. These five forms of stimulus will help the learner learn physics. However, it is not easy to get the five forms at a time or place.

Computer technology is an invention that allows to present some or all forms of stimulus above so that the learning of physics will be more optimal. However, the problems that arise are not as easy as imagined. Teachers are people who have the ability to realize the five forms of stimulus in the form of learning. However most teachers do not have the ability to present the five stimulus with computer programs while computer programmers do not master the learning of physics. The solution is to realize those stimuli in computer programs by using easy-to-learn software so that teachers can easily realize their teaching ideas.

A good learning media must meet some requirements. Media learning should improve teacher motivation. Mhas a goal to motivate the learners. In addition, the media must also stimulate learners to remember what has been learned in addition to providing new learning stimuli. Good media will also enable learners to provide feedback, feedback and also encourage students to practice properly. There are several criteria for assessing the effectiveness of a medium. Hubbard proposed nine criteria to judge (Hubbard, 1983). The first criterion is the cost. Costs should indeed be assessed with the results to be achieved with the use of that medium. Other criteria are availability of supporting facilities such as electricity, suitability with class size, brevity, ability to be changed, time and manpower of preparation, impacts, complexity and last is usability. The more learning objectives that can be helped by a media the better the media.

The above criteria is more for conventional media. Thorn proposed six criteria for assessing interactive multimedia (Thorn, 1995). The first criterion of assessment is the ease of navigation. A program should be designed as simple as possible so that physics learners do not need to learn computer first. The second criterion is the content of cognition, the other criterion is knowledge and information presentation. Both of these criteria are to assess the content of the program itself, whether the program has met the learning needs of the learners or not. The fourth criterion is the integration of media in which the media must integrate the aspects and skills of the language to be learned. To attract learners the program must have an artistic appearance then aesthetics is also a criterion. The last criterion of assessment is the overall function. The program developed should provide the learning desired by the learner. So by the time a person finishes running a program he or she will feel he has learned something.

Edgar Dale (in Setoysari and Sihkabuden, 2005) classifies learning media based on the level of experience gained by learners. The gap of experience is illustrated in a cone of experiences as follows:

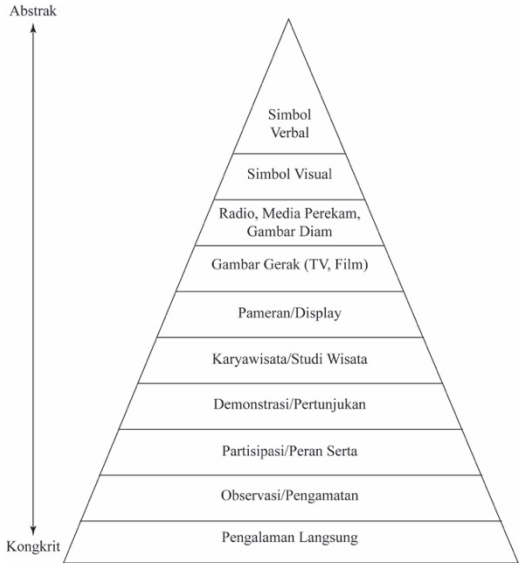

Figure 1.1 Cones of Edgar Dale's Experience (Setyosari and Sihkabuden: 2005)

While J.V. Edling (in Sadiman, 2008), the level of information digecracy presented by a media is influenced by the level of stimulation produced by the media. According to him media is part of the six elements of learning stimuli as depicted in Figure 2.1. In Edling's theory this is a continuum or continuity of learning experience that can be paralleled by the cone of experience by Edgar Dale.

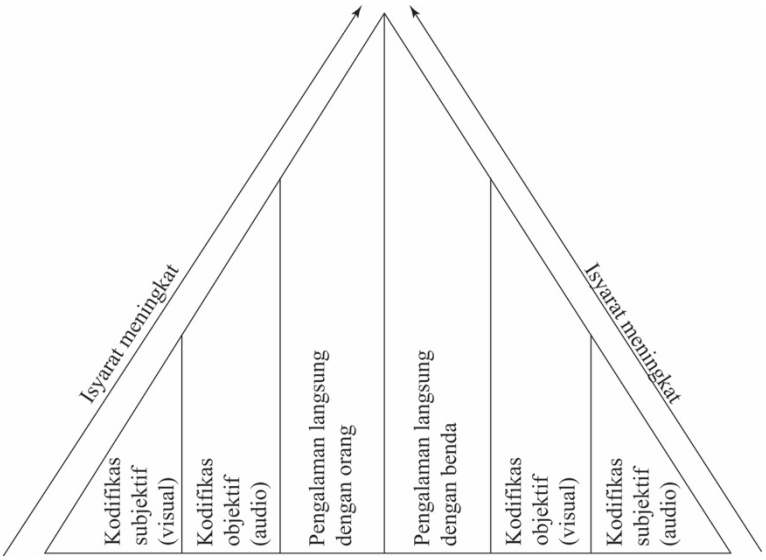

Figure 1.2 Taxonomic Stimulation According to J.V. Edling (Sadiman: 2008)

Investment Management

Investment is the activity of placing funds in financial assets that are financial assets or real assets to obtain results in the future day. To reduce the risk of investment and get optimal results from the investment it requires effective management. The process of treating the property or money is referred to as investment management. The process of managing money for it is done if someone who is professional in the field of financial science called as an investment manager.

The investment manager performs various insights and analyzes on various types of financial assets, assesses financial assets and creates investment strategies to select and evaluate those financial assets to be included in the investment portfolio.

Stock Exchange or Secondary Market

Secondary market or also known as secondary market is a financial market used to trade securities that have been issued in an initial public offering. The stock selling process generally uses auction system because transactions are conducted openly and prices are determined by supply and demand (Husnan, 2005). Basically this secondary market connects investor preferences to liquidity with the preferences of capital users who want to use the capital in the long run. The Jakarta Stock Exchange (BEJ) and the Surabaya Stock Exchange (BES) are the two stock exchanges in Indonesia which in 2007 merged into the Indonesia Stock Exchange (Jogiyanto, 2008).

Trade Mechanism

Before you can make a transaction, investor must first be a client in Securities company or broker's office. The customer or investor may place a sell or buy order after the investor has been approved to become a client in the respective Securities Company. Generally every Securities company requires its customers to deposit a certain amount of money as a guarantee that the customer is eligible to buy and sell shares. The availability of data is necessary as a source of information to make decisions. Data by type of analysis can be divided into two, namely:

Efficient Market Hyphotesis and RandomWalk

The historical journey of Efficient Market Hyphotesis can not be separated from the name Louis Bachelier, a French-blooded stock analyst. In 1900, Louis Bachelier conducted a study to determine whether stock prices and commodity markets fluctuate randomly (random walk). Although Bachelier's efforts to achieve the goals of his studies are experiencing difficulties, particularly in estimating the random characteristics of stock and commodity prices that have the effect of awarding predicate adjourn by the professor, at least this study initiates subsequent studies related to market efficiency and random walk. Three decades later, Cowles (1933) conducted research on the accuracy of analytical results from professional analyst institutes in estimating the volatility of expected stock returns based on historical data on average stock price movements. The study finds that these professional analyst bodies are not accurate in predicting expected returns. His studies continued in 1944 with similar research objects as before, but this time extended the sample period of the average stock return. The results show that, within 40 years, only 3.3% of expected returns made by professional analytical bodies is accurate.

The research on the concept of market efficiency and random walk attracted more scientists, this time by Kendall (1953) for the first time using the random walk financial literature, to observe the routine of the volatility level of the 22 UK stock indices and commodity prices in the US market. The results of the study indicate that price volatility is random, where the increase or decrease of stock price on a certain day is independent from the previous day. Robert (1959) found similar results for the Dow Jones Average Industry (DJIA), where the DJIA index changes are random. Some of the above empirical evidence, discussed by Fama (1965a) in his doctoral dissertation entitled The Behavior of Stock-Market Prices. The dissertation is a proof of his academic attitude in support of empirical evidence that the daily stock price of a random walk is an accurate description of the realities of the capital market.

Random walk implies that a series of stock price changes are independent of past price changes, so historical data can not be used to predict future stock price movements (Fama, 1965b). Stock prices on a given day reflect market conditions on the same day and are not related to market conditions on the previous day. Random walk market price behavior is the basis for Fama in developing market efficiency concept. For the first time Fama (1965b; 3-4) defines market efficiency as follows:

A market where there are large numbers of rational profit maximizers actively competing, with each of the predicted futures market values of individual securities, and where important current information is almost freely available to all participants. The above definition shows that investors are rational, competing against each other to eliminate the difference between actual return and intrinsic value of shares. New information is a source of fundamental analysis, then responded by investors, thus changing the intrinsic value and affect the stock price. According to Fama (1965b), in a situation where new information is published, the true price (intrinsic value) will soon change and move toward new levels of intrinsic value due to investors' rational behavior. The neutralization process of the difference between actual return and intrinsic value, causing actual return to fluctuate randomly around its intrinsic value (Yalçın, 2010). Guerien and Gun (2011) argue that price uncertainty and independence of stock price changes caused by investor response to new information, resulting in neutralization actual return and intrinsic value is a characteristic of efficient stock market work. Therefore the market is said to be efficient, if the price reflects any existing information because of rational behavior investors in responding to any new information. This is explained Fama (1970: 387) as follows:

> A market in which prices are always called efficient. In an efficient market, competition will cause the full effects of information on intrinsic values to be reflected "instantaneously" in actual prices.

Research Design

This research includes research development in order to improve the quality of learning. Research Development or research and development (R & D) is a strategy or research method to improve practice (Sukmadinata, 2009). Development Research is also defined as a process or steps to develop a new product or refine an existing product that can be accounted for (Sujadi, 2003: 164). The resulting product can be either an object or hardware (hardware) and can also be software (software). According to Borg & Gall (1983) research-based development is a research conducted to develop and evaluate products for educational purposes. The purpose of this research is to produce a product. Research development according to Santyasa (2009; 4) has the following characteristics:

1. Problems to be solved are real problems related to innovative efforts or application of technology in learning as a professional responsibility and commitment to the acquisition of quality learning.
2. Development of models, approaches and methods of learning and learning media that support the effectiveness of student achievement competence
3. Product development process, validation done through expert test, and field trial in a limited need to be done so that the resulting product is useful for improving the quality of learning. The development process, validation, and field trials should be clearly described, so it can be accounted for academically.
4. The process of developing models, approaches, modules, methods, and instructional media needs to be well documented and systematically reported in accordance with the research principles that reflect originality.

Research design and implementation of software random walk stock analysis meet the characteristics of research development above. In general, the research design used in this study is based on the development research design proposed by Borg & Gall (1983) and for the construction of programming tools in collaboration with the Software Development Life Cycle (SDLC) approach initiated by Mc Loead-Jr et al. (2009).

Collaboration is done because in previous studies have been built database but still using traditional applications and has some problems that have been described in the previous section. Software Development Life Cycle (SDLC) is a method that can accommodate the design and implementation of a system that is perfect from what has been built previous. In addition Software Development Life Cycle (SDLC) in accordance with the purpose of random walk stock analysis software is to transform the role of investors and investment analysts in the real world to students so as if the students enter the world of investors and the world of analysts. Software Development Life Cycle (SDLC) is implemented at the Preliminary Developments form of Production stage presented by Borg & Gall

The systematic development of media programs in the Borg & Gall model focuses on media issues that have a tendency to be exploited in the formal education process. In addition, the systematic model of Borg & Gall's development gives researchers the flexibility to combine various other research methods in designing and building a learning medium. In the systematic development, there are steps to be taken to achieve the expected results. The stages are: (1) Research and Information collection; (2) Planning; (3) Develop Preliminary form of Product; (4) Preliminary Field Testing; (5) Main Product Revision; (6) Main Field Testing; (7) Operational Product Revision; (8) Operational Field Testing; (9) Final Product Revision; (10) Disemination and Implementation. Here is a step-by-step development of learning media based on the adoption of the Borg & Gall model

1. Preliminary Field Testing. This pilot activity is commonly called validation, which aims to collect data as a basis in determining whether the software random walk stock analysis is feasible to be used as a medium of learning so as to support the achievement of a predetermined goal. Software testing aims to achieve the following objectives: a). Testing is the process of execution of a program with the intent to find errors. b). Good testing is a test that has a high probability of finding errors that have never been found before. c). Successful testing is a test that reveals all the errors that have never been found before. The validation activities in the media development program focuses on formative validation consisting of two first expert tests, software testing using the Black Box test and expert media questionnaire media expert. Second, fill out a material expert questionnaire by a material expert.
2. Software testing on this software random walk stock analysis by the media expert conducted by the Black Box test is a test that focuses on the functional requirements of the software and filling out a questionnaire of media experts. Black box testing is used to show that software functions are operational. That the inputs are well received and the resulting out put as well as the integrity of the external information is maintained. The tests conducted by the material experts through a material expert questionnaire were conducted to determine whether the random walk stock analysis software is feasible to be used in the learning process so as to support the achievement of the intended purpose.
3. Main Product Revision. After initial trials by media experts and material experts, the next step is to improve the product according to the data obtained from the initial trial. Suggestions from experts are used as a cornerstone of product improvement.
4. Main Field Testing. After the initial product is repaired in accordance with the advice of media experts and material experts then next, field trials are conducted to get an evaluation of the product.
5. Operational Product Revision. After field testing, the next step is to study whether the learning product is in accordance with the predetermined objectives. The data on the trial is analyzed and then becomes the cornerstone of product improvement. Operational Field Testing. At this stage, large-scale field trials are conducted. Operational field trials are conducted in four test activities with different samples. The first field test is to apply the software in the course of Capital Market Investment Management. This field test is the final test after the software through various testing, evaluation and improvement.
5. Final Product Revision. At this stage, product refinement is done based on inputs or results of field trials on a wide scale. Guidebooks can be arranged as one of the important support in running the application in this case learning media random walk stock analysis software

Based on the data presentation of expert media test results can be analyzed and interpreted based on success rate criteria are as follows:

All questions are included in valid criteria and overall results of data processing from the media experts above, obtained the results 98. Based on the criteria of success rates that have been determined, then the product developed included in the criteria valid and feasible to be used as a medium of learning

Qualitative data in software development random walk stock analysis as a medium of learning by media experts is a form of criticism and suggestions. In general, random walk stock analysis software does not require revision. According to media experts, software random walk stock analysis has been valid and feasible to be utilized as a medium of learning. As an addition to the need to include the media use manuals in the laboratory, it is one of the products other than the random walk stock analysis software that has been planned since the beginning.

Based on the data of expert material test results can be analyzed and interpreted based on success rate criteria are as follows:

1) Questions that qualify valid include: a). Software reflects fundamental and technical analysis processes; b). Software succeeds in placing users as investors and or analysts; c). Systematic, logical, and clear logic; d). Contextuality and actuality; e). Interactivity f). Software capable of reflecting material process of technical and fundamental analysis; g). The difference between software random walk stock analysis with learning objectives; h). The accuracy of software as a supporting learning strategy i) Software able to improve the ability of investment decision analysis; j) Software improves user skills in the accuracy of investment decision making; k) Software capable of providing a complete understanding of

investment management; l) Accuracy of use of terms / words in the delivery of features; m) Alternative teaching and learning activities applied; n) The level of attractiveness of each feature for the user

2) A statement that includes valid qualification is a language that is used properly and correctly according to EYD
3) From the data processing results obtained an average of 93.33%. Based on the predetermined success rate, the software random walk stock analysis is valid and feasible to be used as a supporting medium of learning in Investment Management course.

Research Instruments

In the development of random walk stock analysis software, the instrument used in the form of questionnaires and tests (pre-test and post-test) for students. Questionnaire is used to measure the feasibility of random walk stock analysis software developed. Questionnaire used in the form of a closed questionnaire, which is a questionnaire that has provided the answer so that the respondents just choose. The questionnaire instrument is used to collect data on the judgments or responses of material experts, media experts, learning experts, and audiences.

Test instruments (pre-test and post-test) are used to measure the effectiveness of random walk stock analysis software in growing and honing analytical skills. The test instruments (pre-test and post-test) each consist of 10 questions, and each question has the same points. The form of test questions (pre test and post test) using an objective test form. The objective test is a test consisting of items that can be answered by choosing one of the correct alternatives from a number of available alternatives

Qualitative data in software development random walk stock analysis as a medium of learning by material experts is a form of criticism and suggestions. In general, random walk stock analysis software requires no revisions, especially on content material. In general, random walk stock analysis software has reflected all the materials in the course of Investment Management. That is, the purpose of the course is to cultivate expertise for students to conduct analysis in making investment decisions have been met in the context of practice through software random walk stock analysis.

To know the effectiveness of learning media developed, experiments have been done by using experimental model before-after. Analysis of experimental results that have been used in the development of learning media is the analysis with the help of SPSS 17.0 for Windows as follows:

a). Normality test

Normality test is performed to test what pretest, post test or both have normal or abnormal distribution. Tests of normality assumption were performed using One-Sample Kolmogorov-Smirnov Test with a significance of 5%. Test results are presented in the following table:

Table 4.10 One-Sample Kolmogorov-Smirnov Test

One-Sample Kolmogorov-Smirnov Test		
	PRE	**POST**
Kolmogorov-Smirnov Z	1.003	1.025
Asymp.Sig.(2-tailed)	.121	.146
a. Test distribution is Normal		

The Kolomogorov-Smirnov test results for the pretest value show the Asymp value. The significance is 0.121 so that the probability> 0.05 and for the post test value of Asymp value. Significance shows 0.146, so the probability> 0.05. It can be concluded that the value of prestest and post test value is normal distribution so that the next data analysis is done using parametric statistical method with paired sample t test analysis type.

b) Paired Test Samples T Test

Paired Samples T Test This test is used to determine whether there is a difference of a sample with the same subject but having two different treatments. The test results are presented in the following table:

Table 4.11 Paired Sample Test

Paired Sample Test			
			Pair 1
			PRE-POST
SIG.(2-tailed)			.012

From result of data processing obtained result of magnitude of probability (significance) that is 0,012 <0,05. So H0 rejected and Ha accepted, meaning there is a significant difference between learning outcomes before using media and learning outcomes that use the media. It can be said that the paired sample test supports the validity test of the media which states that the developed learning media is valid used in investment management learning.

Learning Results Data
Data of student learning result of pre test and post test to limited field trial result presented as follows:

Table 4.12 Data of Student Learning results

Paired Sample Statistic					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PRE	62.1387	30	5.93503	1.178721
	POST	87.4329	30	6.62828	1.45725

From table 4.12 above is known that the use of learning media can increase the average value of students on the standard of competence with an increase in the average student value from 62.1387 to 87.4329 with an increase of 17.14 or 26.86%.

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