INFORMATIKA
UPN "VETERAN" JAWA TIMUR

Pengujian dan Implementasi Perangkat Lunak Bagian 2

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Yang ada pada presentasi ini :

1. Teknik Desain Kasus Uji
2. Teknik *White Box Testing*
3. *Basic Path Testing* & *Flow Graph Testing*
4. Teknik *Black Box Testing*
5. *Review* Pembuatan *Test Plan*

1

Teknik Desain Kasus Uji

Sumber teknik desain kasus pengujian perangkat lunak :

1. Dari spesifikasi persyaratan
2. Dari struktur komponen atau sistem
3. Dari pengalaman tester pada sistem yang sama atau penguji menggunakan intuisi

Dari Spesifikasi Persyaratan

- Analisis Nilai Batas (BVA)
- Kesetaraan Partisi (EP)
- Pengujian Tabel Keputusan
- Transisi Diagram
- Menggunakan Kasus Pengujian

Dari Struktur Komponen/Sistem

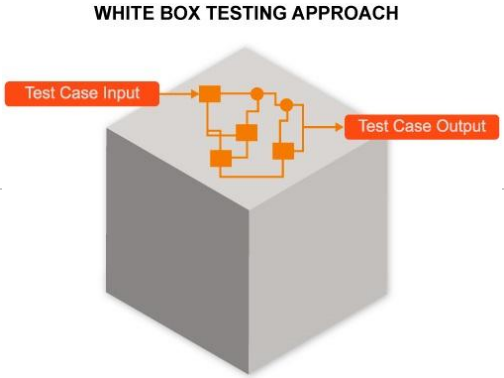
- Cakupan Pernyataan
- Cakupan Branch
- Cakupan Jalur
- Pengujian *Linear Code Sequence and Jump*

Dari pengalaman tester pada sistem yang sama

- Tebakan
- Pengujian Eksplorasi

2

Teknik *White Box Testing*



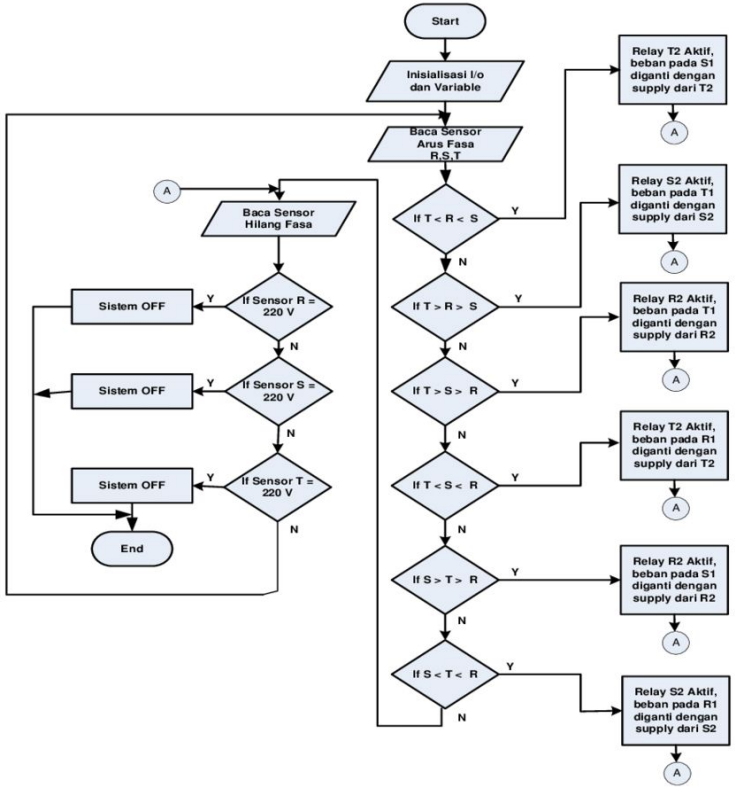
Pengujian kotak putih

Menguji perangkat lunak dari segi desain dan kode program apakah mampu menghasilkan fungsi-fungsi, masukan, dan keluaran yang sesuai dengan spesifikasi kebutuhan.

Pengujian kotak putih dilakukan dengan memeriksa lojik dari kode program. Pembuatan kasus uji bisa mengikuti standar pengujian dari standar pemrograman yang seharusnya.

Contoh pengujian kotak putih :

Menguji alur (dengan menelusuri) pengulangan pada logika pemrograman seperti diagram alir di samping.



3

Basic Path Testing & Flow Graph Testing

Basic Path Testing

Metode ini memungkinkan desainer *test case* mengukur kompleksitas logis dari desain prosedural dan menggunakannya sebagai pedoman untuk menetapkan basis set dari jalur eksekusi. Tujuannya adalah meyakinkan bahwa himpunan *test case* akan menguji setiap *path* pada satu program sedikitnya satu kali. *Basic path testing* berkaitan dengan metrik *Cyclomatic Complexity* dan *Flow Graph Testing*.

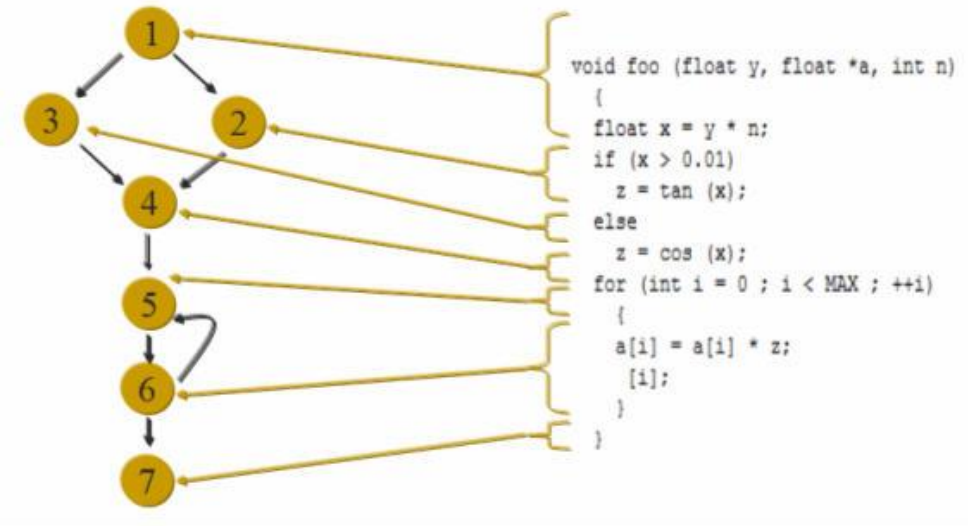
Metrik Cyclomatic Complexity

Cyclomatic complexity adalah metrik perangkat lunak yang memberikan pengukuran kuantitatif terhadap kompleksitas logis suatu program. Kompleksitas dihitung dalam salah satu dari tiga cara berikut :

1. Jumlah region grafik alir sesuai dengan kompleksitas siklomatis
2. V(G) = E–N+2
3. Juga V(G)=P+1

V(G) : Kompleksitas siklomatis
E : Jumlah *edge* dari grafik alir
N : Jumlah simpul (*node*) grafik alir
P : Jumlah simpul predikat dalam grafik alir.

Ilustrasi

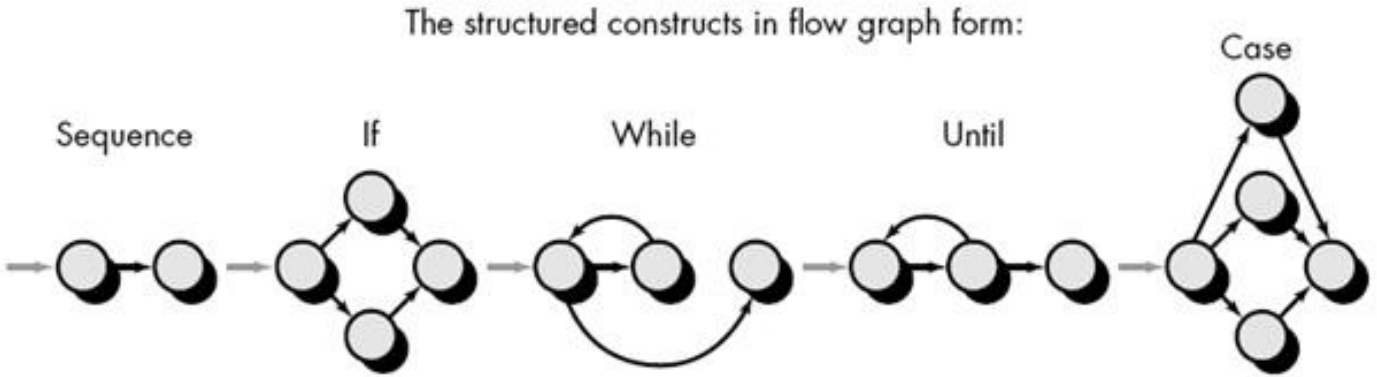


Path 1	1 – 3 – 4 – 5 – 7
Path 2	1 – 2 – 4 – 5 – 7
Path 3	1 – 2 – 4 – 5 – 6 - 7

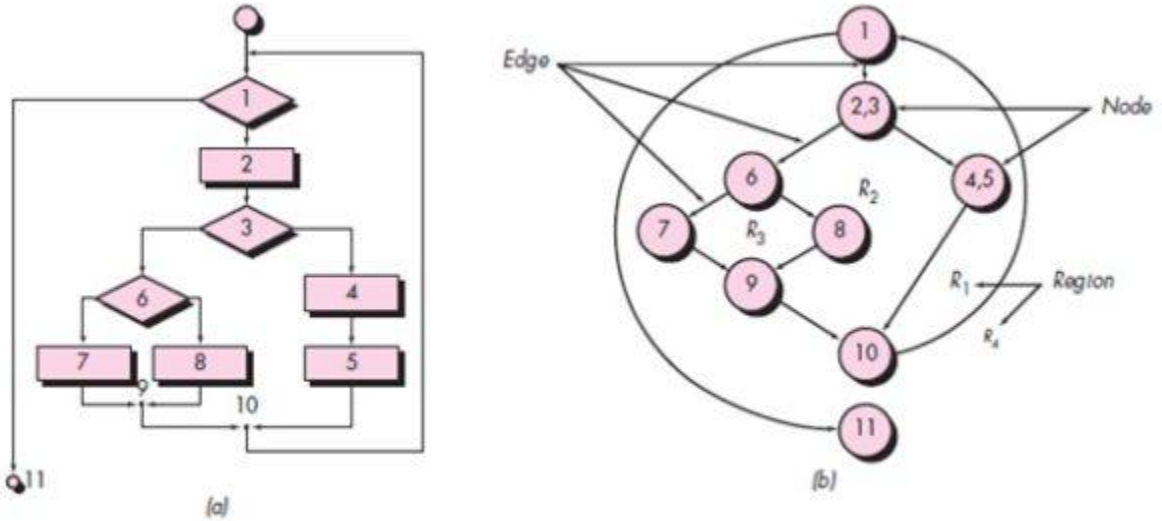
Flow Graph Testing

Flow Graph merupakan grafik yang digunakan untuk menggambarkan aliran kontrol dari sebuah program. Berbeda dengan *flowchart*, grafik pada *flow graph* tidak menggambarkan secara detail proses yang terjadi pada setiap blok notasi. Jenis notasi pada *flowchart* digambarkan secara berbeda (*diamond*, persegi panjang, jajar genjang, dst) untuk menggambarkan proses yang berbeda, sedangkan notasi pada *flow graph* hanya diwakili oleh sebuah notasi lingkaran.

Notasi struktur kontrol :



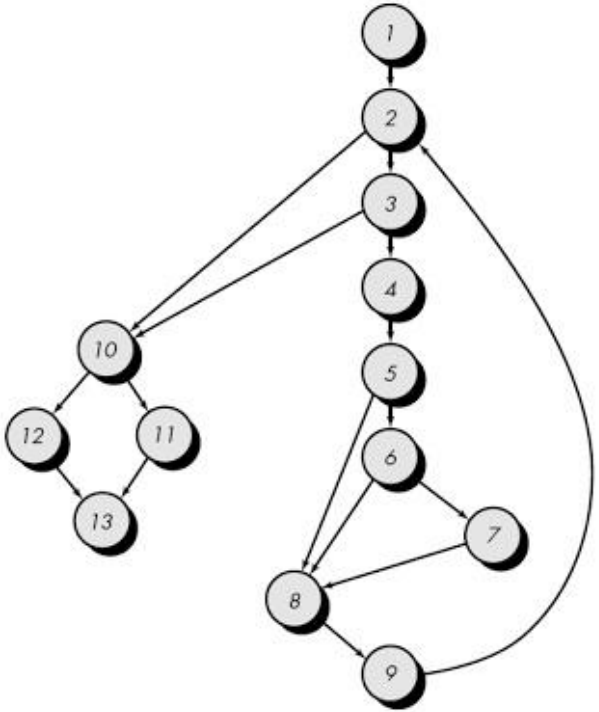
Konversi *flow chart* ke *flow graph*



Konversi *pseudo code* ke *flow graph*

```
INTERFACE RETURNS average, total.input, total.valid;
INTERFACE ACCEPTS value, minimum, maximum;

TYPE value[1:100] IS SCALAR ARRAY;
TYPE average, total.input, total.valid;
    minimum, maximum, sum IS SCALAR;
TYPE i IS INTEGER;
1  i = 1;
   total.input = total.valid = 0;          2
   sum = 0;
   DO WHILE value[i] <> -999 AND total.input < 100   3
4     increment total.input by 1;
      IF value[i] > = minimum AND value[i] < = maximum   6
5        THEN increment total.valid by 1;
7             sum = s sum + value[i]
         ELSE skip
8     ENDIF
      increment i by 1;
9  ENDDO
   IF total.valid > 0   10
11    THEN average = sum / total.valid;
12    ELSE average = -999;
13 ENDIF
```



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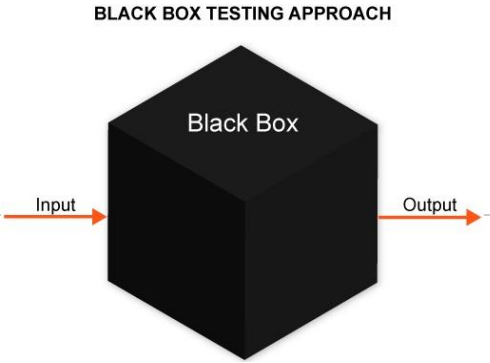
Teknik *Black Box Testing*



Pengujian kotak hitam

Menguji perangkat lunak dari segi spesifikasi fungsional tanpa menguji desain dan kode program. Pengujian dimaksudkan untuk mengetahui apakah fungsi-fungsi, masukan, dan keluaran perangkat lunak sesuai dengan spesifikasi yang dibutuhkan.

Contoh pengujian kotak hitam :

Misalkan untuk kasus *log in*, maka kasus uji yang dibuat adalah :

1. Jika pengguna memasukkan nama pemakai dan kata sandi yang benar
2. Jika pengguna memasukkan nama pemakai dan kata sandi yang salah, misalnya nama pemakai benar tapi kata sandi salah, atau sebaliknya, atau keduanya salah.

5 *Review Test Plan*

Test Plan adalah dokumen yang berisi definisi tujuan dan sasaran pengujian dalam lingkup iterasi (atau proyek), item-item yang menjadi target pengujian, pendekatan yang akan diambil, sumber daya yang dibutuhkan dan point untuk diproduksi. Dengan kata lain *test plan* dapat disebut sebagai perencanaan atau skenario untuk melakukan *testing* yang akan dilakukan baik oleh ahli atau pengguna umum.

Tujuan membuat *test plan* secara umum adalah untuk memudahkan *developer* untuk melakukan *testing* agar *testing* yang dilakukan menjadi jelas sehingga hasilnya lebih berguna dan efisien. Berikut adalah bagian-bagian dari *test plan* berdasarkan *outline* yang dikeluarkan oleh IEEE format 829 dan *review*/ulasan/tanggapan yang saya temukan mengenai *test plan*.

1 TEST PLAN IDENTIFIER RS-MTP01.3

2 REFERENCES

None Identified.

3 INTRODUCTION

This is the Master Test Plan for the Reassigned Sales Re-write project. This plan will address only those items and elements that are related to the Reassigned Sales process, both directly and indirectly affected elements will be addressed. The primary focus of this plan is to ensure that the new Reassigned Sales application provides the same level of information and detail as the current system while allowing for improvements and increases in data acquisition and level of details available (granularity).

The project will have three levels of testing, Unit, System/Integration and Acceptance. The details for each level are addressed in the approach section and will be further defined in the level specific plans.

The estimated time line for this project is very aggressive (six (6) months), as such, any delays in the development process or in the installation and verification of the third party software could have significant effects on the test plan. The acceptance testing is expected to take one (1) month from the date of application delivery from system test and is to be done in parallel with the current application process.

Test Plan Identifier adalah bagian untuk menjelaskan secara singkat mengenai objek yang akan diuji. *References* berisi referensi apa saja yang digunakan pada test plan terkait. I*ntroduction* dibuat untuk menjelaskan secara narasi, mengenai testing yang akan dilakukan terhadap suatu objek pengujian.

Bagian *test item* menjelaskan mengenai daftar komponen-komponen dalam objek pengujian yang akan diuji satu per satu.

4 TEST ITEMS

The following is a list, by version and release, of the items to be tested:

A. EXTOL EDI package, Version **3.0**

If a new release is available prior to roll-out it will not be used until after installation. It will be a separate upgrade/update project.

B. DNS PC EDI transaction package, Version **2.2**

If a new release is available prior to roll-out it will not be used until after installation. It will be a separate upgrade/update project.

C. Custom PC EDI transaction package (two distributors only).

D. New reassigned sales software, initial version to be Version **1.0**

A detailed listing of programs, databases, screens and reports will be provided in the system and detailed design documents.

E. Order Entry EDI interface software, Current version at time of pilot. Currently, version **4.1.**

F. Reassigned Sales System requirements document, SST_RQMT.WPD version **4.1**

G. Reassigned Sales System Design Document, SST_SYSD.WPD version **3.02**

H. Reassigned Sales Detail Design Document, SST_DTLD.WPD version **3.04**

5 SOFTWARE RISK ISSUES

There are several parts of the project that are not within the control of the Reassigned Sales application but have direct impacts on the process and must be checked as well.

A. The local AS/400 based vendor supplied EDI software package. This package will be providing all the reformatting support from the ANSI X12 EDI formats to the internal AS/400 data base file formats.

B. The PC based software package installed at each distributor's location (both custom written and vendor supplied) will be providing the formatting of the distributors data into the correct EDI X12 formats.

C. Backup and Recovery of the EDI transmission files, local databases and restart of the translation process, must be carefully checked.

D. The ability to restart the application in the middle of the process is a critical factor to application reliability. This is especially true in the case of the transmission files as once the data is pulled from the mail box it is no longer available there and must be protected locally.

E. Database security and access must be defined and verified, especially for files shared between the Order Entry application and the Reassigned Sales process. All basic security will be provided through the AS/400 systems native security process.

Berisi mengenai beberapa kemungkinan kerugian pada saat proses pengembangan perangkat lunak.

6 FEATURES TO BE TESTED

The following is a list of the areas to be focused on during testing of the application.

A. New EDI data acquisition process.

B. Redesigned On-line screens.

C. Redesigned/Converted reports.

D. New Automated Archive process.

E. Interface to the Order Entry system and data bases.

F. Computation of Sales Activity by region for commissions

Penjelasan dan daftar daftar fitur yang akan diuji di pada saat pelaksanaan testing dimulai.

7 FEATURES NOT TO BE TESTED

The following is a list of the areas that will not be specifically addressed. All testing in these areas will be indirect as a result of other testing efforts.

A. Non-EDI Order Entry processes.

Only the EDI interface of the Order Entry application will be verified. Changes to the EDI interface to support Reassigned Sales are not anticipated to have an impact on the Order Processing application. Order Entry is a separate application sharing the data interface only, orders will continue to process in the same manner.

B. Network Security and dial-in access.

Changes to include EDI transactions for reassigned sales will have no impact on the security aspects of the network or the EXTOL/EDI interface.

C. Operational aspects of the EDI process.

Changes to include EDI transactions for reassigned sales will have no impact on the operational aspects of the EXTOL/EDI interface.

Menjelaskan mengenai fitur fitur apa saja yang ada di dalam objek testing namun, fitur tersebut tidak akan diuji pada saat pelaksanaan testing dan disertakan penjelasan singkat mengapa fitur tersebut tidak diuji pada saat testing.

8 APPROACH

8.1 Testing Levels

The testing for the Reassigned Sales project will consist of Unit, System/Integration (combined) and Acceptance test levels. It is hoped that there will be at least one full time independent test person for system/integration testing. However, with the budget constraints and time line established; most testing will be done by the test manager with the development teams participation.

UNIT Testing will be done by the developer and will be approved by the development team leader. Proof of unit testing (test case list, sample output, data printouts, defect information) must be provided by the programmer to the team leader before unit testing will be accepted and passed on to the test person. All unit test information will also be provided to the test person.

SYSTEM/INTEGRATION Testing will be performed by the test manager and development team leader with assistance from the individual developers as required. No specific test tools are available for this project. Programs will enter into System/Integration test after all critical defects have been corrected. A program may have up to two Major defects as long as they do not impede testing of the program (I.E. there is a work around for the error).

ACCEPTANCE Testing will be performed by the actual end users with the assistance of the test manager and development team leader. The acceptance test will be done in parallel with the existing manual ZIP/FAX process for a period of one month after completion of the System/Integration test process.

Programs will enter into Acceptance test after all critical and major defects have been corrected. A program may have one major defect as long as it does not impede testing of the program (I.E. there is a work around for the error). Prior to final completion of acceptance

Bagian *Approach* adalah bagian yang digunakan untuk memberi deskripsi mengenai cara yang dilakukan untuk melaksanakan testing dan disertakan dengan penjelasan mengenai *approach* yang digunakan.

9 ITEM PASS/FAIL CRITERIA

The test process will be completed once the initial set of distributors have successfully sent in reassigned sales data for a period of one month and the new EDI data balances with the old ZIP/FAX data received in parallel. When the sales administration staff is satisfied that the data is correct the initial set of distributors will be set to active and all parallel stopped for those accounts.

At this point the next set of distributors will begin the parallel process, if not already doing so. Only the initial set of distributors must pass the data comparison test to complete the testing, at that point the application is considered live. All additional activations will be on an as ready basis. When a distributor is ready, and their data is verified, they will then also be activated.

Berisi tentang Kriteria- kriteria yang harus dipenuhi sebelum berlanjut ke fase berikutnya dan kriteria pengujian disebut gagal/*fail*.

10 SUSPENSION CRITERIA AND RESUMPTION REQUIREMENTS

A. No Distributors are ready for testing at pilot initiation.

The pilot project will be delayed until at least three Distributors are ready to initiate the pilot process. No additional elements will be added to the Reassigned Sales project during this delay.

B. Unavailability of two EDI mail boxes.

In the event two production lines and mail box facilities cannot be obtained the current single production line and mail box will continue to be used until a second line becomes available. This will necessitate careful coordination between the Order Entry department and the Reassigned Sales group.

C. Distributor PC EDI software delays.

In the event of a delay in the delivery or availability of the PC software package, the only major delay will be in pilot testing. Unit, Integration and Systems testing can continue using limited data until such time as the PC software is ready.

This will also add time to the lower levels of testing as full complete testing cannot be done without reasonable amounts of data. The data can only be derived from actual transmissions from the PC software package.

Berisi tentang Spesifikasi Kriteria- kriteria yang dapat digunakan untuk menghentikan sementara kegiatan testing dan testing tersebut dapat dilanjutkan di waktu lain.

11 TEST DELIVERABLES

Acceptance test plan

System/Integration test plan

Unit test plans/turnover documentation

Screen prototypes

Report mock-ups

Defect/Incident reports and summaries

Test logs and turnover reports

Adalah daftar dokumen-dokumen apa saja yang akan dihasilkan setelah pengujian selesai dilakukan.

12 REMAINING TEST TASKS

TASK	Assigned To	Status
Create Acceptance Test Plan	TM, PM, Client	
Create System/Integration Test Plan	TM, PM, Dev.	
Define Unit Test rules and Procedures	TM, PM, Dev.	
Define Turnover procedures for each level	TM, Dev	
Verify prototypes of Screens	Dev, Client, TM	
Verify prototypes of Reports	Dev, Client, TM	

Menjelaskan Kegiatan pengujian beserta dengan pihak yang akan melaksanakan kegiatan tersebut.

13 ENVIRONMENTAL NEEDS

The following elements are required to support the overall testing effort at all levels within the reassigned sales project:

A. Access to both the development and production AS/400 systems. For development, data acquisition and testing.

B. A communications line to the EDI mailbox facility. This will have to be a shared line with the Order Entry process as only one mailbox is in use. There will have to be a coordinated effort to determine how often to poll the mailbox as the order entry process requires that data be accessed every hour and the sales process really only needs to be pulled once a day.

C. An installed and functional copy of the AS/400 based EDI vendor package.

D. At least one distributor with an installed copy of the PC based EDI vendor package for sales data.

E. Access to the master control tables (data bases) for controlling the production/testing environment on both production and development systems.

F. Access to the nightly backup/recovery process.

Spesifikasi dan perincian segala sesuatu yang dibutuhkan dan digunakan selama proses *testing* berjalan, bisa berupa *hardware* yaitu spesifikasi komputer atau hal lain selain *hardware*.

14 STAFFING AND TRAINING NEEDS

It is preferred that there will be at least one (1) full time tester assigned to the project for the system/integration and acceptance testing phases of the project. This will require assignment of a person part time at the beginning of the project to participate in reviews etc... and approximately four months into the project they would be assigned full time. If a separate test person is not available the project manager/test manager will assume this role.

In order to provide complete and proper testing the following areas need to be addressed in terms of training.

A. The developers and tester(s) will need to be trained on the basic operations of the EDI interface. Prior to final acceptance of the project the operations staff will also require complete training on the EDI communications process.

B. The sales administration staff will require training on the new screens and reports.

C. At least one developer and operations staff member needs to be trained on the installation and control of the PC based distributors EDI package. The distributors personnel will also have to be trained on the PC based package and its operational characteristics.

Secara garis besar menjelaskan bagaimana melakukan pendekatan untuk menentukan peran para staf di dalam proyek dan melakukan pelatihan apabila diperlukan untuk pengujian.

15 RESPONSIBILITIES

	TM	PM	Dev Team	Test Team	Client
Acceptance test Documentation & Execution	X	X		X	X
System/Integration test Documentation & Exec.	X		X	X	
Unit test documentation & execution	X		X	X	
System Design Reviews	X	X	X	X	X
Detail Design Reviews	X	X	X	X	
Test procedures and rules	X	X	X	X	
Screen & Report prototype reviews			X	X	X
Change Control and regression testing	X	X	X	X	X

The development team leader will be responsible for the verification and acceptance of all unit test plans and documentation.

Berisi mengenai tugas yang diemban pada tiap divisi dalam tim pengembang perangkat lunak.

16 SCHEDULE

Time has been allocated within the project plan for the following testing activities. The specific dates and times for each activity are defined in the project plan time line. The persons required for each process are detailed in the project time line and plan as well. Coordination of the personnel required for each task, test team, development team, management and customer will be handled by the project manager in conjunction with the development and test team leaders.

A. Review of Requirements document by test team personnel (with other team members) and initial creation of Inventory classes, sub-classes and objectives.

B. Development of Master test plan by test manager and test with time allocated for at least two reviews of the plan.

C. Review of the System design document by test team personnel. This will provide the team with a clearer understanding of the application structure and will further define the Inventory classes, sub-classes and objectives.

Ada beberapa tujuan dalam membuat schedule di dalam test plan, antara lain :

1. Merincikan Tolak ukur waktu pengerjaan Testing.
2. Merincikan event transmittal item.
3. Estimasi waktu yang dibutuhkan untuk setiap task.
4. Menjadwalkan Testing task dan Test Milestone.
5. Merincikan periode pemakaian Testing resources.

17 PLANNING RISKS AND CONTINGENCIES

A. Limited Reassigned Sales staff.

The Reassigned Sales administration staff currently has two positions unfilled. As a result of this staff shortage there may be delays in getting staff to review appropriate documents and to participate in the Acceptance test process. Should client staff become a problem, the appropriate dates for reviews and acceptance testing will slip accordingly. No attempt will be made to bypass any part of the review and testing processes.

However, if acceptable to the Reassigned Sales staff administrator, a member if the test team my be available to act as the client's representative for part of the Acceptance test itself. The reviews of the screens and reports must have Client participation and approval.

18 APPROVALS

Project Sponsor - Steve Sponsor	
Development Management - Ron Manager	
EDI Project Manager - Peggy Project	
RS Test Manager - Dale Tester	
RS Development Team Manager - Dale Tester	
Reassigned Sales - Cathy Sales	
Order Entry EDI Team Manager - Julie Order	

Planning risks and contingencies digunakan untuk memastikan agar hasil testing tetap berkualitas dengan memeriksa beberapa bagian yang tidak termasuk di dalam kontrol pengerjaan *software*, namun bagian tersebut dapat berdampak langsung terhadap proses.

Lembar persetujuan(approvals) sebagai tanda bahwa seluruh tim/pimpinan telah menyetujui *test plan* yang telah dibuat.

Referensi

S, Rosa A. & Shalahuddin, M. 2018. *Rekayasa Perangkat Lunak Terstruktur dan Berorientasi Objek Edisi Revisi*. Bandung : Informatika

http://41813120217.blog.mercubuana.ac.id/wp-content/uploads/sites/104/2015/06/Desain-Test-Case.pdf

https://sis.binus.ac.id/2016/12/16/test-kasus-desain-teknik/

http://sis.binus.ac.id/2017/05/03/pengertian-test-plan/

http://socs.binus.ac.id/2016/12/30/basis-path-testing-flow-graph/

Terima kasih!