1 Application

On partirait sur une application « Profiler » permettant de créer des tests (QCM) d'évaluation des candidats et de les faire passer à ces deniers aux fins d'évaluation.
Une première analyse fonctionnelle (Analyse V1.2) a déjà été faite (voir ANNEXE1). Elle doit être revue et validée par les équipes commerciale/RH qui seront les futurs utilisateurs de l'application. Il faut a minima y intégrer la problématique RGPD.

2 PROFIL RECHERCHE ET TECHNOS

Profil : développeur Java/Spring ayant a minima des connaissances HTML/JavaScript et si possible Angular ou Vue.JS

Application WEB en deux parties :

- Back :
  - API REST (webservices) écrits en Java/SpringBoot
  - BD : MySql
- Front :
  - Dans un premier temps, utiliser Postman pour tester les WS
  - Ensuite, créer les écrans :
    - Idéalement en Angular/JS ou Vue.JS
    - Si pas possible en HTML/JS

3 ORGANISATION

Le stage se passera dans les locaux du stagiaire.

Le stagiaire ne pourra PAS bénéficier de l'infrastructure IT interne (PC, connexion LAN, internet, imprimantes, …). Il faudra donc prévoir un repository GitHub pour échanger les fichiers. Cette tâche incombera au stagiaire.

Le stagiaire sera suivi par le maitre de stage via une réunion hebdomadaire de max 1h.

On travaille en mode Agile :

- Sprint de 1 semaine où Le stagiaire travaille sur les Todo's en étant le plus autonome possible. Si le stagiaire est vraiment bloqué ➔ Le stagiaire fait appel à au maître de stage via mail/GSM/Teams/,…. Charge à lui de trouver du support via les *tech leads* Java /Spring/Angular,…
- Une fois par semaine (date à convenir) :
  - Le stagiaire montre les progrès effectués dans l'analyse/l'appli/tests/… + remet son rapport de stage au maître de stage qui le validera dans la foulée
  - Le stagiaire partage les éventuels soucis et le maître de stage l'aide au mieux afin d'éviter les blocages (choix fonctionnels, changements de scope si nécessaire, modification architecture/technos, …)
  - En fin de séance le stagiaire et le maître de stage définissent de concert les prochains Todo's

La durée du stage n'est pas fixée à ce stade. Les participants s'engagent à mettre tout en œuvre pour mener à bien le projet À tout moment le stagiaire et Aubay pourront mettre fin au stage (avec préavis d'une semaine).

En fin de stage, Aubay pourra récupérer et utiliser à sa guise les codes sources de l'applications. Le stagiaire pourra quant à lui mentionner l'expérience correspondante (stage) sur son CV.

Le stage n'est pas rémunéré.

4 Cordonnées des participants au stage

4.1 Stagiaire

Eric KEIBLER

4.2 Maître de stage

Philippe LAURENT

5 Analyse de l'application (V1.2)

5.1 Executive summary

A tablet application should be developed presenting questionnaires with multiple choice answers to an individual, permitting to:

Requirement	MoSCoW
Draft a person's individual profile competence	M
Compare profile competences between individuals	?
Detect training needs of an individual, based on his/her profile competence	?
Find the best match between individual profile competences and clients' requirements	?

The system build around this business case can be very flexible, but the higher the flexibility (lots of parameters to configure), the higher the complexity will be.
The best approach seems to take one specific profile and to develop a prototype with predefined questionnaires and business rules. The application can be enriched later if required, after a period of intensive testing.

5.2 Business Analysis

The following basic high level processes could be detected for this kind of application. Every process is treated in detail further on in this document (chapter Functional Analysis). All processes are to be seen as valid for a single candidate & profile. Every candidate/profile pair needs to have its own instance of these processes.
Management has to decide which of these processes are to be developed.

Input	Process	Output	MoSCoW
• 1-n predefined questionnaires • 1-n stored tests	**Prepare a test**	A predefined test	M
A predefined test	**Run a test**	A stored raw score	M
• A predefined test • 1-n unloaded, predefined questionnaires • Manual input • 0-n test questions	**Configure a test**	A customized test	?
A customized test	**Run a test**	A stored raw score	?
A stored raw score	**Report scores**	A transformed score 0-n graphs	M ?

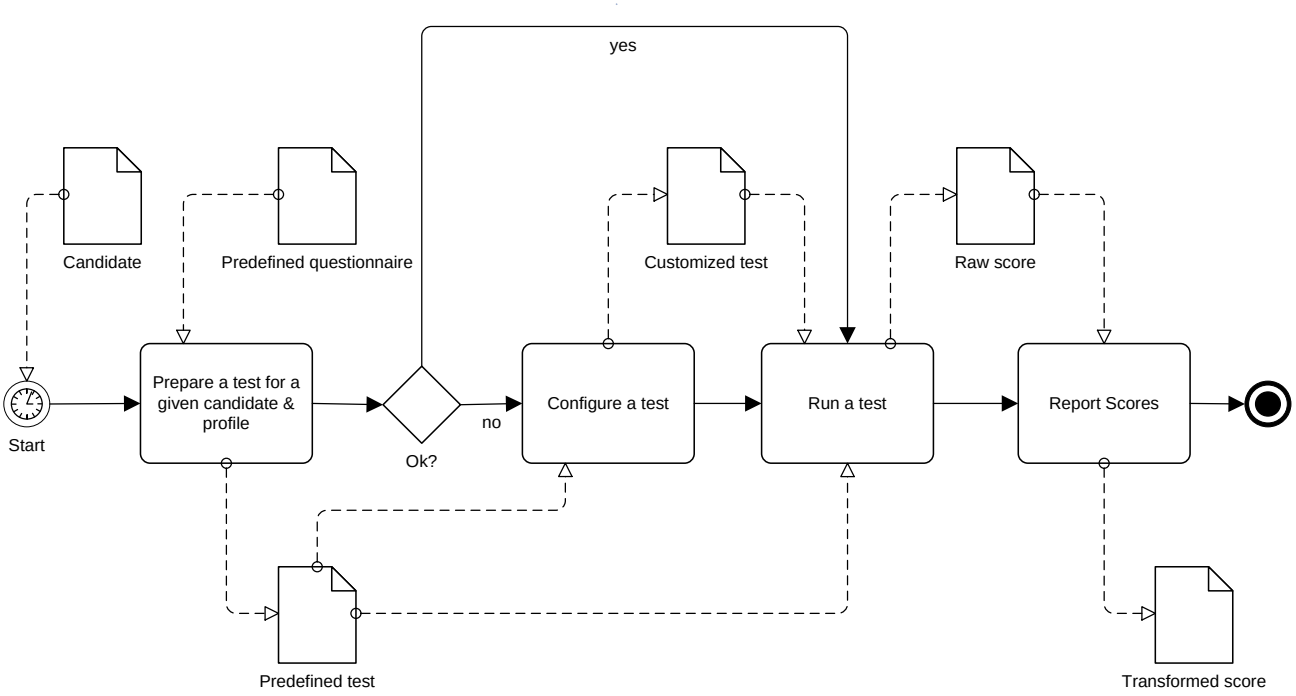

Table 1: Basic high level processes

The following supplementary high level processes could be detected for this kind of application. Every process is treated in detail further on in this document (chapter Functional Analysis).

Input	Process	Output	MoSCoW
A transformed score	**Compare profiles**	An ordered profile list (highest score first)	?
An ordered profile list	**Match profiles**	A matching profile	?

6.1 Functional Analysis

6.1.1 Functions

6.1.1.1 Prepare a test

Description:
Preparing may consist of 1 of the following actions:

Action	MoSCoW
• Pick a questionnaire (repeat until all required questionnaires are loaded) • Pick a previously stored test	• M • ?

Prerequisites:

- The availability of at least 1 predefined multiple choice questionnaires, with 1-n possible answers per question and their predefined configuration parameters (stored in a database of choice)
- The availability of a previously stored test for a given profile

Limitations, risks, assumptions:

- Some sort of a database with different questions, questionnaires and tests exists.
- Each question, questionnaire and/or test is suited to a specific need and with a score suited for the purpose.
- Budget and time frame for developing this process are unknown at this time.

Process output:

- If customizing is not necessary: 1 test is ready to run
- If customizing is required: 1-n questionnaires are ready to be customized

Event triggers:
This process is time triggered. The process starts whenever a candidate needs testing.

Test scenarios
Scenario 1: Prepare and activate a test by combining predefined questionnaires in a certain order

Pre-conditions:

- Action controls for activating or customizing a test are inactive as long as no questionnaire or test is loaded
- Action controls for loading a test or a questionnaire are active
- Loading predefined as well as customized questionnaires should be tested
- Only 1 test or questionnaire can be loaded at the time (the action must be repeated for every test or questionnaire that needs to be loaded)

Step	Result
Activate the action controls for loading a stored questionnaire.	• A list of available tests & questionnaires appears on screen • The selection screen keeps focus
Pick a previously stored questionnaire	• The questionnaire is loaded • The action controls for activating the test become active • The action controls for customizing questionnaires become active
Repeat the scenario for loading a stored questionnaire	• A confirmation window appears, asking if the questionnaire should be appended to the previously loaded one or if the previously loaded one should be overwritten.
Choose to overwrite the questionnaire	• The questionnaire is loaded • The action controls for activating the test stay active • The action controls for customizing questionnaires stay active
Repeat the scenario for loading a stored questionnaire	• A confirmation window appears, asking if the questionnaire should be appended to the previously loaded one or if the previously loaded one should be overwritten.
Choose to append the questionnaire	• The questionnaire is appended to the existing one • The action controls for activating the test stay active • The action controls for customizing questionnaires stay active • An action control permitting to save the new combined questionnaire (giving it a custom name) becomes active

Activate the test	• An action control to start or skip a dummy test appears on screen • The actions controls for activating the test become inactive or disappear • The action controls for customizing questionnaires become inactive or disappear • The action controls permitting to save the new combined questionnaire (giving it a custom name) become inactive or disappears
Repeat this scenario as much as required	Results should be as previously defined

Scenario 2: Prepare and activate a test by combining predefined tests in a certain order

Pre-conditions:

- Action controls for activating or customizing a test are inactive as long as no questionnaire or test is loaded
- Action controls for loading a test or a questionnaire are active
- Loading predefined as well as customized tests should be tested
- Only 1 test or questionnaire can be loaded at the time (the action must be repeated for every test or questionnaire that needs to be loaded)

Step	Result
Activate the action controls for loading a stored test.	• A list of available tests& questionnaires appears on screen • The selection screen keeps focus
Pick a previously stored test	• The test is loaded • The action controls for activating the test become active • The action controls for customizing questionnaires become active
Repeat the scenario for loading a stored test	• A confirmation window appears, asking if the test should be appended to the previously loaded one or if the previously loaded one should be overwritten.
Choose to overwrite the test	• The test is loaded • The action controls for activating the test stay active • The action controls for customizing questionnaires stay active
Repeat the scenario for loading a stored test	• A confirmation window appears, asking if the test should be appended to the previously loaded one or if the previously loaded one should be overwritten.
Choose to append the test	• The test is appended to the existing one • The action controls for activating the test stay active • The action controls for customizing questionnaires stay active • An action control permitting to save the new combined test (giving it a custom name become active)

Activate the test	• An action control to start or skip a dummy test appears on screen • The actions controls for activating the test become inactive or disappear • The action controls for customizing questionnaires become inactive or disappear • The action controls permitting to save the new combined questionnaire (giving it a custom name) become inactive or disappears
Repeat this scenario as much as required	Results should be as previously defined

Scenario 3: Prepare and activate a test by combining predefined test & questionnaires in a certain order

Pre-conditions:

- Action controls for activating or customizing a test are inactive as long as no questionnaire or test is loaded
- Action controls for loading a test or a questionnaire are active
- Loading predefined as well as customized tests & questionnaires should be tested
- Only 1 test or questionnaire can be loaded at the time (the action must be repeated for every test or questionnaire that needs to be loaded)

Step	Result
Activate the action controls for loading a stored test or a stored questionnaire.	• A list of available tests& questionnaires appears on screen • The selection screen keeps focus
Pick a previously stored test	• The test is loaded • The action controls for activating the test become active • The action controls for customizing questionnaires become active
Repeat the scenario for loading a stored questionnaire	• A confirmation window appears, asking if the questionnaire should be appended to the previously loaded one or if the previously loaded one should be overwritten.
Choose to overwrite the test	• The questionnaire is loaded • The action controls for activating the test stay active • The action controls for customizing questionnaires stay active
Repeat the scenario for loading a stored test	• A confirmation window appears, asking if the test should be appended to the previously loaded questionnaire or if the previously loaded questionnaire should be overwritten.
Choose to append the test	• The test is appended to the existing questionnaire • The action controls for activating the test stay active • The action controls for customizing questionnaires stay active • An action control permitting to save the new combined test (giving it a custom name become active)
Repeat the scenario for loading a stored test	• A confirmation window appears, asking if the test should be appended to the previously loaded one or if the previously loaded one should be overwritten.

Choose to overwrite the test	• The test is loaded • The action controls for activating the test stay active • The action controls for customizing questionnaires stay active
Repeat the scenario for loading a stored questionnaire	• A confirmation window appears, asking if the questionnaire should be appended to the previously loaded test or if the previously loaded test should be overwritten.
Choose to append the questionnaire	• The questionnaire is appended to the existing test • The action controls for activating the test stay active • The action controls for customizing questionnaires stay active • An action control permitting to save the new combined test (giving it a custom name become active)
Activate the test	• An action control to start or skip a dummy test appears on screen • The actions controls for activating the test become inactive or disappear • The action controls for customizing questionnaires become inactive or disappear • The action controls permitting to save the new combined questionnaire (giving it a custom name) become inactive or disappears
Repeat this scenario as much as required	Results should be as previously defined

Acceptance criteria:

- All test scenarios for this process should be run and pass on every step
  - The user interface has to be very intuitive
  - Response times:
    - Screen appearances: < 1 second
    - Loading tests & questionnaires: < 1 second for every 10 questions
    - Saving tests & questionnaires: < 1 second for every 10 questions
    - Activating controls: < 1 second per control
  - Results of the actions taken are to be made visible on screen:

- Names of questionnaires & tests loaded (retractable/expandable & ordered tree structure tests/questionnaires)
- Number of questions per questionnaire, (retracted view per questionnaire)
- Questions (expanded view of a questionnaire)
- Answers per question (expanded view of a question)
- Points per test, per questionnaire, per question & per answer (in the respective expanded views)
- Weights per answer, per question & per questionnaire (in the respective expanded views)

6.1.1.2 Configure a test

Description:
Configuring a test can consist of 0 – n of the following actions:

Action	MoSCoW
Join 1-n questionnaires for a given test into one bigger one	?
Split 1-n questionnaires for a given test into several smaller ones	?
Hide 1-n questions in a questionnaire for a given test	?
Add 1-n questions from unloaded questionnaires into 1 - n loaded questionnaires	?
Create 1-n new predefined questionnaires with 0-n existing or 0-n new questions	?
Adapt predefined configuration parameters before a test is executed, like: • Time limits for completion per question, per questionnaire and/or per test • The possibility of showing chronometer(s) on the screen or not • The possibility of showing the percentage(s) of completion or not • Points per answer (positive or negative) • Weights per answer • Weights per question • Weights per questionnaire • The right to review 0-n questions per questionnaire or not • Fixing the labels and the required levels of proficiency that will be used to match the results for a given test and a given profile • Defining the right for a candidate to view his final score	• ? • ? • ? • ? • ? • ? • ? • ? • ? • ? • ?
Group questions by area or skill	?
Configure the possibility of answering 0-n test questions (no score) to familiarize the individual with the nature of the application	?
Store modified questionnaires & tests	?

Prerequisites:
- The availability of at least 1 predefined or customized test

Limitations, risks, assumptions:
- Some sort of a database with different questions, questionnaires and tests exists.
- Each question, questionnaire and/or test is suited to a specific need and with a score suited for the purpose.
- Each question & questionnaire needs to have some default, predefined parameters.
- Budget and time frame for developing this process are unknown at this time.

Process output:
- A customized test

Event triggers:
This process is triggered by a XOR condition. When customizing is necessary (yes), the process starts. When customizing is not necessary (no) the process is skipped.

6.1.1.3 Run a test

Description:
Run a test can consist of 3 – n of the following actions:

Action	MoSCoW
Fill in the questionnaire	M
Review questions if allowed	S
Validate reviewed questions	M
Validate questionnaires	M
Time out if required	S
Calculate score	M
Show score	C
Show chronometer(s)	C
Show completion status'	C
Save score	M

Prerequisites:
- The availability of at least 1 predefined or customized test

Limitations, risks, assumptions:
- Some sort of a database where scores can be saved should be present.
- Budget and time frame for developing this process are unknown at this time.

Process output:
- A numerical score, stored for later use

Event triggers:
This process is triggered by the end of a previous process (either "Prepare a test" or "Customize a test").

Test scenarios
Scenario 1: Perform a dummy test to familiarize oneself with the application

Pre-conditions:
- Action controls for customizing a test are inactive
- Action controls for activating a test are inactive
- The action control for starting a dummy test is active
- An action control for skipping the dummy test (starting the real test) is active
- All variables are initialized (chronometer, percentage of completion, score, etc.)

Step	Result
Activate the action control for proceeding to a dummy test (if so configured, else go to the next scenario)	• An information screen appears stating the nature of the questionnaire (time available, number of questions reviewable, general rules) • An action control to start the dummy test appears

Activate the action control to start the dummy test	• The first question/answers of the dummy questionnaire appears
	• Answers can be checked by check boxes
	• If so configured for the test:
	  ○ a down counting chronometer per question appears
	  ○ a down counting chronometer for the active questionnaire appears
	  ○ a percentage of completion for the questionnaire appears
	  ○ a percentage of completion for the entire test appears
	• An action control is shown to advance to the next question

Let the question time out	• The next question is shown

Continue answering questions until the last question has been answered	• For every answer, the same applies as stated before
	• After answering the last question a summary screen is shown with the following content:
	  ○ An indication about how many questions the candidate may review (can be 0)
	  ○ An action control to validate the entire questionnaire
	  ○ An action control permitting to proceed to a review of the allowed number of questions (if > 0)

Activate the review action control (a dummy test should allow some reviews)	• A screen is shown listing all questions followed by checkboxes • A counter is shown with the allowed number of reviewable questions • An action control is shown to start the test review • An action control is shown for cancelling a review

Cancel the review	• A screen is shown with the following content:
	  ○ An indication about how many questions the candidate may review (can be 0)
	  ○ An action control to validate the entire questionnaire
	• An action control permitting to proceed to a review of the allowed number of questions (if > 0)

Activate the review action control (a dummy test should allow some reviews)	• A screen is shown listing all questions followed by checkboxes • A counter is shown with the allowed number of reviewable questions • An action control is shown to start the test review • An action control is shown for cancelling a review
Check some questions for review (less than the allowed number)	• Questions to review are checked • The counter shows de remaining number of reviewable questions • An action control is shown to start the test review • An action control is shown for cancelling a review

Activate the action control to start the test review	• The first question/answers checked for review appears
	• Answers can be checked by check boxes
	• If so configured for the test:
	  ○ a down counting chronometer per question appears
	  ○ a down counting chronometer for the active questionnaire appears
	  ○ a percentage of completion for the questionnaire appears
	  ○ a percentage of completion for the entire test appears
	• An action control is shown to advance to the next question

Let a question time out without changing anything	• The original answer remains unchanged • The next question is shown • The counter goes down by 1
Let a question time out after changing anything	• The modified answer is taken into account • The next question is shown • The counter goes down by 1

Continue answering all questions	• For every answer, the same applies as stated before
	• After answering the last reviewable question a summary screen is shown with the following content:
	  ○ An indication about how many questions the candidate may still review (can be 0)
	  ○ An action control to validate the entire questionnaire
	  ○ An action control permitting to proceed to a review of the allowed number of questions (if > 0)

Activate the review action control (a dummy test should allow some reviews)	• A screen is shown listing all questions followed by checkboxes • A counter is shown with the allowed number of reviewable questions • An action control is shown to start the test review • An action control is shown for cancelling a review

Check some questions for review (= to allowed number but try checking more than the allowed number too)	• The counter shows de remaining number of reviewable questions • Questions to review can be checked when the counter is > 0 • Questions can no longer be checked when the counter = 0 • Questions can be unchecked when counter = 0 • An action control is shown to start the test review • An action control is shown for cancelling a review

Activate the action control to start the test review	• The first question/answers checked for review appears
	• Answers can be checked by check boxes
	• If so configured for the test:
	  ○ a down counting chronometer per question appears
	  ○ a down counting chronometer for the active questionnaire appears
	  ○ a percentage of completion for the questionnaire appears
	  ○ a percentage of completion for the entire test appears
	• An action control is shown to advance to the next question

Continue answering all remaining reviewable questions	• For every answer, the same applies as stated before
	• When the last reviewable question has been reviewed:
	  ○ The questionnaire timer stops
	  ○ An action control is shown to start the real test

	• If more questionnaires are to be completed:
	  ○ An action control is shown to go to the next questionnaire
	  ○ The previous questionnaire is autovalidated
	• An action control is shown to review the allowed number of questions (if at all permitted)

Scenario 2: Perform a real test (no time out on questionnaires)

Pre-conditions:

- Action controls for customizing a test are inactive
- Action controls for activating a test are inactive
- The action control for starting a dummy test is active
- An action control for skipping the dummy test (starting the real test) is active
- All variables are initialized (chronometer, percentage of completion, score, etc.)

Step	Result
Activate the action control for skipping the dummy test (if so configured, else activate the action control for proceeding to a real test)	• An information screen appears stating the nature of the questionnaire (time available, number of questions reviewable, general rules) • An action control to start the real test appears

Activate the action control to start the real test	• The first question/answers of the first questionnaire appears
	• Answers can be checked by check boxes
	• If so configured for the test:
	  ○ a down counting chronometer per question appears
	  ○ a down counting chronometer for the active questionnaire appears
	  ○ a percentage of completion for the questionnaire appears
	  ○ a percentage of completion for the entire test appears
	• An action control is shown to advance to the next question

Let the question time out	• The next question is shown

Continue answering questions until the last question has been answered	• After proceeding to the next question de question timer stops and restarts for the next question
	• After answering the last question a summary screen is shown with the following content:
	  ○ An indication about how many questions the candidate may review (can be 0)
	  ○ An action control to validate the entire questionnaire
	  ○ An action control permitting to proceed to a review of the allowed number of questions (if > 0)

If the number of reviewable questions is > 0, go to scenario 3, else continue this scenario	• The ended questionnaire is auto validated
	• The questionnaire timer stops
	• If more questionnaires are to be completed:
	  ○ An action control is shown to go to the next questionnaire
	• If no more questionnaires are to be completed:
	  ○ The "End of test" screen is shown and scores are calculated

Continue this scenario until all questionnaires are finished	• The "End of test" screen is shown and scores are calculated

Scenario 3: Perform a test review

Pre-conditions:

- The test should have at least 1 questionnaire with a number of reviewable questions to perform this test

Step	Result
First execute scenario 2 using a test with reviewable questionnaires	• Results are as to be expected in scenario 2
Activate the action control to proceed to a review	• A screen is shown listing all questions followed by checkboxes • A counter is shown with the allowed number of reviewable questions • An action control is shown to start the test review • An action control is shown for cancelling a review

Cancel de review	• A screen is shown with the following content:
	  ○ An indication about how many questions the candidate may review (can be 0)
	  ○ An action control to validate the entire questionnaire
	• An action control permitting to proceed to a review of the allowed number of questions (if > 0)

Activate the action control to proceed to a review	• A screen is shown listing all questions followed by checkboxes • A counter is shown with the allowed number of reviewable questions • An action control is shown to start the test review • An action control is shown for cancelling a review
Check some questions for review (less than the allowed number)	• Questions to review are checked • The counter shows de remaining number of reviewable questions • An action control is shown to start the test review • An action control is shown for cancelling a review

Activate the action control to start the test review	• The first question/answers checked for review appears
	• Answers can be checked by check boxes
	• If so configured for the test:
	  ○ a down counting chronometer per question appears
	  ○ a down counting chronometer for the active questionnaire appears
	  ○ a percentage of completion for the questionnaire appears
	  ○ a percentage of completion for the entire test appears
	• An action control is shown to advance to the next question

Let a question time out without changing anything	• The original answer remains unchanged • The next question is shown • The counter goes down by 1
Let a question time out after changing anything	• The modified answer is taken into account • The next question is shown • The counter goes down by 1

Continue answering all questions	• After proceeding to the next question de question timer stops and restarts for the next question
	• After answering the last reviewable question a summary screen is shown with the following content:
	  ○ An indication about how many questions the candidate may still review (can be 0)
	  ○ An action control to validate the entire questionnaire
	  ○ An action control permitting to proceed to a review of the allowed number of questions (if > 0)

Activate the review action control	• A screen is shown listing all questions followed by checkboxes • A counter is shown with the allowed number of reviewable questions • An action control is shown to start the test review • An action control is shown for cancelling a review

Check some questions for review (= to allowed number, but try checking more than the allowed number too)	• The counter shows de remaining number of reviewable questions • Questions to review can be checked when the counter is > 0 • Questions can no longer be checked when the counter = 0 • Questions can be unchecked when counter = 0 • An action control is shown to start the test review • An action control is shown for cancelling a review

Activate the action control to start the test review	• The first question/answers checked for review appears
	• Answers can be checked by check boxes
	• If so configured for the test:
	  ○ a down counting chronometer per question appears
	  ○ a down counting chronometer for the active questionnaire appears
	  ○ a percentage of completion for the questionnaire appears
	  ○ a percentage of completion for the entire test appears
	• An action control is shown to advance to the next question

Continue answering all remaining reviewable questions	• After proceeding to the next question the question timer stops and restarts for the next question
	• After answering the last question the questionnaire timer stops
	• If more questionnaires are to be completed:
	  ○ An action control is shown to go to the next questionnaire
	• If no more questionnaires are to be completed:
	  ○ The “End of test” screen is shown and scores are calculated

Scenario 4: Perform a real test (time out on questionnaire)

Pre-conditions:

- Action controls for customizing a test are inactive
- Action controls for activating a test are inactive

- The action control for starting a dummy test is active
- An action control for skipping the dummy test (starting the real test) is active
- All variables are initialized (chronometer, percentage of completion, score, etc.)
- Use a test with a time out on a questionnaire. The questionnaire should contain at least 1 question without time out. This question should be reviewable

Step	Result
Activate the action control for skipping the dummy test (if so configured, else activate the action control for proceeding to a real test)	• An information screen appears stating the nature of the questionnaire (time available, number of questions reviewable, general rules) • An action control to start the real test appears

Activate the action control to start the real test	• The first question/answers of the first questionnaire appears
	• Answers can be checked by check boxes
	• If so configured for the test:
	  ○ a down counting chronometer per question appears
	  ○ a down counting chronometer for the active questionnaire appears
	  ○ a percentage of completion for the questionnaire appears
	  ○ a percentage of completion for the entire test appears
	• An action control is shown to advance to the next question

Let all questions time out. When a question without time out appears, wait until the questionnaire itself times out.	• After proceeding to the next question de question timer stops and restarts for the next question
	• The questionnaire should time out on the question without time out.
	• The timed out questionnaire is auto validated
	• The questionnaire timer stops
	• If more questionnaires are to be completed:
	  ○ An action control is shown to go to the next questionnaire
	• If no more questionnaires are to be completed:
	  ○ The “End of test” screen is shown and scores are calculate

Restart the test, but let the questionnaire time out occur on a reviewable question without time out, but during a review	• After proceeding to the next question de question timer stops and restarts for the next question
	• The questionnaire should time out on the reviewable question without time out during the review.
	• The timed out questionnaire is auto validated
	• The questionnaire timer stops
	• If more questionnaires are to be completed:
	  ○ An action control is shown to go to the next questionnaire
	• If no more questionnaires are to be completed:
	  ○ The "End of test" screen is shown and scores are calculate

Acceptance criteria:

- All test scenarios for this process should be run and pass on every step
  - The user interface has to be very intuitive
  - Response times:
    - Screen appearances: < 1 second
    - Showing next question: < 1 second
    - Activating controls: < 1 second per control
  - Results of the actions taken are to be made visible on screen:
    - Done number of questions / total number of questions (per questionnaire)
    - Chronometers for question, questionnaire & test (if so configured)
    - Percentage of completion for the active questionnaire & test (if so configured)
    - Number of reviewable questions allowed

6.1.1.4 Report scores

Description:
Reporting a score consists of all the following actions:

Action	MoSCoW
Transform scores into the required format (level, numeric, percentage)	M
Group scores as required (per knowledge, per skill, per soft skill, per version, etc…)	M
Show scores in the required format	M
Create and show scores as radar charts as required, together with required proficiency data. Examples: • Knowledge radar • Skills radar • Soft Skills radar	?

Prerequisites:
- The availability of at least 1 raw score and the necessary data for the required proficiency levels to compare them with

Limitations, risks, assumptions:
- Some sort of a database where scores can be retrieved will be necessary.
- Budget and time frame for developing this process are unknown at this time.

Process output:
- 1 numerical score
- 0-n radar graphs

Event triggers:
This process is triggered by the end of a previous process (”Run a test”).

6.1.1.5 Compare profiles

Description:
Since all scores are calculated, they might easily be stored in a database environment and compared with each other’s.
Since the standards (points, weights, standard levels) to which individuals are compared are represented as numbers too, the different proficiency levels can be adjusted in accordance with any requirement.
Comparing a score consists of all of the following actions:

Action	MoSCoW
Transform all scores for a given profile into the same format (level, numeric, percentage)	?
Group all scores for a given profile the same way as required (per knowledge, per skill, per soft skill, per version, etc…)	?
Create an ordered list of matching scores per profile (highest first)	?
Create and show the highest scores as radar charts (limited to a maximum of 3)	?
Store an ordered profile list	?

Prerequisites:
- The availability of at least 2 transformed scores

Limitations, risks, assumptions:
- Some sort of a database where scores can be retrieved will be necessary.
- It might be difficult to compare profiles based on tests that are executed with unequal parameters (points, weights, level of difficulty of the questions, etc.). In order to be able to compare correctly, all candidates for a given profile should execute exactly the same test.
- Budget and time frame for developing this process are unknown at this time.

Process output:
- 1 ordered profile list (highest scores first)

Event triggers:
This process is time triggered. The process starts whenever a comparison of candidates with the same profile is required.

6.1.1.6 Match profiles

Description:
Matching a score consists of the following actions:

Action	MoSCoW
Match an ordered profile list to 1-n client's requirements	?
Create and show an ordered list of best matches with possible defects (training needs!), together with required client data	?

Prerequisites:

- The availability of at least 1 ordered profile list and 1 client requirement

Limitations, risks, assumptions:

- Some sort of a database where scores (at least) and/or ordered lists can be retrieved will be necessary.
- It might be difficult to match profiles based on tests that are executed with unequal parameters (points, weights, level of difficulty of the questions, etc.). In order to be able to match correctly, all candidates for a given profile should execute exactly the same test.
- Budget and time frame for developing this process are unknown at this time.

Process output:

- 0-n matching profiles (highest scores first)

Event triggers:
This process can be triggered either by the end of a previous process (”Compare profiles”), either by a time trigger (whenever matching is necessary and at least 1 ordered profile list already exists).

6.1.2 Actors and their tasks

Actors are related to the application. They can be human or they can be systems.
Every actor is responsible for executing 0 – n of the actions mentioned above (actor labels are given arbitrarily and should be adapted as required).
The following actors can be detected for this application:

Actor	Tasks

Candidate	Any individual. He/she undergoes the test
	• His/her tasks are:
	  ○ To fill in the questionnaire as it is presented (with possible limitations on time and/or the ability for reviewing his/her answers)
	  ○ To validate a questionnaire before taking on the next one. After validation of a questionnaire, reviewing questions of that particular questionnaire will no longer be possible. Validating the last questionnaire implies a validation of the entire test.

Recruiters	• Any individual studying the results (scores, radars). Their tasks are:
	  ○ To evaluate the final result scores
	  ○ To compare the final results against those of other individuals with the same profile (market value of a candidate compared to other candidates) based on the ordered lists and/or radar graphs

Account Managers	• Any sales person. Their task is: ○ Matching a candidate against a client's requirements for a given profile using the order matching list and/or radar graphs

Application	• The tasks for the application are:
	  ○ Running the test
	  ○ Showing the chronometer(s) and/or the completion status if required
	  ○ Calculating the results
	  ○ Showing multiple radar graphs based on the questionnaires

Developer	• The tasks for the developer are:
	  ○ Develops the application
	  ○ Maintains the application
	  ○ Enhances the application as required

Tester	• The tester tests the application

Database System (whatever form it takes)	• The tasks for the database system are:
	  ○ Storing questionnaires
	  ○ Storing tests
	  ○ Storing scores
	  ○ Allowing CRUD operations on questionnaires, tests & scores

Administrator	The individual preparing the test.
	• His/her tasks are:
	  ○ Selecting the right questionnaires for a test and loading it into the application
	  ○ Hiding/showing/adding questions to a questionnaire if required
	  ○ Joining or splitting questionnaires if required
	  ○ Review and/or adapt quotations (points, weights)
	  ○ Setting the time limits if required
	  ○ Make the chronometer(s) shown or not during the test
	  ○ Make the percentage of completion show or not during the test
	  ○ Configure the possibility for the tested individual to review 0-n questions
	  ○ Grouping questions by area or skill if required
	  ○ Configure the possibility for 0-n non scored test questions (to familiarize the tested individual with the application) if required
	  ○ Fixing the labels and the required levels of proficiency that will be used to match the results for a given test and a given profile
	  ○ Defining the right for a candidate to view his final score if required

6.1.3 Calculating scores

There are several methods to implement the calculation of scores. The method proposed here will need approval from Management.
With multiple possible answers, it might be interesting to weigh answers based on their pertinence or level of detail. A possible example of business rules for calculating scores is as follows:

- Answers that are only to be known by experts are given 3 points with a weight of 3.
- Less detailed answers (that might be known by more candidates) are given 2 points with a weight of 2.
- Answers that should actually be known by anyone with the given profile are given 1 point and a weight of 1.
- Irrelevant answers are given a negative score with a positive weight (in order to avoid the possibility of candidates checking all answers). Score and weight can be given the same way as with correct answers. The more irrelevant the answer is the higher the negative score and the positive weight.
- Answers that are timed out or left unanswered are scored as 0 points.
- All points hooked to an answer are first multiplied with their respective weight and the results are summed per answer (including negative points). Candidates with a negative total score for a given question get 0 points (a negative total score on a question is therefore not possible).
- If a question has only a predefined number of correct answers, every extra answer brings the score for the whole question down to 0 (even if the correct answer has been given!).
- Total results for every question are then multiplied by the respective weight for those question and the results are summed. Since no question can get negative points, the results for a questionnaire cannot be negative.
- Total results for every questionnaire are then multiplied by the respective weight for that questionnaire and the results are summed. Since no question or questionnaire can get negative points, the final result for a test cannot be negative.

- The final score of a test is then compared to a table with predefined levels of proficiency. Those tables should be defined in function of:
    - The given profile being tested.
    - The level of proficiency one is looking for (as a percentage of the maximum score possible).

  An example is given below for a test of the required knowledge and skills for a Project Manager. The maximum number of points a candidate could score on this test is 124. In this case a candidate is considered:
    - An expert when he/she scores from 80 – 124 points (minimum 65%)
    - A senior when he/she scores from 50 – 79 points (minimum 40%)
    - A junior when he/she scores 16 – 49 points (minimum 13%).
    - Not to fit the profile of a Project Manager when he/she scores less than 16 points

  This table is just an example. The naming conventions (labels "Expert", "Senior" and "Junior") used to define the different levels of proficiency, as well as the scores and percentages to obtain in order to adhere to a given level are to be defined as required (and can be different for every profile if necessary).

Level	From	To	%
Expert	80	124	65%
Senior	50	79	40%
Junior	16	49	13%

Table 2: Example of proficiency level scores for a Project Manager profile (arbitrary data!)

6.1.4 Timing of questions, questionnaires & tests

As stated earlier in this document it should be possible to add time outs to 0 - n distinct questions, questionnaires and tests. These are the business rules that are proposed:

- An administrator can decide to show the timing on screen (per question, per questionnaire, per test or combinations of those)
- Answers are auto validated when clicking "Next"
- If a question times out, it validates the answer given and the next question is shown. If no answer was given for the timed out question yet, it obtains a score of 0.
- If all questions in a questionnaire have been defined with a time out, the time outs for every question are summed and per question that can be reviewed, a time of 2 minutes is added to the questionnaire's time out definition (the latter can be 0). If a questionnaire needs to time out and some questions have no prefixed time out definition, a time out of 3 minutes will be taken into account for every non timed question.
- When a questionnaire is finished, a candidate needs to validate his/her answers to carry on. When a questionnaire is validated, all non-answered questions are set to 0 and the next questionnaire is shown (if any, otherwise the test ends).
- If a candidate is allowed to review 1 – n questions, he can go back to 1 - n questions after he finished the entire questionnaire for as long as the questionnaire has not been validated or timed out, whichever occurs first. In other words, once a questionnaire has been validated or timed out, reviewing questions will be disallowed. Some warning should be given to the candidate when he validates a questionnaire ("Are you sure? You will not be able to review questions if you do")

- A question with a time out can be validated before a time out occurs. The remaining time will then be added - in order of priority - to that of the next question time out (if any) or to the time out of the questionnaire (if any).
- A questionnaire with a time out can be validated before a time out occurs. The remaining time will then be added - in order of priority - to that of the next questionnaire time out (if any) or to the time out of the entire test (if any).
- If a questionnaire times out, the application fixes the score at that point in time, sets all non-answered questions to 0, auto validates the results and shows the next questionnaire (if any, otherwise the test ends). The answer on the question where the time out occurred is auto validated. If no answer was given yet, it obtains a score of 0.
- If all questionnaires in a test have a time out, the time outs for every questionnaire are summed. If a time out for a test is required and some questionnaires in a test have no prefixed time out (meaning not one single question in this questionnaire has a time out), a time out of 3 minutes per question will be taken into account for every non timed questionnaire and per question that can be reviewed, a time of 2 minutes is added to the questionnaire's time out (can be 0).
- If a test times out, the application fixes the score at that point in time, sets all non-answered questions to 0, auto validates and stores the answer on the question where the time out occurred and validates the last questionnaire. If no answer was given yet on the question where the time out occurred, it obtains a score of 0. Optionally, the final score can be shown to the candidate (configurable).
- If a test ends (the candidate validates the last questionnaire) or times out, the scores and charts can be consulted.

6.1.5 Reviewing questions

Within every questionnaire, 0 – n answers might be reviewed and changed by the candidate. This means that a candidate can uncheck or check as many answers for a given question for as long as the review time (2 minutes) or the questionnaire or test has not timed out whichever occurs first. Reviewed questions must be validated by the candidate.
In case of a time out of a reviewable question, the very last changes will be auto validated and the normal time out business rules will apply. If no answer was given yet on the question where the time out occurred, it obtains a score of 0; otherwise the answer is validated as is.
When a changed answer has been validated by the candidate, the counter of reviewable questions goes down with one unit. A candidate can change the same question multiple times, but after every validation, the counter goes down with one unit. As long as time is available and the review counter is not 0, the candidate can review more of his/her answers. Timed out questions are always followed by the questionnaire's validation screen for the questionnaire.
For every question where an answer has been changed and validated, the score is recalculated accordingly.

6.1.6 The radar charts

Below an example of a radar graph is shown. It can be adapted as required and others can be created. For every profile a different graph can be generated.

The "Knowledge Radar":

Positions the individual's knowledge (red) towards those of an expert (green), a senior (yellow) and a junior (purple) in the same radar, within specific knowledge domains (Pragmatic, DSDM, Scrum, Prince2)

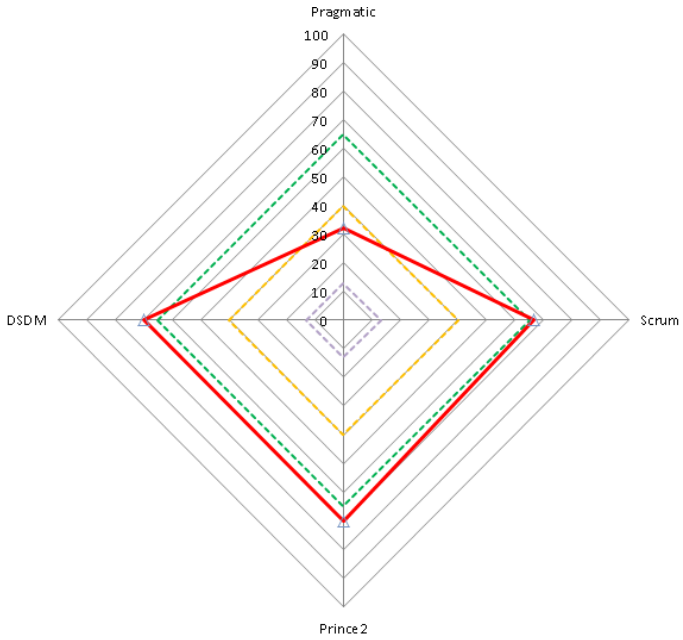

Table 3: Example of a knowledge radar for a Project Manager

6.1.7 Project Plan

No time, effort or budget has been defined for this project. Making a project plan is therefore impossible at this time.

6.1.8 Open Issues

Question: Should reviewing questions be limited to specific questions or is the number of reviewable questions only bound to its number?
Question: Should candidates be registered before performing a test?
Question: Should it be possible to rearrange the order of questionnaires for a test?

6.1.9 Finding a common language

Finding a common language in defining profiles in terms of:

- Naming conventions, such as:
  - What unique name do we use to refer to a given profile?
- Aspects of a profile, like:
  - Knowledge;
  - Skill;
  - Soft Skills (Attitude);

  & the accumulation of those aspects into:
  - Competence.
- Levels of proficiency in a profile and on every single aspect of it, like:
  - Junior;
  - Senior;
  - Expert;

Inspiration to solve this issue has been found (although not completely) in a European standard:

- The European e-Competence Framework 1.0 or **e-CF**;

Important comments:

- Not all definitions used within Aubay can be mapped to one of the 32 e-CF profiles. For some a proprietary standard has to be developed.
- Some definitions - as used in this document & in the prototypes Excel - can be found in the Glossary at the end of this document.

6.1.10 Flaws of the European e-Competence Framework

The second issue is that the European e-Competence Framework is incomplete. It needs to be completed with missing profiles.

6.1.11 Relevance of the questionnaires

A last - but not least important - issue might be that an enormous time and effort will go into the questionnaires to make them representative for the purpose. Some issues to deal with:

- How to make questionnaires relevant for a given profile to test
- How to group questions in domains (if at all necessary)
- How many questions will give an adequate snapshot for a given profile?
- How to evaluate soft skills
- How to streamline points and weights - used to quote answers, questions and questionnaires – to make them representative for the given profile
- How to define the standards to which individuals are compared

Each of these issues should be solved, before the application goes into production. They are, however, not blocking for development, as they can be resolved by entering arbitrary data.

6.2 Glossary

Item	Description
Attitude	The cognitive and relational capacity needed to combine knowledge and skills into competence.
Profile	A combination of one or more competences for a given consultant. A consultant can have more than one profile during his career.
(Corporate) Profile	A set of standardized competences and their associated proficiency levels as defined by Aubay.
Customer Profile	A set of competences (not necessary in a standardized fashion) and their associated proficiency levels, issued by a (potential) customer.
Commercial Profile	A set of competences (not necessary in a standardized fashion) and their associated proficiency levels, issued by Aubay to serve a (potential) customer.
Competence	A demonstrated ability to apply knowledge, skills and attitudes for achieving observable results.
Competence level	A proficiency level giving an indication of the general abilities of a given consultant

Item	Description
Knowledge	The measurable result of studying scientific, theoretical learning material.
Knowledge level	A proficiency level indicating how well knowledge is mastered.
Maturity level	A proficiency level indicating how well attitudes are in accordance with a given e-Competence.
Skill	The learnt capacity or talent to carry out pre-determined managerial or technical tasks with the acquired knowledge.
Experience level	A proficiency level indicating how well a skill is mastered.
Technical Focus	The ability of a consultant to operate in different technical environments and versions/releases (Examples: Windows 95, 98, 2000, 2003, Oracle 9i, 10g, J2EE, etc…)