

SPLC Special Issue 2022
Test Scenario Generation for Feature-Based
Context-Oriented Software Systems
Complete usage scenario and original test suite
(Annex A)

Pierre Martou

February 2022

Table 1: Real life usage scenario on our case study, with its analysis. Scenarios 1 to 13.

N	Description	Analysis
<i>Situation: a group of friends discuss with each other through the messaging application.</i>		
1	Malcolm (an Adult) is messaging his friends on his Tablet at a Loud coffee shop. His Tablet vibrates when he receives a message from one of his friends, Alma (another Adult).	
2	Alma receives a message back from her friend Malcolm and replies with her Tablet using 4G, while walking on the street.	<i>How was Alma notified of the message from Malcolm, if there was no Notification feature active? There might be a mapping error. Mute should be activated by default if neither the condition to activate Alarm nor Vibration are met.</i>
3	Adult C is reading at home when his tablet alerts him of a message. He sees that it is a message coming from a group of friends who are joining together at a nearby coffee shop.	
4	Likewise, Danilo (an Adult) was at home when he was alerted of a message. With a simple glance at his cutting edge Tablet, he enjoys a Complete Layout and immediately sees the complete information: the message, the hour, the group of friends.	<i>The features Layout and Complete were just activated. But then, what was the Layout of the preceding Adults if none was active? Does it make sense for the messaging application to have no Layout? There seems to be an incoherent feature adaptation of the system to the contexts. The feature model lacks a default feature or an alternative to having an explicit Layout.</i>
<i>Situation: a group of teenagers discuss with each other through the messaging application.</i>		
5	Fallon (Teenager A) is in a park, where she has no Connection. She writes messages on her Smartphone using the virtual Keyboard. She's also taking selfies to update her Profile Picture with the camera of her Smartphone.	<i>We have no information on her Connection, yet Sending messages is still active. She shouldn't be able to update photos or send messages if there is no Connection. The context model lacks information and the environment is incorrectly modelled.</i>
6	Teenager B answers to Teenager A on his desktop.	
7	Teenager C chats with them but has a good Connection, and he can send photos to his friends.	
8	A Teenager borrowed the Tablet of his father to chat with his friends.	
9	Teenager D is also chatting with a friend. However, his wifi is bad, so he's walking around the house to find a place with better wifi reception, hence sending Vocals to his friends while walking.	
10	Teenager E is receiving messages from his friend Teenager F asking him to join him, but no alarm is triggered as he's reading in the school library.	
<i>Situation: several people use a Desktop computer in a cybercafé, where there is a lot of ambient Noise.</i>		
11	Ed (another Teenager) is playing on a Desktop computer in a cybercafé. He's chatting with a friend and is alerted through Vibration when his friend finally answers him.	<i>Since the environment is Loud, he's alerted by a Vibration, which is expected. However, it seems unexpected to receive a Vibration notification when working on a Desktop computer. There might be a mapping error.</i>

Table 2: Real life usage scenario on our case study, with its analysis. Scenarios 14 to 17.

N	Description	Analysis
12	Not far from Ed, a man is sipping his coffee while scrolling on his cutting-edge Smartphone, sending Photos and listening to Vocal messages.	<i>Should he be able to listen to the Vocal messages when being in a Loud environment? While not necessarily an error, we could improve the application by adding TextToSpeech and SpeechToText features. By converting the spoken message to written text, the teenager could then still consult a vocal message even when in a loud environment.</i>
13	In another corner of the cybercafe, Teenager G is focused on a school assignment. Fortunately, the application does not distract him as it is Mute.	
<i>Situation: several users are in a school's library.</i>		
14	Another teenager works on this assignment at the school's library. He uses his Tablet to read the school books, and is not distracted by the application.	
15	His friend is there too. He's receiving multiple Vocals from a chatty friend, but the Tablet does not alert him of it, to let him focus.	
16	The librarian is working on his laptop (Desktop), and he supervises the library, going back and forth in it. Naturally, the application is Mute on his Desktop.	
17	Once home, the librarian starts cooking. Even if not in a quiet environment anymore, the application remains mute as the librarian is busy. Unfortunately, he can't send Photos of his meal, as his Connection is Bad.	

Table 3: Full test suite the usage scenarios are based on.

N	Activated contexts	Activated features
1	Adult, Loud, Tablet, Available	Search, Description, Notification, Vibration, Keyboard
2	Adult, Normal, Tablet, Connection, Bad, Available	Search, Description, Keyboard, Light, Mode
3	Adult, Normal, Tablet, AudioCard, Available, Peripheral	Search, Description, Notification, Vocal, Keyboard, Alarm
4	Adult, Normal, VideoCard, Tablet, AudioCard, Available, Peripheral	Search, Description, Complete, Notification, Layout, Vocal, Keyboard, Alarm
5	Normal, VideoCard, Teen, Smartphone, Available, Peripheral	Layout, Keyboard, Minimalist, ProfilePicture, Match
6	Normal, VideoCard, Desktop, Teen, Available, Peripheral	Complete, Layout, ProfilePicture, Match
7	Normal, VideoCard, Desktop, Good, Teen, Connection, AudioCard, Available, Peripheral	Photo, Complete, Notification, Layout, Standard, Vocal, ProfilePicture, Mode, Match, Alarm
8	Normal, VideoCard, Good, Tablet, Teen, Connection, Available, Peripheral	Photo, Complete, Layout, Standard, Keyboard, ProfilePicture, Mode, Match
9	Normal, Teen, Connection, Smartphone, AudioCard, Bad, Available, Peripheral	Notification, Layout, Vocal, Keyboard, Minimalist, ProfilePicture, Light, Mode, Match, Alarm
10	Quiet, Teen, Connection, Smartphone, AudioCard, Bad, Available, Peripheral	Notification, Layout, Mute, Vocal, Keyboard, Minimalist, ProfilePicture, Light, Mode, Match
11	Loud, VideoCard, Desktop, Teen, Connection, AudioCard, Bad, Available, Peripheral	Complete, Notification, Layout, Vibration, Vocal, ProfilePicture, Light, Mode, Match
12	Adult, Loud, VideoCard, Good, Connection, Smartphone, AudioCard, Available, Peripheral	Search, Description, Photo, Notification, Layout, Standard, Vibration, Vocal, Keyboard, Minimalist, Mode
13	Occupied, Loud, Good, Teen, Connection, Smartphone	Notification, Layout, Standard, Mute, Keyboard, Minimalist, ProfilePicture, Mode, Match
14	Occupied, Quiet, Good, Tablet, Teen, Connection	Notification, Standard, Mute, Keyboard, ProfilePicture, Mode, Match
15	Occupied, Quiet, Tablet, Teen, AudioCard, Peripheral	Notification, Mute, Vocal, Keyboard, ProfilePicture, Match
16	Occupied, Adult, Quiet, VideoCard, Desktop, Good, Connection, Peripheral	Search, Description, Photo, Complete, Notification, Layout, Standard, Mute, Mode
17	Occupied, Adult, Normal, VideoCard, Desktop, Connection, Bad, Peripheral	Search, Description, Complete, Notification, Layout, Mute, Light, Mode

Table 4: Full test suite the usage scenarios are based on, in terms of (de)activations.

N	Contexts act	Contexts deact	Features act	Features deact
1	Adult, Noise, Loud, Device, Context, Tablet, Age, Available, UserAvailability		Text, Search, Feature, Display, Description, AddSystem, Notification, Friend-Name, Vibration, Receiving, Keyboard, MessageType, Group, Friend, ContactList, Sending	
2	Normal, Connection, Bad	Loud	Light, Mode	Notification, Vibration
3	AudioCard, Peripheral	Connection, Bad	Notification, Vocal, Alarm	Light, Mode
4	VideoCard		Complete, Layout	
5	Teen, Smartphone	Adult, Tablet, AudioCard	Minimalist, ProfilePicture, Match	Search, Description, Complete, Notification, Vocal, Alarm
6	Desktop	Smartphone	Complete	Keyboard, Minimalist
7	Good, Connection, AudioCard		Photo, Notification, Standard, Vocal, Mode, Alarm	
8	Tablet	Desktop, AudioCard	Keyboard	Notification, Vocal, Alarm
9	Smartphone, AudioCard, Bad	VideoCard, Good, Tablet	Notification, Vocal, Minimalist, Light, Alarm	Photo, Complete, Standard
10	Quiet	Normal	Mute	Alarm
11	Loud, VideoCard, Desktop	Quiet, Smartphone	Complete, Vibration	Mute, Keyboard, Minimalist
12	Adult, Good, Smartphone	Desktop, Teen, Bad	Search, Description, Photo, Standard, Keyboard, Minimalist	Complete, ProfilePicture, Light, Match
13	Occupied, Teen	Adult, VideoCard, AudioCard, Available, Peripheral	Mute, ProfilePicture, Match	Search, Description, Photo, Vibration, Vocal
14	Quiet, Tablet	Loud, Smartphone		Layout, Minimalist
15	AudioCard, Peripheral	Good, Connection	Vocal	Standard, Mode
16	Adult, VideoCard, Desktop, Good, Connection	Tablet, Teen, AudioCard	Search, Description, Photo, Complete, Layout, Standard, Mode	Vocal, Keyboard, ProfilePicture, Match
17	Normal, Bad	Quiet, Good	Light	Photo, Standard