Dhirubhai Ambani Institute of Information and Communication Technology

IT314 - Software Engineering GROUP - 9

Black box Test cases



STAYEAZY - HOTEL BOOKING SYSTEM

Instructor: Prof. Saurabh T. December 02, 2024

BlackBox Testing

1. Sign Up As Customer:

First Name & Last Name Constraints:

- No numbers allowed.
- Validity of characters: alphabets and spaces only.
- Maximum length: 50 characters.

Email Constraints:

• Must contain "@" sign with character before and after. Must not already be registered.

Mobile Number Constraints:

• The mobile number should have a fixed length (e.g., 10 digits).

Password Constraints:

- Minimum: 8 characters
- Must include at least one number (0-9).
- Must include at least one lowercase letter (a-z).
- Must include at least one uppercase letter (A-Z).
- Must include at least one special character (e.g., !@#\$%^&*).

Confirm Password Constraints:

- The input must be the same as the original password (case-sensitive)...
- Must satisfy the same rules for password validation.

Class	Description	Values
	Valid First Name (Only	
E1	alphabets, ≤ 50)	Examples: "John", "Alice"
	Invalid First/Last Name	Examples: "John123", "Alice!",
	(Contains numbers/specials, >	${\it "VeryLongNameThatExceedsFiftyChar}$
E2	50)	acters"
		Examples: "user@example.com",
E3	Valid Email Address	"john.doe@mail.com"
		Examples: "user@", "@example.com",
E4	Invalid Email Address	"userexample.com"
E5	Valid Mobile Number (10 digits)	Examples: "9876543210", "1234567890"
		Examples: "98765", "123456789012",
E6	Invalid Mobile Number	"mobile123"
	Valid Password (8 ≤ length ≤ 30,	Examples: "Abcd@123", "Password1!",
E7	meets rules)	"Passw0rd@"
		Examples: "short", "NoSpecial123",
	Invalid Password (Fails criteria, <	${\it "Excessively Long Password That Exceed}$
E8	8 or > 30)	sThirtyCharacters1!"
	Confirm Password Matches	Examples: "Abcd@123" (matches the
E9	Password (Valid)	original password)

	Confirm Password Does Not	Examples: "abcd@123" (does not match
E10	Match Password (Invalid)	the original password)

Input Tuple	Expected Output	Classes Covered
("John", "Doe",		
"john.doe@example.com",		
"9876543210", "Abcd@123",	Valid (All fields meet the	
"Abcd@123")	constraints)	E1, E3, E5, E7, E9
("User", "Smith",		
"user@example.com",		
"1234567890", "Pass1234!",	Valid (All fields meet the	
"Pass1234!")	constraints)	E1, E3, E5, E7, E9
("John123", "Doe",		
"john.doe@example.com",		
"9876543210",		
"Password123",	Invalid (First Name	
"Password123")	contains numbers)	E2, E3, E5, E7, E9
("Alice",		
"LongLastNameExceedingFi		
ftyCharacters",		
"alice.smith@example.com",	Invalid (Last Name	
"9876543210", "Valid1234!",	exceeds 50 characters)	E1, E2, E5, E7, E9

"Valid1234!")		
("John", "Doe",		
"john.doe@domaincom",		
"9876543210", "Password1",	Invalid (Invalid email	E1, E4, E5, E7,
"Password123")	format)	E10
("Us", "Smith",		
"us@domain.com",		
"9876543210", "Valid1",	Invalid (First Name too	
"Valid1")	short, Password too short)	E2, E5, E8, E7
("John", "Doe",		
"john.doe@domain.com",		
"98765432101", "Valid1234!",	Invalid (Mobile Number	
"Valid1234!")	too long)	E1, E3, E6, E7, E9
("A"*51, "Doe",		
"john.doe@example.com",		
"9876543210", "Pass1234@",	Invalid (First Name exceeds	
"Pass1234@")	50 characters)	E2, E3, E5, E7, E9
("John", "Doe",		
"john.doe@example.com",		
"9876543210", "Password123",	Invalid (Passwords do not	
"password123")	match)	E1, E3, E5, E8
("John", "Doe",		
"john.doe@example.com",		
"9876543210", "Short", "Short")	Invalid (Password too short)	E1, E3, E5, E8

("John", "Doe",		
"john.doe@example.com",		
"9876543210",		
"Pass1234LongPassword",	Invalid (Password exceeds	
"Pass1234LongPassword")	max length)	E1, E3, E5, E8
("TestUser", "Smith",		
"testuser@domain.com",		
"9876543210", "P@ssw0rd123",	Valid (All fields meet the	
"P@ssw0rd123")	constraints)	E1, E3, E5, E7, E9

2. Sign in As Customer:

Email Constraints:

- The email field is mandatory (cannot be left empty).
- Already registered (customer).

Password Constraints:

- Must contain at least 8 characters.
- The password field is required (cannot be blank).
- Should include at least one numeric character.
- Should have at least one lowercase letter.
- Must include at least one uppercase letter.
- Should contain at least one special character.

(Note: Other password validations are already handled in the database.)

Class	Description	Values Represented
		Registered email in correct format (e.g.,
E1	Valid Email	"user@example.com")
	Invalid Email	
E2	(Empty)	Empty email field
	Invalid Email (Not	Unregistered email (e.g.,
E3	Registered)	"unknown@example.com")
	Invalid Email	Invalid email format (e.g., "user@",
E4	(Incorrect format)	"@example.com", "userexample.com")
E 5	Valid Password	Password meets criteria (e.g., "Abcd@123")
	Invalid Password	
E6	(Empty)	Empty password field
	Invalid Password	
E7	(Too Short)	Password length < 8 (e.g., "abc")
	Invalid Password (No	
E8	number)	Password without a number (e.g., "Abcd@abcd")
	Invalid Password (No	Password without a lowercase letter (e.g.,
E9	lowercase letter)	"ABCD@123")
	Invalid Password (No	Password without an uppercase letter (e.g.,
E10	uppercase letter)	"abcd@123")
	Invalid Password (No	Password without a special character (e.g.,
E11	special character)	"Abcd1234")
E12	Invalid Password	Password length > 30 characters (e.g.,

Input Tuple (Email, Password)	Expected Outcome	Classes Covered
("user@example.com", "Abcd@123")	Valid	E1, E5
("user@example.com", "")	Invalid (Password Empty)	E1, E6
("", "Abcd@123")	Invalid (Email Empty)	E2, E5
("unknown@example.com", "Abcd@123")	Invalid (Email Not Registered)	E3, E5
("user@", "Abcd@123")	Invalid (Email Incorrect Format)	E4, E5
("user@example.com", "abc")	Invalid (Password Too Short)	E1, E7
("user@example.com", "Abcdabcd")	Invalid (Password No Number)	E1, E8
("user@example.com", "ABCD@123")	Invalid (Password No Lowercase)	E1, E9
("user@example.com", "abcd@123")	Invalid (Password No Uppercase)	E1, E10
("user@example.com", "Abcd1234")	Invalid (Password No Special Character)	E1, E11
("user@example.com", "Abcd@123456789012345678 901234567890")	Invalid (Password Too Long)	E1, E12
("user@example.com", "Abcd@123")	Valid	E1, E5

3. Sign in As Manager:

Hotel-Email Id Constraints:

• The email field is mandatory (cannot be left empty).

Password Constraints:

- Must contain at least 8 characters.
- The password field is required (cannot be blank).
- Should include at least one numeric character.
- Should have at least one lowercase letter.
- Must include at least one **uppercase letter**.
- Should contain at least one **special character**.

(Note: Other password validations are already handled in the database.)

Class	Description	Values Represented
		Registered email in correct format (e.g.,
E1	Valid Hotel-Email Id	"manager@hotel.com")
	Invalid Hotel-Email Id	
E2	(Empty)	Empty email field
	Invalid Hotel-Email Id	
E3	(Not Registered)	Unregistered email (e.g., "unknown@hotel.com")
	Invalid Hotel-Email Id	Invalid email format (e.g., "manager@", "@hotel.com",
E4	(Incorrect Format)	"managerhotel.com")
E5	Valid Password	Password meets criteria (e.g., "Passw0rd@123")
	Invalid Password	
E6	(Empty)	Empty password field
	Invalid Password (Too	
E7	Short)	Password length < 8 (e.g., "pass")

E8	Invalid Password (No number)	Password without a number (e.g., "Passwrd@")
E9	Invalid Password (No lowercase letter)	Password without a lowercase letter (e.g., "PASSW0RD@123")
E10	Invalid Password (No uppercase letter)	Password without an uppercase letter (e.g., "passw0rd@123")
E11	Invalid Password (No special character)	Password without a special character (e.g., "Passw0rd123")
E12	Invalid Password (Too Long)	Password length > 30 characters (e.g., "Passw0rd@123456789012345678901234567890")

Input Tuple (Hotel-Email Id, Password)	Expected Outcome	Classes Covered
("manager@hotel.com", "Passw0rd@123")	Valid	E1, E5
	Invalid (Password	
("manager@hotel.com", "")	Empty)	E1, E6
	Invalid (Email	
("", "Passw0rd@123")	Empty)	E2, E5
	Invalid (Email Not	
("unknown@hotel.com", "Passw0rd@123")	Registered)	E3, E5
	Invalid (Email	
("manager@", "Passw0rd@123")	Incorrect Format)	E4, E5
	Invalid (Password	
("manager@hotel.com", "pass")	Too Short)	E1, E7
	Invalid (Password	
("manager@hotel.com", "Passwrd@")	No Number)	E1, E8

("manager@hotel.com", "PASSW0RD@123")	Invalid (Password No Lowercase)	E1, E9
("manager@hotel.com", "passw0rd@123")	Invalid (Password No Uppercase)	E1, E10
("manager@hotel.com", "Passw0rd123")	Invalid (Password No Special Character)	E1, E11
("manager@hotel.com", "Passw0rd@12345678901234567890")	Invalid (Password Too Long)	E1, E12
("manager@hotel.com", "Passw0rd@123")	Valid	E1, E5

4. Forgot Password:

Email Constraints:

- The email field is mandatory (cannot be left empty).
- Already registered (customer or manager).

Class	Description	Values Represented
		Registered email in correct format (e.g.,
E1	Valid Email	"user@hotel.com", "manager@hotel.com")
E2	Invalid Email (Empty)	Empty email field
		Unregistered email (e.g.,
E3	Invalid Email (Not Registered)	"unknown@hotel.com")

		Invalid email format (e.g., "user@",
E4	Invalid Email (Incorrect Format)	"@hotel.com", "userhotel.com")

Input Tuple (Email)	Expected Outcome	Classes Covered
("user@hotel.com")	Valid	E1
("manager@hotel.com")	Valid	E1
("")	Invalid (Email Empty)	E2
("unknown@hotel.com")	Invalid (Email Not Registered)	E3
("user@")	Invalid (Email Incorrect Format)	E4
("@hotel.com")	Invalid (Email Incorrect Format)	E4
("userhotel.com")	Invalid (Email Incorrect Format)	E4

5. Reset Password Constraints

• New Password Constraints:

- o Required: The field cannot be empty.
- o Length: Minimum of 8 characters.
- Must include at least one number (0-9).
- Must include at least one lowercase letter (a-z).
- Must include at least one uppercase letter (A-Z).
- Must include at least one special character (e.g., !@#\$%^&*).

• Confirm Password Constraints:

- Required: The field cannot be empty.
- Must exactly match the New Password (case-sensitive).
- Must satisfy the same rules for password validation (same criteria as the New Password).

Equivalence Partitioning:

Class	Description	Examples
E1	Valid New Password (meets all criteria)	"Passw0rd@123", "Valid1Password!"
E2	Invalid New Password (empty field)	m
E3	Invalid New Password (too short, less than 8 characters)	"short", "pwd1!"
E4	Invalid New Password (no number)	"Password@", "password!"
E5	Invalid New Password (no lowercase letter)	"PASSWORD123!", "12345678@"
E6	Invalid New Password (no uppercase letter)	"password123@", "12345678@"
E7	Invalid New Password (no special character)	"Password123", "Password1234"
E9	Valid Confirm Password (matches New Password exactly)	"Passw0rd@123" (matches New Password)
E10	Invalid Confirm Password (does not match New Password)	"password123" (does not match New Password)
E11	Invalid Confirm Password (empty field)	m

Input Tuple (New Password, Confirm Password)	Expected Outcome	Classes Covered
("Passw0rd@123", "Passw0rd@123")	Valid	E1, E9
("", "")	Invalid (Both fields empty)	E2, E11
("short", "short")	Invalid (Password too short)	E3, E10
("Password1@", "Password1@")	Valid	E1, E9
("Password@", "Password@")	Invalid (No number)	E4, E10
("PASSWORD123!", "PASSWORD123!")	Invalid (No lowercase letter)	E5, E10
("password123@", "password123@")	Invalid (No uppercase letter)	E6, E10
("Password123", "Password123")	Invalid (No special character)	E7, E10
("Password1@", "Password1@")	Valid	E1, E9
("Password1@", "passw0rd@123")	Invalid (Passwords do not match)	E9, E10
("Password1234", '"")	Invalid (Confirm Password empty)	E10, E11

6. HotelSearch Page:

City Name Constraints:

City Name must be Valid

Check-In ,Check-Out Dates Constraints:

- Both Dates have to be greater than or equal to today's Date.
- My check-out Dates must be greater than the Check-In Date.

Class	Description	Examples
E1	Valid City	"New York", "Los Angeles"
E2	Invalid City (Empty)	""
E3	Invalid City (Contains Numbers)	"Paris1", "New York 123"
E4	Invalid City (Contains Special Characters)	"Los@Angeles", "San*Francisco"
E5	Valid Check-In Date (Future Date, >= today's date)	"2024-12-05"
E6	Invalid Check-In Date (Empty)	""
E7	Invalid Check-In Date (Before Today's Date)	"2024-11-30"
E8	Valid Check-Out Date (Greater than Check-In Date)	"2024-12-10"
E9	Invalid Check-Out Date (Empty)	m
E10	Invalid Check-Out Date (Before Check-In Date)	"2024-12-04"

Test Case	Input (City, Check-In Date, Check-Out Date)	Expected Outcome	Classes Covered
1	("New York", "2024-12-05", "2024-12-10")	Valid	E1, E5, E8
2	("", "2024-12-05", "2024-12- 10")	Invalid (Empty City Name)	E2, E5, E8
3	("Paris1", "2024-12-05", "2024-	Invalid (City Contains	E3, E5, E8

	12-10")	Numbers)	
4	("Los@Angeles", "2024-12- 05", "2024-12-10")	Invalid (City Contains Special Characters)	E4, E5, E8
5	("Los Angeles", "", "2024-12- 10")	Invalid (Empty Check-In Date)	E1, E6, E8
6	("New York", "2024-12-05", "")	Invalid (Empty Check- Out Date)	E1, E5, E9
7	("New York", "2024-11-30", "2024-12-10")	Invalid (Check-In Date Before Today's Date)	E1, E7, E8
8	("New York", "2024-12-05", "2024-12-04")	Invalid (Check-Out Date Before Check-In Date)	E1, E5, E10
9	("A very long city name that exceeds fifty characters!", "2024-12-05", "2024-12-10")	Invalid (City Name Too Long)	E1, E5, E8
10	("New York", "2024-11-29", "2024-12-01")	Invalid (Dates in the Past)	E1, E7, E10

7.Enter the details (after selecting Hotel)

First Name & Last Name Constraints:

- No numbers allowed.
- Validity of characters: alphabets and spaces only.
- Maximum length: 50 characters.

Email Constraints:

• Must contain "@" sign with character before and after. Must not already be registered.

Mobile Number Constraints:

• The mobile number should have a fixed length (e.g., **10 digits**).

Class	Description	Examples
E1	Valid First Name & Last Name (only alphabets and spaces)	"John Doe", "Alice Smith"
E2	Invalid First Name & Last Name (contains numbers)	"John123", "Alice1", "Jane3 Doe"
E3	Invalid First Name & Last Name (contains special characters)	"John@Doe", "Alice#Smith", "J@ne D@e"
E4	Invalid First Name & Last Name (too long, exceeds 50 characters)	"This is a very long first name and last name that exceeds fifty characters"
E5	Valid Email (contains '@' sign, with characters before and after)	"user@example.com", "john.doe@mail.com"
E6	Invalid Email (empty)	""
E7	Invalid Email (missing '@')	"userexample.com", "johndoe.com"
E8	Invalid Email (contains multiple '@')	"user@@example.com", "john.doe@@mail.com"
E9	Valid Mobile Number (exactly 10 digits)	"9876543210", "1234567890"
E10	Invalid Mobile Number (too short)	"98765"
E11	Invalid Mobile Number (too long)	"123456789012"
E12	Invalid Mobile Number (contains non-numeric	"98765432ab"

characters)	

Test Case	Input (First Name, Last Name, Email, Mobile Number)	Expected Outcome	ses Cov
1	("Michael", "Jordan", "michael.jordan@example.com", "9876543210")	Valid	E1, E5, E9
2	("Michael123", "Jordan", "michael.jordan@example.com", "9876543210")	Invalid (First Name contains numbers)	E2, E5, E9
3	("Michael", "Jordan@", "michael.jordan@example.com", "9876543210")	Invalid (Last Name contains special character)	E1, E3, E9
4	("This is a very long first name and last name", "that exceeds fifty characters", "michael.jordan@example.com", "9876543210")	Invalid (Name exceeds 50 characters)	E4, E5, E9
5	("Michael", "Jordan", "", "9876543210")	Invalid (Email is empty)	E1, E6, E9
6	("Michael", "Jordan", "michaeljordanexample.com", "9876543210")	Invalid (Email missing '@')	E1, E7, E9
7	("Michael", "Jordan", "michael@@example.com", "9876543210")	Invalid (Email contains multiple '@')	E1, E8, E9
8	("Michael", "Jordan", "newuser@example.com", "9876543210")	Valid	E1, E5, E9
9	("Michael", "Jordan", "newuser@example.com", "98765")	Invalid (Mobile number too short)	E1, E5, E10
10	("Michael", "Jordan", "newuser@example.com", "123456789012")	Invalid (Mobile number too long)	E1, E5, E11

	("Michael", "Jordan",		
	"newuser@example.com",	Invalid (Mobile number contains	E1, E5,
11	"98765432ab")	non-numeric characters)	E12

8. Update Profile

First Name & Last Name Constraints:

- No numbers allowed.
- Validity of characters: alphabets and spaces only.
- Maximum length: 50 characters.

Email Constraints:

• Must contain "@" sign with character before and after. Must not already be registered.

Mobile Number Constraints:

• The mobile number should have a fixed length (e.g., 10 digits).

Class	Description	Examples
E1	Valid First Name & Last Name (only alphabets and spaces)	"Alice Smith", "John Doe"
E2	Invalid First Name & Last Name (contains numbers)	"John123", "Alice1", "Jane3 Doe"
E3	Invalid First Name & Last Name (contains	"Alice@Smith", "J@ne D@e"

	special characters)	
E4	Invalid First Name & Last Name (too long, exceeds 50 characters)	"This is a very long name exceeding fifty characters"
E5	Valid Email (contains '@' with characters before and after)	"user@example.com", "john.doe@mail.com"
E6	Invalid Email (empty)	1111
E7	Invalid Email (missing '@')	"userexample.com", "johndoe.com"
E8	Invalid Email (contains multiple '@')	"user@@example.com", "john.doe@@mail.com"
E9	Valid Mobile Number (exactly 10 digits)	"9876543210", "1234567890"
E10	Invalid Mobile Number (too short)	"98765"
E11	Invalid Mobile Number (too long)	"123456789012"
E12	Invalid Mobile Number (contains non-numeric characters)	"98765432ab"

Input Tuple	Expected Outcome	Classes Covered
("Alice Smith", "user@example.com", "9876543210")	Valid	E1, E5, E9
("", "user@example.com", "9876543210")	Invalid (Empty Name)	E2, E5, E9
("John123", "user@example.com", "9876543210")	Invalid (Numbers in Name)	E3, E5, E9
("John@Doe", "user@example.com", "9876543210")	Invalid (Special Characters in Name)	E4, E5, E9
("Alice Smith", "", "9876543210")	Invalid (Empty Email)	E1, E6, E9

("Alice Smith", "userexample.com", "9876543210")	Invalid (Missing '@')	E1, E7, E9
("Alice Smith", "user@@example.com", "9876543210")	Invalid (Multiple '@')	E1, E8, E9
("Alice Smith", "user@example.com", "98765")	Invalid (Short Mobile Number)	E1, E5, E10
("Alice Smith", "user@example.com", "123456789012")	Invalid (Long Mobile Number)	E1, E5, E11
("Alice Smith", "user@example.com", "98765432ab")	Invalid (Non-Numeric Mobile Number)	E1, E5, E12

8.Update HotelDetails

City, Country Name Constraints:

• City Name must be Valid,Can't be blank

Address Constraints:

• must not be Blank,must not have any special character

Description of Hotel Constraints:

• Can not be Blank

Room Count Constraints:

must be only integer

Price Per Night Constraints:

Must not Have any alphabet

Contact Information:

• The mobile number should have a fixed length (e.g., 10 digits) an alphabet and special chrecter.

Class	Description	Examples
E1	Valid City Name (alphabets and spaces only)	"New York", "Los Angeles", "Chicago"
E2	Invalid City Name (blank)	ıııı
E3	Invalid City Name (contains special characters)	"New@York", "San*Francisco"
E4	Valid Country Name (alphabets and spaces only)	"USA", "United Kingdom", "Canada"
E5	Invalid Country Name (blank)	ıııı
E6	Invalid Country Name (contains special characters)	"US@", "U.K!"
E 7	Valid Address (no special characters)	"123 Main Street", "Apartment 101, Maple Rd."
E8	Invalid Address (blank)	ıııı
E9	Invalid Address (contains special characters)	"123 Main St.!", "Apt#10@"
E10	Valid Description (non-blank)	"A luxury hotel", "Budget-friendly hotel"
E11	Invalid Description (blank)	ııı
E12	Valid Room Count (integer only)	10, 25, 100
E13	Invalid Room Count (non-integer)	"ten", 10.5, "5a"

E14	Valid Price Per Night (integer only)	150, 200, 499
E15	Invalid Price Per Night (contains special characters)	"150\$", "\$200"
E16	Valid Contact Number (10 digits only)	"9876543210", "1234567890"
E17	Invalid Contact Number (too short)	"98765"
E18	Invalid Contact Number (too long)	"123456789012"
E19	Invalid Contact Number (contains alphabets/special characters)	"98765abcd#", "12345@6789"

Inputs (City, Country, Address, Description, Room Count, Price Per Night, Contact)	Expected Outcome	Classes Covered
("New York", "USA", "123 Main Street", "A luxury hotel", 10, 150, "9876543210")	Valid	E1, E4, E7, E10, E12, E14, E16
("", "USA", "123 Main Street", "A luxury hotel", 10, 150, "9876543210")	Invalid (Blank City)	E2, E4, E7, E10, E12, E14, E16
("New@York", "USA", "123 Main Street", "A luxury hotel", 10, 150, "9876543210")	Invalid (City with Special Characters)	E3, E4, E7, E10, E12, E14, E16
("New York", "", "123 Main Street", "A luxury hotel", 10, 150, "9876543210")	Invalid (Blank Country)	E1, E5, E7, E10, E12, E14, E16
("New York", "US@", "123 Main Street", "A luxury hotel", 10, 150, "9876543210")	Invalid (Country with Special Characters)	E1, E6, E7, E10, E12, E14, E16
("New York", "USA", "", "A luxury hotel", 10, 150, "9876543210")	Invalid (Blank Address)	E1, E4, E8, E10, E12, E14, E16

("New York", "USA", "123 Main St.!", "A luxury hotel", 10, 150, "9876543210")	Invalid (Address with Special Characters)	E1, E4, E9, E10, E12, E14, E16
("New York", "USA", "123 Main Street", "", 10, 150, "9876543210")	Invalid (Blank Description)	E1, E4, E7, E11, E12, E14, E16
("New York", "USA", "123 Main Street", "A luxury hotel", "ten", 150, "9876543210")	Invalid (Room Count Non-Integer)	E1, E4, E7, E10, E13, E14, E16
("New York", "USA", "123 Main Street", "A luxury hotel", 10, "150\$", "9876543210")	Invalid (Price Contains Special Characters)	E1, E4, E7, E10, E12, E15, E16
("New York", "USA", "123 Main Street", "A luxury hotel", 10, 150, "98765abcd#")	Invalid (Contact Contains Alphabets/Special Characters)	E1, E4, E7, E10, E12, E14, E19
("New York", "USA", "123 Main Street", "A luxury hotel", 10, 150, "98765")	Invalid (Contact Too Short)	E1, E4, E7, E10, E12, E14, E17
("New York", "USA", "123 Main Street", "A luxury hotel", 10, 150, "123456789012")	Invalid (Contact Too Long)	E1, E4, E7, E10, E12, E14, E18