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Here are the solutions to each of the problems listed:

### 1. Check whether a string starts and ends with the same character

```python

Def check\_same\_start\_end(string):

Return string[0] == string[-1] if string else False

# Example usage

String = “abca”

Print(check\_same\_start\_end(string)) # Output: True

```

### 2. Python regex to find sequences of one upper case letter followed by lower case letters

```python

Import re

Def find\_upper\_followed\_by\_lower(text):

Pattern = r’[A-Z][a-z]+’

Return re.findall(pattern, text)

# Example usage

Text = “Hello World H”

Print(find\_upper\_followed\_by\_lower(text)) # Output: [‘Hello’, ‘World’]

```

### 3. Python Program to Remove duplicate words from Sentence

```python

Def remove\_duplicate\_words(sentence):

Words = sentence.split()

Unique\_words = list(dict.fromkeys(words))

Return ‘ ‘.join(unique\_words)

# Example usage

Sentence = “This is a test test string”

Print(remove\_duplicate\_words(sentence)) # Output: “This is a test string”

```

### 4. Remove all characters except letters and numbers

```python

Import re

Def remove\_special\_characters(text):

Return re.sub(r’[^a-zA-Z0-9]’, ‘’, text)

# Example usage

Text = “Hello, World! 123”

Print(remove\_special\_characters(text)) # Output: “HelloWorld123”

```

### 5. Program to accept string ending with alphanumeric character

```python

Import re

Def ends\_with\_alphanumeric(string):

Pattern = r’[a-zA-Z0-9]$’

Return bool(re.search(pattern, string))

# Example usage

String = “Hello World1”

Print(ends\_with\_alphanumeric(string)) # Output: True

```

### 6. Program to accept string starting with vowel

```python

Import re

Def starts\_with\_vowel(string):

Pattern = r’^[AEIOUaeiou]’

Return bool(re.match(pattern, string))

# Example usage

String = “apple”

Print(starts\_with\_vowel(string)) # Output: True

```

### 7. Program to check if a string starts with a substring using regex

```python

Import re

Def starts\_with\_substring(string, substring):

Pattern = r’^’ + re.escape(substring)

Return bool(re.match(pattern, string))

# Example usage

String = “Hello world”

Substring = “Hello”

Print(starts\_with\_substring(string, substring)) # Output: True

```

### 8. Program to Check if an URL is valid or not using Regular Expression

```python

Import re

Def is\_valid\_url(url):

Pattern = re.compile(r’^(https?|ftp)://[^\s/$.?#].[^\s]\*$’)

Return bool(re.match(pattern, url))

# Example usage

url = <https://www.example.com>

print(is\_valid\_url(url)) # Output: True

```

### 9. Parsing and Processing URL using Python – Regex

```python

Import re

Def parse\_url(url):

Pattern = re.compile(r’^(https?|ftp)://([^\s/$.?#].[^\s]\*)’)

Match = re.match(pattern, url)

If match:

Protocol = match.group(1)

Domain = match.group(2)

Return {“protocol”: protocol, “domain”: domain}

Return None

# Example usage

url = <https://www.example.com/path?query=123>

print(parse\_url(url)) # Output: {‘protocol’: ‘https’, ‘domain’: ‘www.example.com’}

```

### 10. Program to validate an IP address using ReGex

```python

Import re

Def is\_valid\_ip(ip):

Pattern = re.compile(r’^((25[0-5]|2[0-4][0-9]|[01]?[0-9][0-9]?)\.){3}(25[0-5]|2[0-4][0-9]|[01]?[0-9][0-9]?)$’)

Return bool(re.match(pattern, ip))

# Example usage

Ip = “192.168.1.1”

Print(is\_valid\_ip(ip)) # Output: True

```

These solutions cover a variety of regular expression and string manipulation tasks in Python.