Sample Answer for Programming Assignment Unit 7

Python Program

```python
alphabet = "abcdefghijklmnopqrstuvwxyz"

test_dups = ["zzz","dog","bookkeeper","subdermatoglyphic",
"subdermatoglyphics"]

test_miss = ["zzz","subdermatoglyphic",
"the quick brown fox jumps over the lazy dog"]

# From Section 11.2 of:
# Downey, A. (2015). Think Python: How to think like a
# computer scientist. Needham, Massachusetts: Green Tree
# Press.
def histogram(s):
    d = dict()
    for c in s:
        if c not in d:
            d[c] = 1
        else:
            d[c] += 1
    return d

# Part 1

def has_duplicates(s):
    h = histogram(s)
    for k,v in h.items():
        if v > 1:
            return True
    return False

for s in test_dups:
    if has_duplicates(s):
        print(s,"has duplicates")
    else:
        print(s,"has no duplicates")

# Part 2

def missing_letters(s):
    h = histogram(s)
    m = []
    for c in alphabet:
        if c not in h:
```

```python
            m.append(c)
    return ''.join(m)

for s in test_miss:
    m = missing_letters(s)
    if len(m):
        print(s,"is missing letters",m)
    else:
        print(s,"uses all the letters")
```

Output for Python 3

```
zzz has duplicates
dog has no duplicates
bookkeeper has duplicates
subdermatoglyphic has no duplicates
subdermatoglyphics has duplicates
zzz is missing letters abcdefghijklmnopqrstuvwxy
subdermatoglyphic is missing letters fjknqvwxz
the quick brown fox jumps over the lazy dog uses all the
letters
```