Task 7

The commands and outputs for -sha1 are as follows:
H1:
Command: openssl dgst -sha1 -hmac "112233" sample_text.txt
Generated hash: HMAC-SHA1(sample_text.txt)=
549660400842c2392aab75a2c4c2fd5654626caa

The next hash is generated after changing one bit of the sample text.

H2:
Command: openssl dgst -sha1 -hmac "112233" sample_text.txt
Generated hash: HMAC-SHA1(sample_text.txt)=
99f743a6273ce8fb0469a288b3ef378b2e607ee8

Observation
H1 and H2 are not similar. The following program can be used to count how many bits are the same between H1 and H2:

```
#include<bits/stdc++.h>

using namespace std;

int main(){
   string h1, h2;
   h1 = "549660400842c2392aab75a2c4c2fd5654626caa";
   h2 = "99f743a6273ce8fb0469a288b3ef378b2e607ee8";
   int count_ = 0;
   for(int i = 0; i < h1.size(); i++){
       if(h1[i] == h2[i]){
           count_++;
       }
   }
   cout <<count_ <<endl;
   return 0;
}
```

The same procedure is run for -md5:

H1:

```
Command: openssl dgst -md5 -hmac "112233" sample_text.txt
Generated hash: HMAC-MD5(sample_text.txt)=
757025efb10944f0fa271883eda97428
```

H2:

```
Command: openssl dgst -md5 -hmac "112233" sample_text.txt
Generated hash: HMAC-MD5(sample_text.txt)=
e7b8decf356bac33e9de7025eccb29f8
```

Counting the number of same bits:

```
#include<bits/stdc++.h>

using namespace std;

int main(){
   string h1, h2;
   h1 = "757025efb10944f0fa271883eda97428";
   h2 = "e7b8decf356bac33e9de7025eccb29f8";
   int count_ = 0;
   for(int i = 0; i < h1.size(); i++){
       if(h1[i] == h2[i]){
           count_++;
       }
   }
   cout <<count_ <<endl;
   return 0;
}
```

Number of same bits: 3