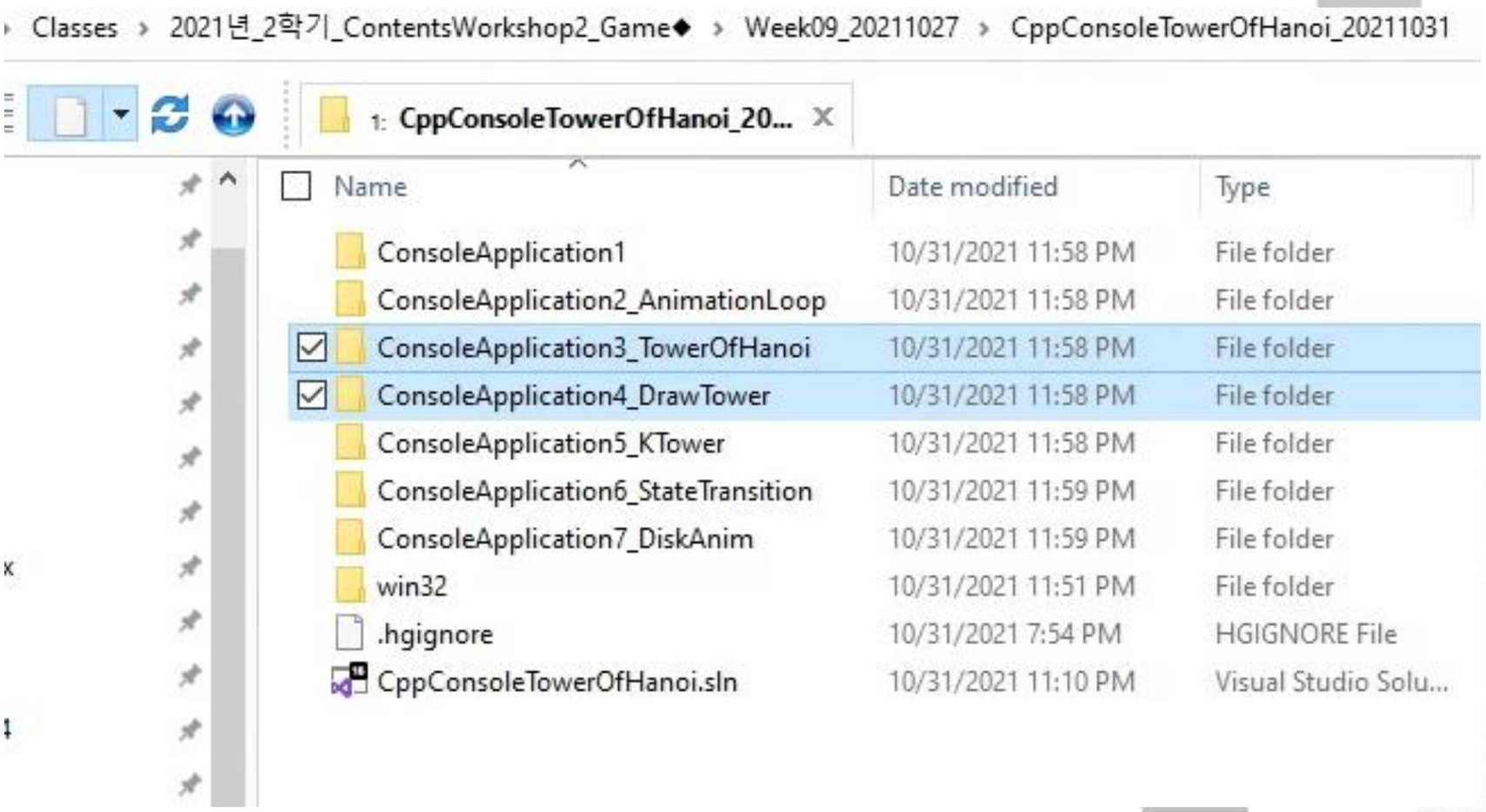
Contents Workshop 2 (Game)

# Console Torus Animation

jintaeks@dongseo.ac.kr

November, 2021

DSU Dongseo University 동서대학교


Classes › 2021년_2학기_ContentsWorkshop2_Game◆ › Week09_20211027 › CppConsoleTowerOfHanoi_20211031
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ConsoleApplication4_DrawTower 10/31/2021 11:58 PM File folder
ConsoleApplication5_KTower 10/31/2021 11:58 PM File folder
ConsoleApplication6_StateTransition 10/31/2021 11:59 PM File folder
ConsoleApplication7_DiskAnim 10/31/2021 11:59 PM File folder
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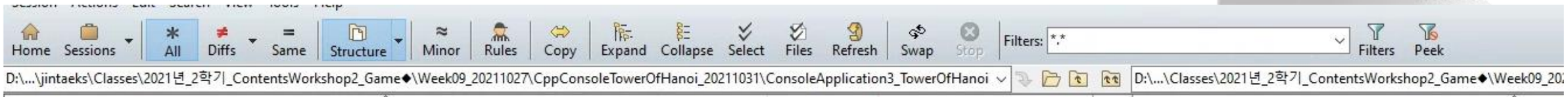
CppConsoleTowerOfHanoi.sln 10/31/2021 11:10 PM Visual Studio Solu...

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| ConsoleApplication3_TowerOfHanoi.vcxproj.user | 168 | 10/31/2021 7:54:54 PM | |
| | | | ConsoleApplication4_DrawTower.vcxproj |
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| KMatrix2.cpp | 141 | 10/31/2021 7:54:54 PM | KMatrix2.cpp |
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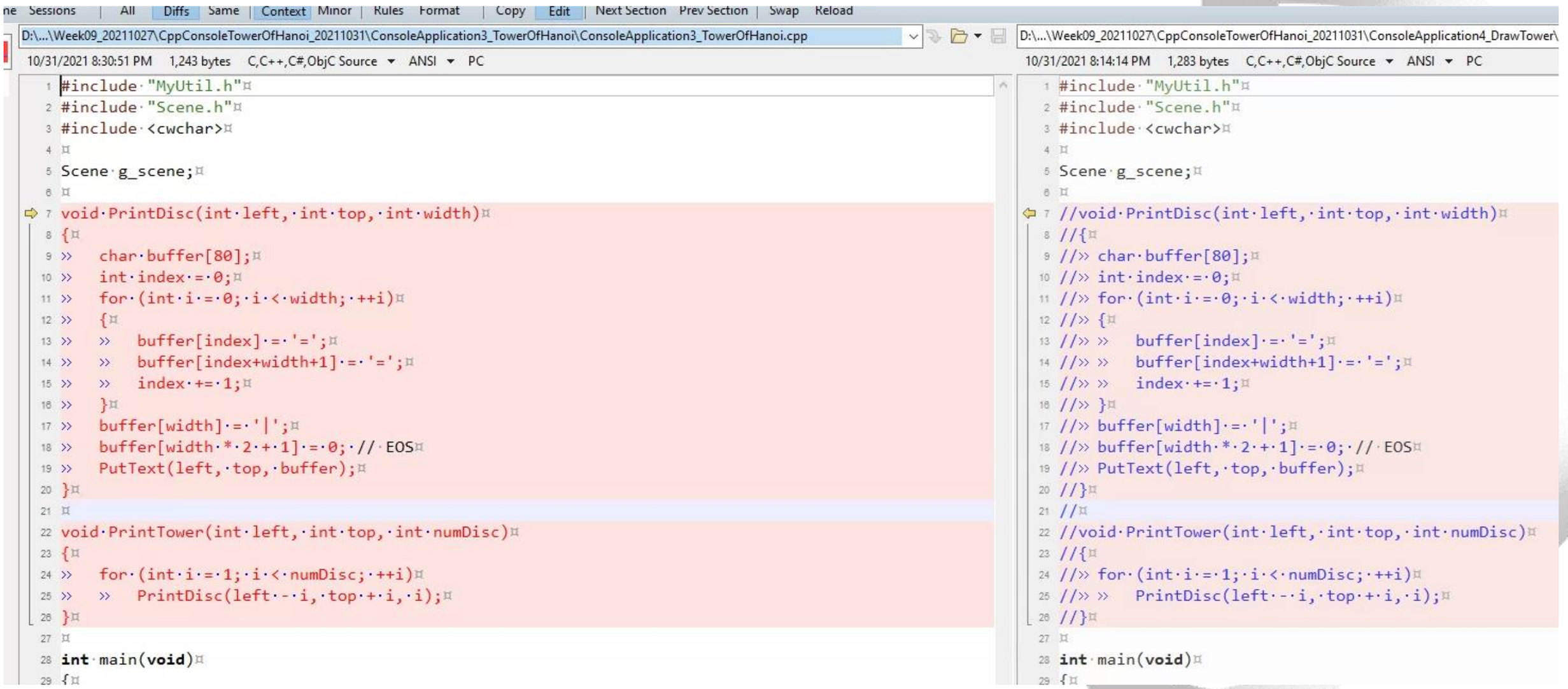
| KStack.h | 394 | 10/31/2021 7:54:54 PM | KStack.h |
| KTowerOfHanoi.cpp | 3,649 | 10/31/2021 7:54:54 PM | KTowerOfHanoi.cpp |
| KTowerOfHanoi.h | 695 | 10/31/2021 7:54:54 PM | KTowerOfHanoi.h |
| KVector2.cpp | 496 | 10/31/2021 7:54:54 PM | KVector2.cpp |
| KVector2.h | 1,135 | 10/31/2021 7:54:54 PM | KVector2.h |
| MyUtil.cpp | 3,556 | 10/31/2021 7:54:54 PM | MyUtil.cpp |
| MyUtil.h | 566 | 10/31/2021 7:54:54 PM | MyUtil.h |
| Scene.cpp | 1,222 | 10/31/2021 7:54:54 PM | Scene.cpp |
| Scene.h | 283 | 10/31/2021 7:54:54 PM | Scene.h |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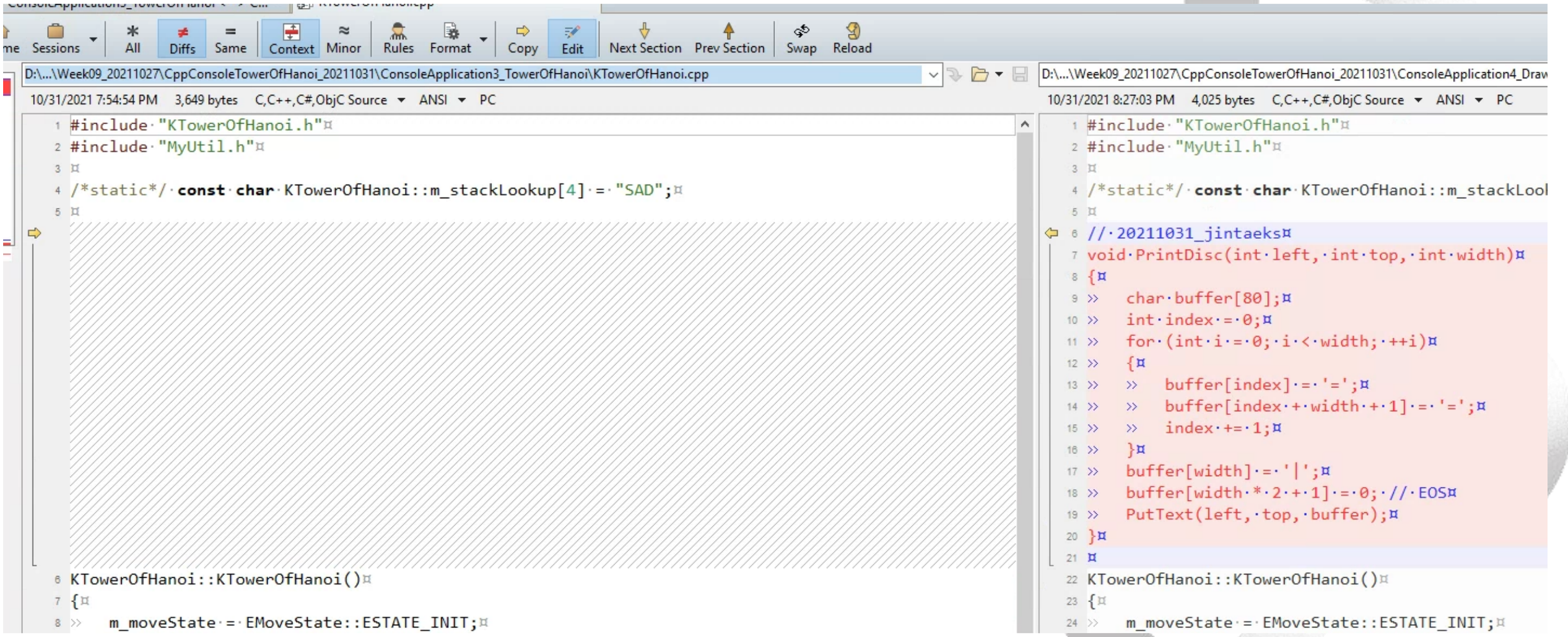
10/31/2021 8:30:51 PM 1,243 bytes C,C++,C#,ObjC Source ANSI PC
#include "MyUtil.h"
#include "Scene.h"
#include <cwchar>
Scene g_scene;
void PrintDisc(int left, int top, int width)
{
char buffer[80];
int index = 0;
for (int i = 0; i < width; ++i)
{
buffer[index] = '=';
buffer[index+width+1] = '=';
index += 1;
}
buffer[width] = '|';
buffer[width * 2 + 1] = 0; // EOS
PutText(left, top, buffer);
}
void PrintTower(int left, int top, int numDisc)
{
for (int i = 1; i < numDisc; ++i)
PrintDisc(left--i, top+i, i);
}
int main(void)
{
D:\...\Week09_20211027\CppConsoleTowerOfHanoi_20211031\ConsoleApplication4_DrawTower\
10/31/2021 8:14:14 PM 1,283 bytes C,C++,C#,ObjC Source ANSI PC
//void PrintDisc(int left, int top, int width)
//{
//char buffer[80];
//int index = 0;
//for (int i = 0; i < width; ++i)
//{
//buffer[index] = '=';
//buffer[index+width+1] = '=';
//index += 1;
//}
//buffer[width] = '|';
//buffer[width * 2 + 1] = 0; // EOS
//PutText(left, top, buffer);
//}
//void PrintTower(int left, int top, int numDisc)
//{
//for (int i = 1; i < numDisc; ++i)
//PrintDisc(left--i, top+i, i);
//}
int main(void)
{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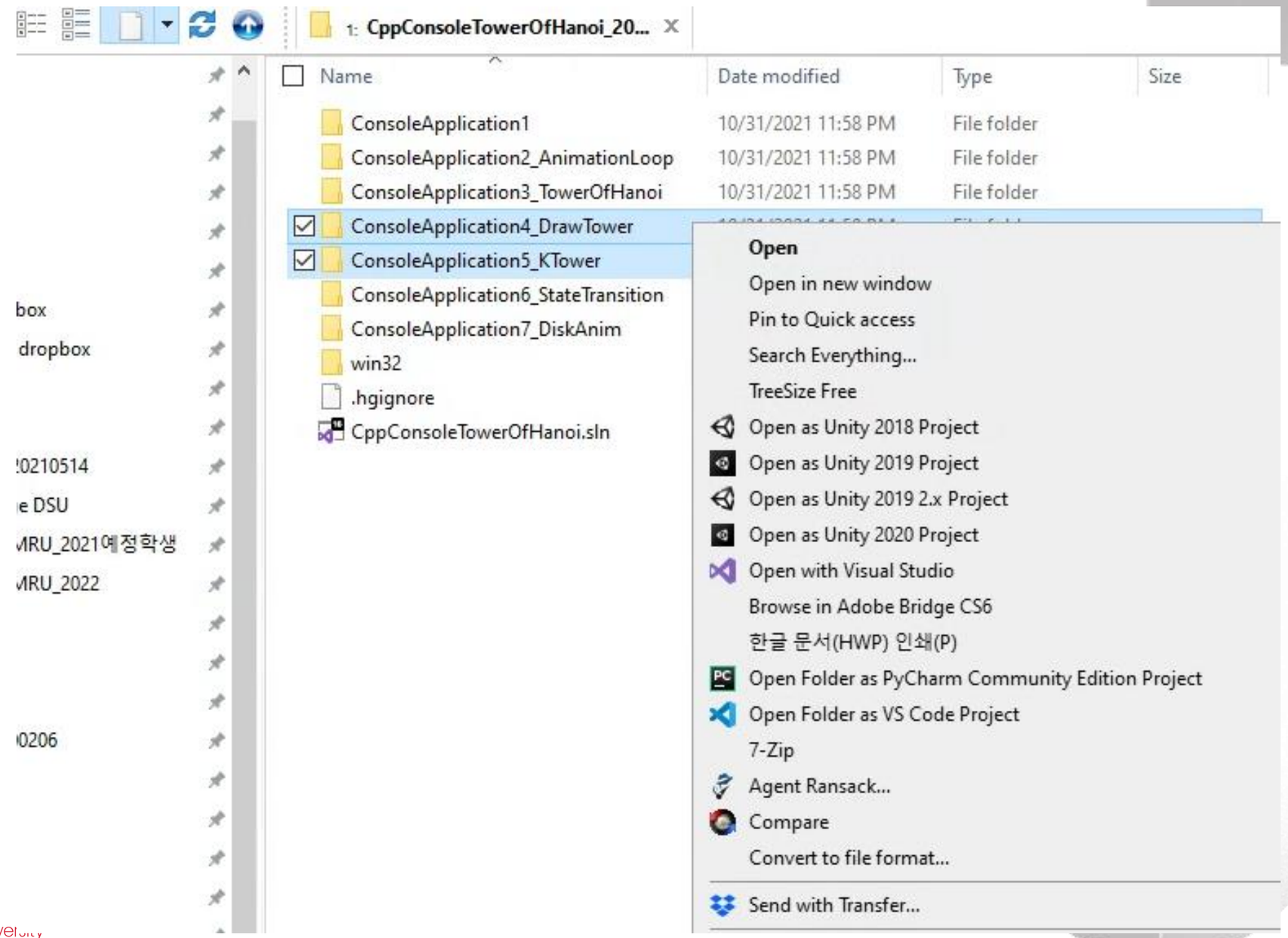
10/31/2021 7:54:54 PM 3,649 bytes C,C++,C#,ObjC Source ANSI PC
#include "KTowerOfHanoi.h"
#include "MyUtil.h"
/*static*/ const char KTowerOfHanoi::m_stackLookup[4] = "SAD";
KTowerOfHanoi::KTowerOfHanoi()
{
m_moveState = EMoveState::ESTATE_INIT;
D:\...\Week09_20211027\CppConsoleTowerOfHanoi_20211031\ConsoleApplication4_Draw
10/31/2021 8:27:03 PM 4,025 bytes C,C++,C#,ObjC Source ANSI PC
#include "KTowerOfHanoi.h"
#include "MyUtil.h"
/*static*/ const char KTowerOfHanoi::m_stackLool
//20211031_jintaeks
void PrintDisc(int left, int top, int width)
{
char buffer[80];
int index = 0;
for (int i = 0; i < width; ++i)
{
buffer[index] = '=';
buffer[index + width + 1] = '=';
index += 1;
}
buffer[width] = '|';
buffer[width * 2 + 1] = 0; // EOS
PutText(left, top, buffer);
}
KTowerOfHanoi::KTowerOfHanoi()
{
m_moveState = EMoveState::ESTATE_INIT;

```
            PutText(x, y, str.c_str());
            y += 1;
        }

        char buffer[80];
        int startx = 50;
        int starty = 20;
        const int width = m_numOfDisks * 2 + 1;
        x = startx;
        y = starty;
        for (int i = 0; i < 3; ++i) {
            x += width;
            y = starty;
            for (int n : m_stack[i]) {
                _itoa_s(n, buffer, 10);
                PutText(x, y, buffer);

                y -= 1;
            }
        }
    }
```

```
            PutText(x, y, str.c_str());
            y += 1;
        }

        char buffer[80];
        int startx = 50;
        int starty = 10;
        const int width = m_numOfDisks * 2 + 2;
        x = startx;
        y = starty;
        for (int i = 0; i < 3; ++i) {
            x += width;
            y = starty;
            for (int n : m_stack[i]) {
                _itoa_s(n, buffer, 10);
                PutText(x, y, buffer);
                PrintDisc(x - n, 20 + y, n); //jintaek on 20211031

                y -= 1;
            }
        }
    }
```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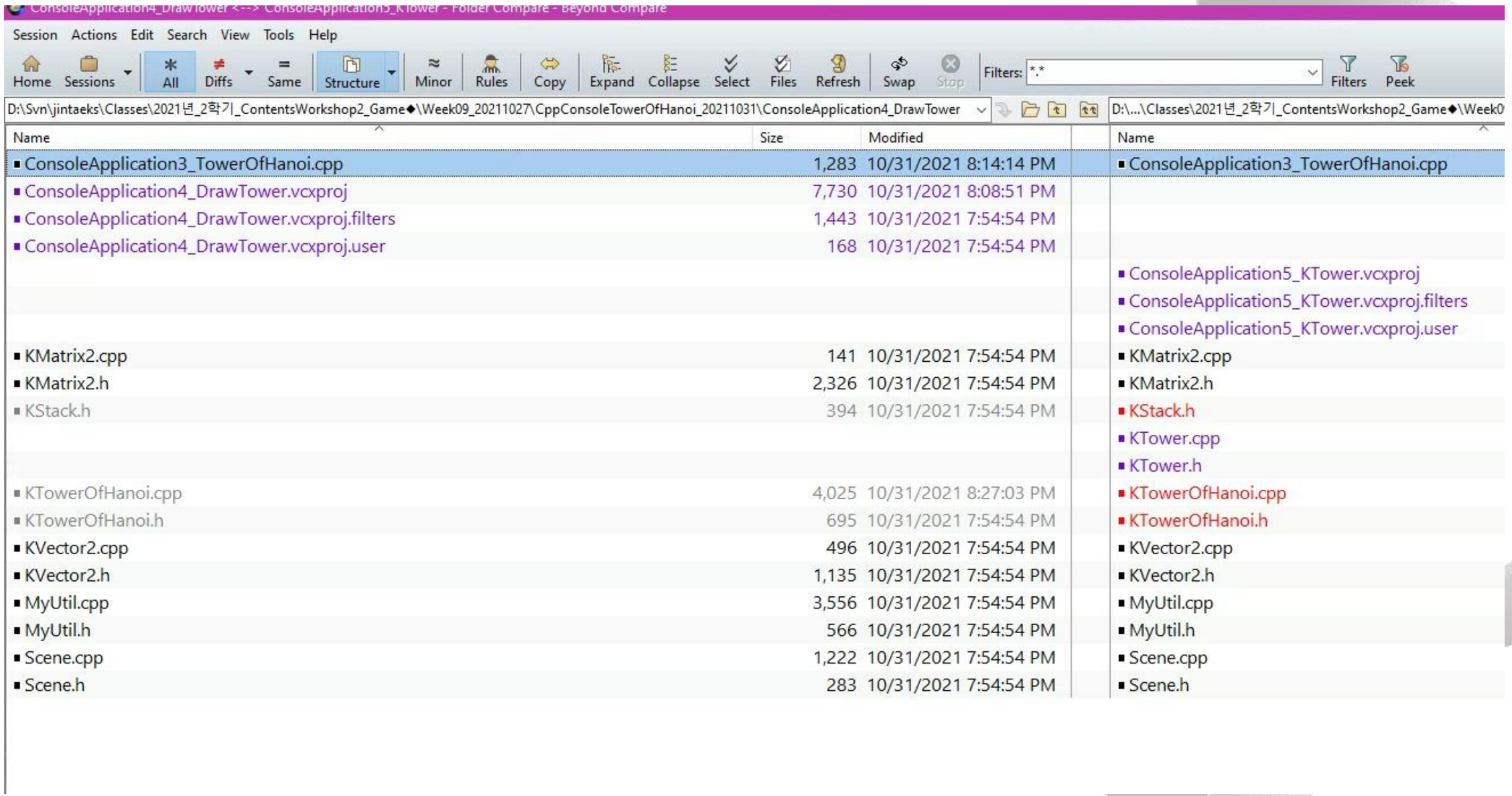
ConsoleApplication4_DrawTower <--> ConsoleApplication5_KTower - Folder Compare - Beyond Compare
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KMatrix2.cpp 141 10/31/2021 7:54:54 PM
KMatrix2.h 2,326 10/31/2021 7:54:54 PM
KStack.h 394 10/31/2021 7:54:54 PM
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MyUtil.h 566 10/31/2021 7:54:54 PM
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KStack.h
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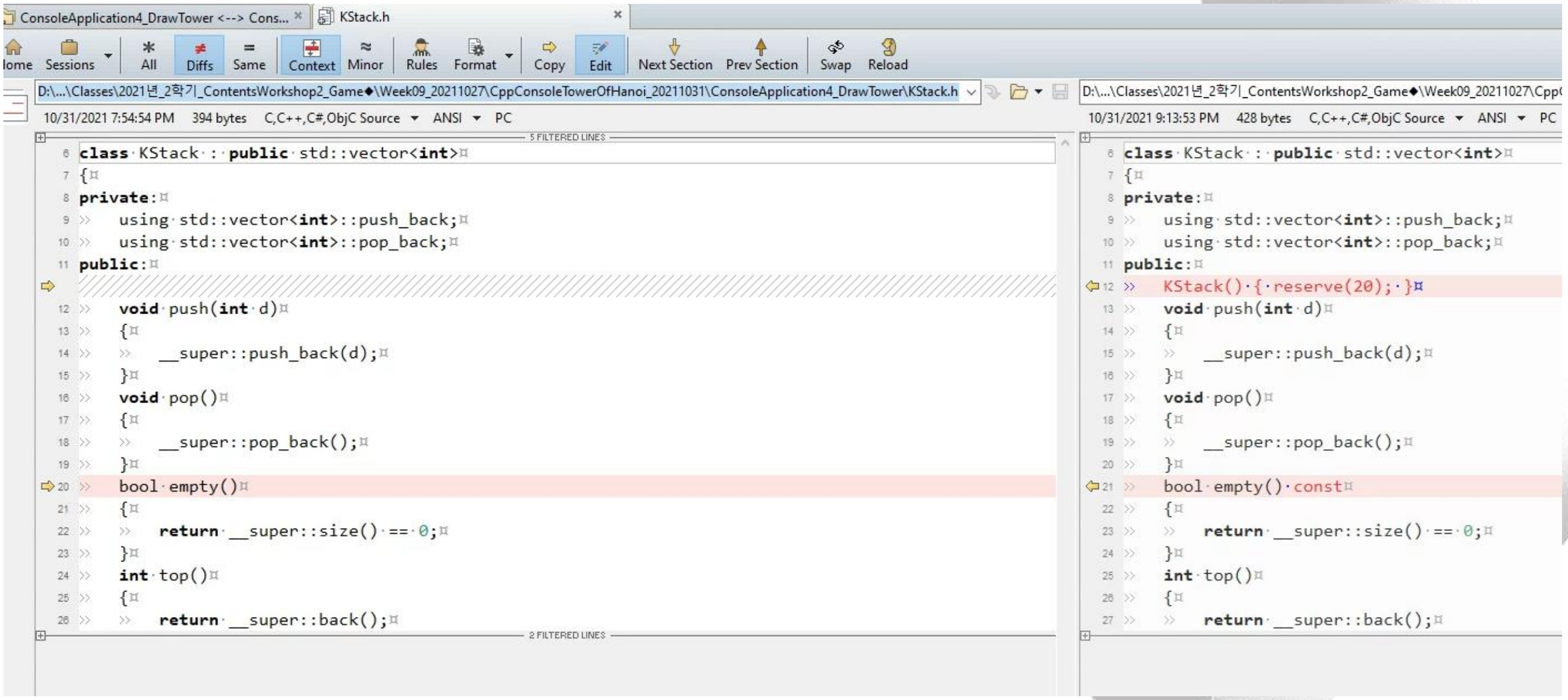
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10/31/2021 7:54:54 PM 394 bytes C,C++,C#,ObjC Source ANSI PC
5 FILTERED LINES
class KStack : public std::vector<int>
{
private:
using std::vector<int>::push_back;
using std::vector<int>::pop_back;
public:
void push(int d)
{
__super::push_back(d);
}
void pop()
{
__super::pop_back();
}
bool empty()
{
return __super::size() == 0;
}
int top()
{
return __super::back();
2 FILTERED LINES
D:\...\Classes\2021년_2학기_ContentsWorkshop2_Game◆\Week09_20211027\Cpp
10/31/2021 9:13:53 PM 428 bytes C,C++,C#,ObjC Source ANSI PC
class KStack : public std::vector<int>
{
private:
using std::vector<int>::push_back;
using std::vector<int>::pop_back;
public:
KStack() { reserve(20); }
void push(int d)
{
__super::push_back(d);
}
void pop()
{
__super::pop_back();
}
bool empty() const
{
return __super::size() == 0;
}
int top()
{
return __super::back();

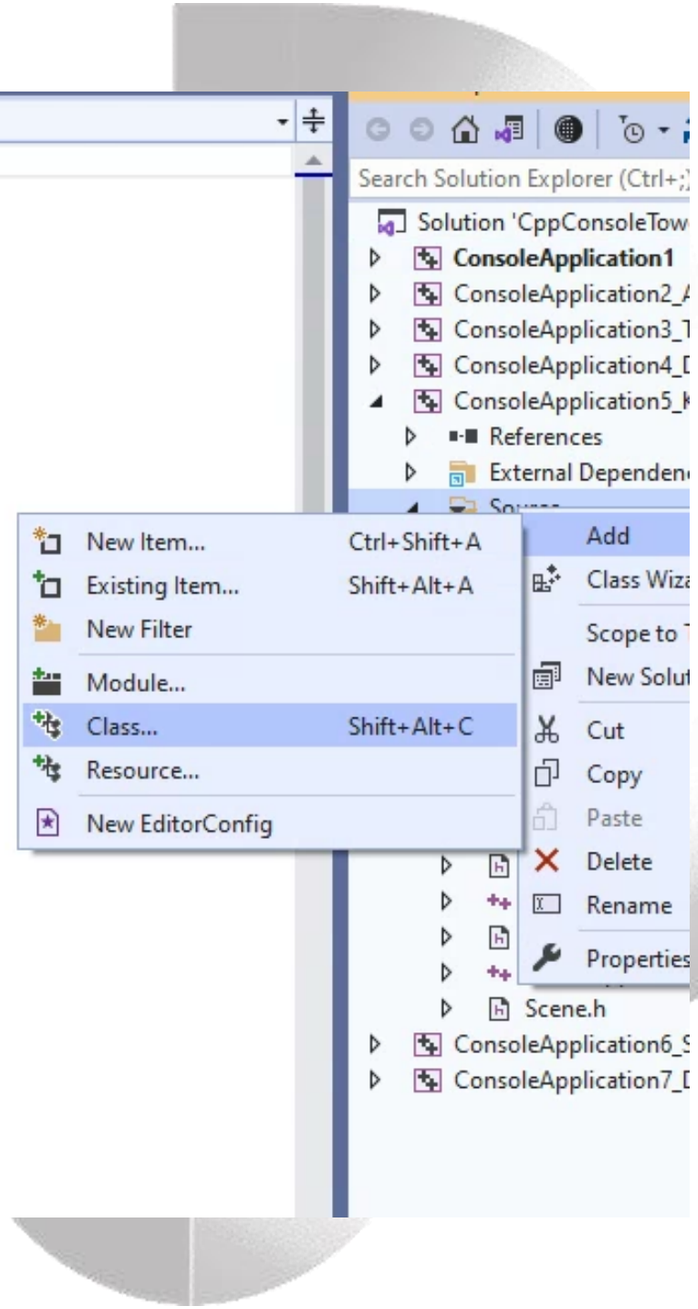
pplication5_KTower (Global Scope)

```cpp
#pragma once
#include "KStack.h"
#include "KVector2.h"

class KTower
{
public:
    typedef std::vector<int>::iterator iterator;
private:
    KStack      m_stack;
    KVector2    m_position;

public:
    KTower(int x = 0, int y = 0);
    void PushDisk(int d) { m_stack.push(d); }
    void PopDisk() { m_stack.pop(); }
    bool Empty() const { return m_stack.empty(); }
    int TopDisk() const { return m_stack.back(); }
    iterator begin() { return m_stack.begin(); }
    iterator end() { return m_stack.end(); }

    void Clear() { m_stack.clear(); }
    //KStack& GetStack() { return m_stack; }
    int GetDiskCount() const { return (int)m_stack.size(); }
    bool GetTopDiskPosition( KVector2& vOut );
};
```



KTower.cpp | KTower.h

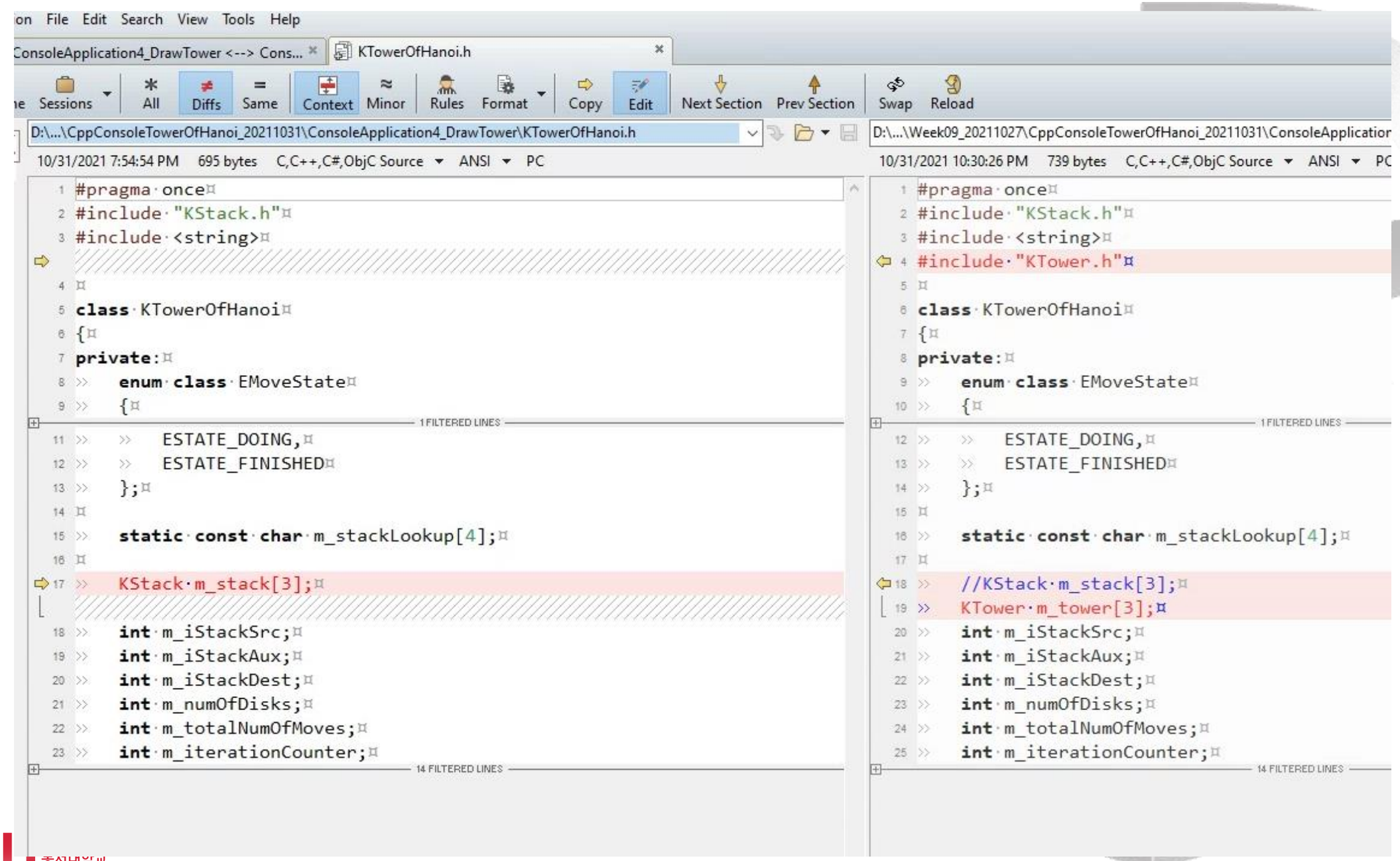
ConsoleApplication5_KTower | (Global Scope)

```cpp
#include "KTower.h"

KTower::KTower(int x, int y)
{
    m_stack.clear();
    m_position = KVector2::zero;
}

bool KTower::GetTopDiskPosition(KVector2& vOut )
{
    if (Empty())
        return false;

    int y = (int)m_position.y - GetDiskCount();
    int x = (int)m_position.x - TopDisk();
    vOut = KVector2(x, y); // set [out] parameter
    return true;
}
```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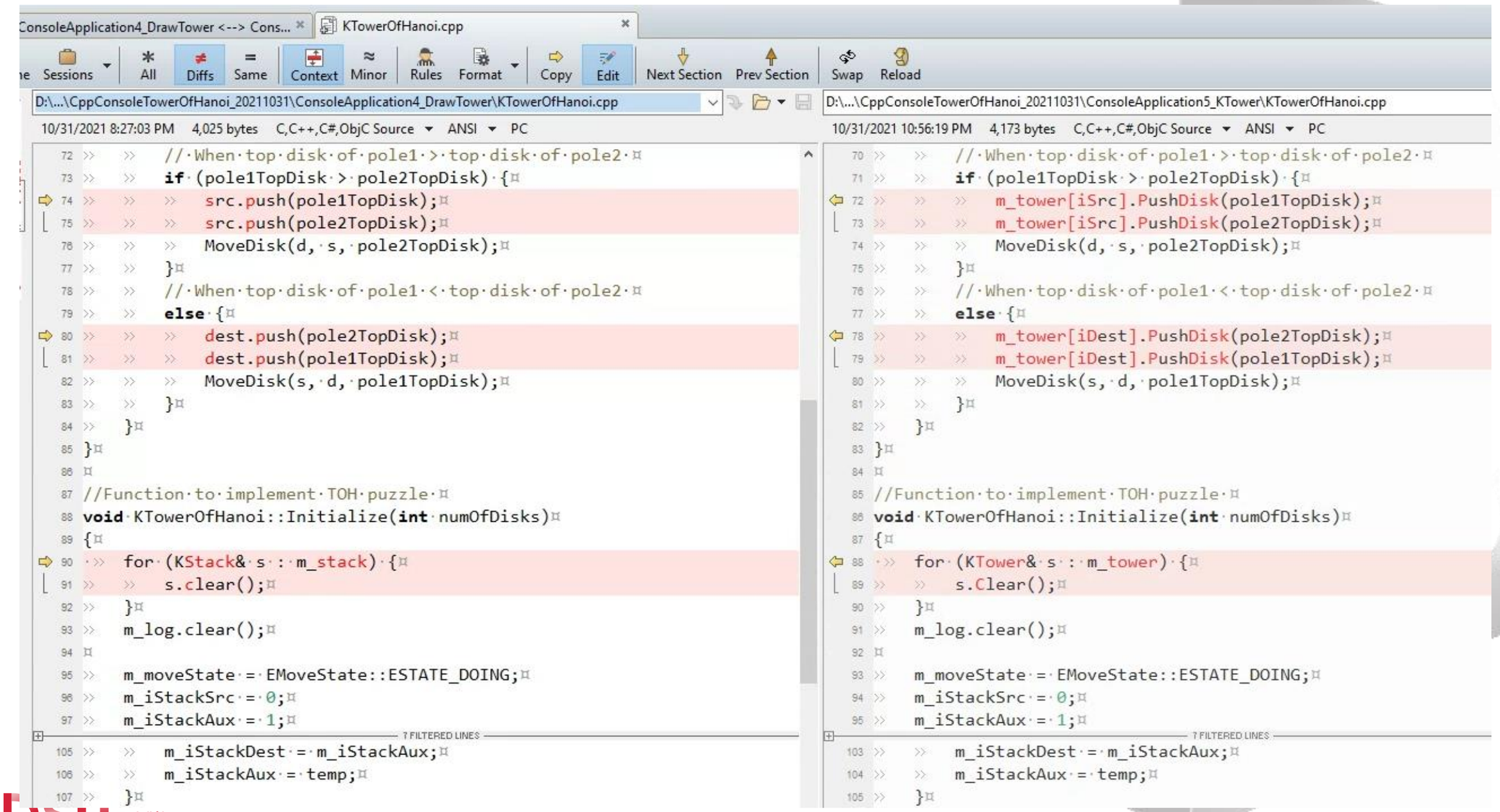
10/31/2021 10:30:26 PM 739 bytes C,C++,C#,ObjC Source ANSI PC
#pragma once
#include "KStack.h"
#include <string>
#include "KTower.h"
class KTowerOfHanoi
{
private:
enum class EMoveState
{
1 FILTERED LINES
ESTATE_DOING,
ESTATE_FINISHED
};
static const char m_stackLookup[4];
KStack m_stack[3];
//KStack m_stack[3];
KTower m_tower[3];
int m_iStackSrc;
int m_iStackAux;
int m_iStackDest;
int m_numOfDisks;
int m_totalNumOfMoves;
int m_iterationCounter;
14 FILTERED LINES

```
//·Function·to·implement·legal·movement·between·¤
//·two·poles·¤
void·KTowerOfHanoi::MoveDisksBetweenTwoPoles(int·iSrc,·int·iDest)¤
{¤
»   KStack&·src·=·m_stack[iSrc];¤
»   KStack&·dest·=·m_stack[iDest];¤
»   char·s·=·m_stackLookup[iSrc];¤
»   char·d·=·m_stackLookup[iDest];¤
¤
»   //·When·pole·1·is·empty·¤
»   if·(src.empty())·{¤
»   »   int·pole2TopDisk·=·dest.top();¤
»   »   dest.pop();¤
»   »   src.push(pole2TopDisk);¤
»   »   MoveDisk(d,·s,·pole2TopDisk);¤
»   }¤
»   //·When·pole2·pole·is·empty·¤
»   else·if·(dest.empty())·{¤
»   »   int·pole1TopDisk·=·src.top();¤
»   »   src.pop();¤
»   »   dest.push(pole1TopDisk);¤
»   »   MoveDisk(s,·d,·pole1TopDisk);¤
»   }¤
»   else·{¤
»   »   int·pole1TopDisk·=·src.top();¤
»   »   int·pole2TopDisk·=·dest.top();¤
»   »   src.pop();¤
»   »   dest.pop();¤
»   »   //·When·top·disk·of·pole1·>·top·disk·of·pole2·¤
»   »   if·(pole1TopDisk·>·pole2TopDisk)·{¤
»   »   »   src.push(pole1TopDisk);¤
»   »   »   src.push(pole2TopDisk);¤
»   »   »   MoveDisk(d,·s,·pole2TopDisk);¤
»   »   }¤
»   »   //·When·top·disk·of·pole1·<·top·disk·of·pole2·¤
```

```
//·Function·to·implement·legal·movement·between·¤
//·two·poles·¤
void·KTowerOfHanoi::MoveDisksBetweenTwoPoles(int·iSrc,·int·iI
{¤
»   char·s·=·m_stackLookup[iSrc];¤
»   char·d·=·m_stackLookup[iDest];¤
¤
»   //·When·pole·1·is·empty·¤
»   if·(m_tower[iSrc].Empty())·{¤
»   »   int·pole2TopDisk·=·m_tower[iDest].TopDisk();¤
»   »   m_tower[iDest].PopDisk();¤
»   »   m_tower[iSrc].PushDisk(pole2TopDisk);¤
»   »   MoveDisk(d,·s,·pole2TopDisk);¤
»   }¤
»   //·When·pole2·pole·is·empty·¤
»   else·if·(m_tower[iDest].Empty())·{¤
»   »   int·pole1TopDisk·=·m_tower[iSrc].TopDisk();¤
»   »   m_tower[iSrc].PopDisk();¤
»   »   m_tower[iDest].PushDisk(pole1TopDisk);¤
»   »   MoveDisk(s,·d,·pole1TopDisk);¤
»   }¤
»   else·{¤
»   »   int·pole1TopDisk·=·m_tower[iSrc].TopDisk();¤
»   »   int·pole2TopDisk·=·m_tower[iDest].TopDisk();¤
»   »   m_tower[iSrc].PopDisk();¤
»   »   m_tower[iDest].PopDisk();¤
»   »   //·When·top·disk·of·pole1·>·top·disk·of·pole2·¤
»   »   if·(pole1TopDisk·>·pole2TopDisk)·{¤
»   »   »   m_tower[iSrc].PushDisk(pole1TopDisk);¤
»   »   »   m_tower[iSrc].PushDisk(pole2TopDisk);¤
»   »   »   MoveDisk(d,·s,·pole2TopDisk);¤
»   »   }¤
»   »   //·When·top·disk·of·pole1·<·top·disk·of·pole2·¤
```


ConsoleApplication4_DrawTower <--> Cons...
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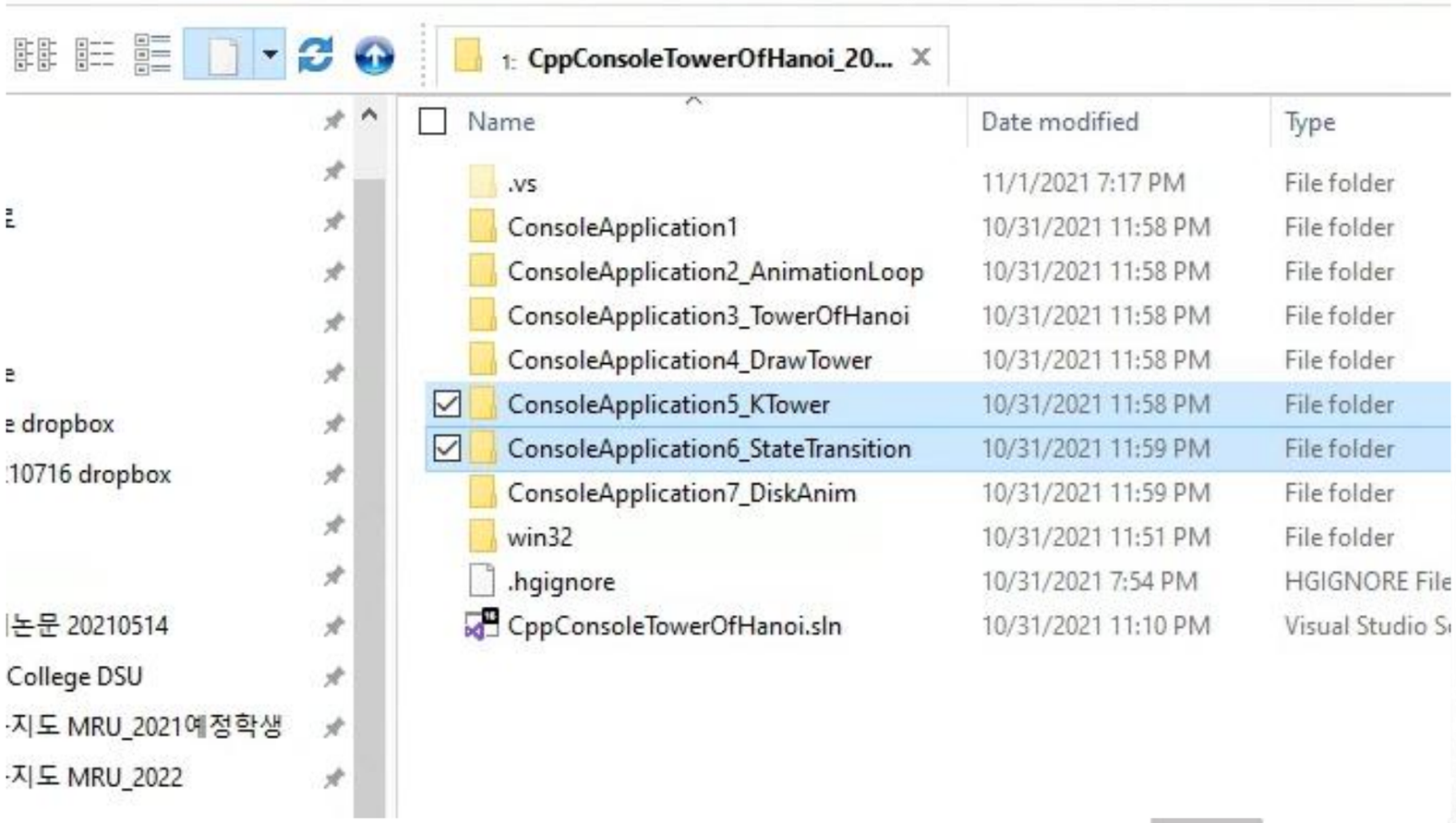
10/31/2021 10:56:19 PM 4,173 bytes C,C++,C#,ObjC Source ANSI PC
//When top disk of pole1 > top disk of pole2
if (pole1TopDisk > pole2TopDisk) {
src.push(pole1TopDisk);
src.push(pole2TopDisk);
MoveDisk(d, s, pole2TopDisk);
}
//When top disk of pole1 < top disk of pole2
else {
dest.push(pole2TopDisk);
dest.push(pole1TopDisk);
MoveDisk(s, d, pole1TopDisk);
}
}
}
//Function to implement TOH puzzle
void KTowerOfHanoi::Initialize(int numOfDisks)
{
for (KStack& s : m_stack) {
s.clear();
}
m_log.clear();
m_moveState = EMoveState::ESTATE_DOING;
m_iStackSrc = 0;
m_iStackAux = 1;
7 FILTERED LINES
m_iStackDest = m_iStackAux;
m_iStackAux = temp;
}
m_tower[iSrc].PushDisk(pole1TopDisk);
m_tower[iSrc].PushDisk(pole2TopDisk);
m_tower[iDest].PushDisk(pole2TopDisk);
m_tower[iDest].PushDisk(pole1TopDisk);
for (KTower& s : m_tower) {
s.Clear();

```
88  void KTowerOfHanoi::Initialize(int numOfDisks)
89  {
90      for (KStack& s : m_stack) {
91          s.clear();
92      }
93      m_log.clear();
94
95      m_moveState = EMoveState::ESTATE_DOING;
96      m_iStackSrc = 0;
97      m_iStackAux = 1;
        7 FILTERED LINES
105         m_iStackDest = m_iStackAux;
106         m_iStackAux = temp;
107     }
108     m_numOfDisks = numOfDisks;
109     m_totalNumOfMoves = (int)pow(2, numOfDisks) - 1;
110
111     KStack& src = m_stack[m_iStackSrc];
112     //Larger disks will be pushed first
113     for (int i = m_numOfDisks; i >= 1; i--)
114         src.push(i);
115 }
116
117 //Function to implement TOH puzzle
118 void KTowerOfHanoi::Iterate(double elapsedTime)
119 {
120     if (m_moveState == EMoveState::ESTATE_FINISHED) {
        3 FILTERED LINES
124     m_oneStepTimer += elapsedTime;
125     if (m_oneStepTimer < 1.0) {
126         return;
127     }
128     m_oneStepTimer = 0.0;
129
130     KStack& src = m_stack[m_iStackSrc];
131     KStack& aux = m_stack[m_iStackAux];
132     KStack& dest = m_stack[m_iStackDest];
133     m_iterationCounter += 1;
```

```
86  void KTowerOfHanoi::Initialize(int numOfDisks)
87  {
88      for (KTower& s : m_tower) {
89          s.Clear();
90      }
91      m_log.clear();
92
93      m_moveState = EMoveState::ESTATE_DOING;
94      m_iStackSrc = 0;
95      m_iStackAux = 1;
        7 FILTERED LINES
103         m_iStackDest = m_iStackAux;
104         m_iStackAux = temp;
105     }
106     m_numOfDisks = numOfDisks;
107     m_totalNumOfMoves = (int)pow(2, numOfDisks) - 1;
108
109     KTower& src = m_tower[m_iStackSrc];
110     //Larger disks will be pushed first
111     for (int i = m_numOfDisks; i >= 1; i--)
112         src.PushDisk(i);
113 }
114
115 //Function to implement TOH puzzle
116 void KTowerOfHanoi::Iterate(double elapsedTime)
117 {
118     if (m_moveState == EMoveState::ESTATE_FINISHED) {
        3 FILTERED LINES
122     m_oneStepTimer += elapsedTime;
123     if (m_oneStepTimer < 1.0) {
124         return;
125     }
126     m_oneStepTimer = 0.0;
127
128     m_iterationCounter += 1;
```

```
127 »   }¤
128 »   m_oneStepTimer·=·0.0;¤
129 ¤
130 »   KStack&·src·=·m_stack[m_iStackSrc];¤
131 »   KStack&·aux·=·m_stack[m_iStackAux];¤
132 »   KStack&·dest·=·m_stack[m_iStackDest];¤
133 »   m_iterationCounter·+=·1;¤
134 »   if·(m_iterationCounter·>·m_totalNumOfMoves)·{¤
135 »   »   m_moveState·=·EMoveState::ESTATE_FINISHED;¤
136 »   »   return;¤
137 »   }¤
138 ¤
      20 FILTERED LINES
159 »   const·int·width·=·m_numOfDisks·*·2·+·2;¤
160 »   x·=·startx;¤
161 »   y·=·starty;¤
162 »   for·(int·i·=·0;·i·<·3;·++i)·{¤
163 »   »   x·+=·width;¤
164 »   »   y·=·starty;¤
165 »   »   for·(int·n·:·m_stack[i])·{¤
166 »   »   »   _itoa_s(n,·buffer,·10);¤
167 »   »   »   PutText(x,·y,·buffer);¤
168 »   »   »   PrintDisc(x·-·n,·20·+·y,·n);·//·jintaek·on·20211031¤
169 »   »   »   y·-=·1;¤
170 »   »   }¤
171 »   }¤
      1 FILTERED LINES
1   Operator
```

```
125 »   }¤
126 »   m_oneStepTimer·=·0.0;¤
127 ¤
128 »   m_iterationCounter·+=·1;¤
129 »   if·(m_iterationCounter·>·m_totalNumOfMoves)·{¤
130 »   »   m_moveState·=·EMoveState::ESTATE_FINISHED;¤
131 »   »   return;¤
132 »   }¤
133 ¤
      20 FILTERED LINES
154 »   const·int·width·=·m_numOfDisks·*·2·+·2;¤
155 »   x·=·startx;¤
156 »   y·=·starty;¤
157 »   for·(int·i·=·0;·i·<·3;·++i)·{¤
158 »   »   x·+=·width;¤
159 »   »   y·=·starty;¤
160 »   »   for·(int·j·=·0;·j·<·m_numOfDisks·+·1;·++j)¤
161 »   »   »   PutText(x,·20·+·y·-·j,·"|");¤
162 »   »   for·(int·n·:·m_tower[i])·{·//·custom·iterator,·20211031¤
163 »   »   »   _itoa_s(n,·buffer,·10);¤
164 »   »   »   PutText(x,·y,·buffer);¤
165 »   »   »   PrintDisc(x·-·n,·20·+·y,·n);·//·jintaek·on·20211031¤
166 »   »   »   y·-=·1;¤
167 »   »   }¤
168 »   }¤
      1 FILTERED LINES
42: 1   Operator
```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ConsoleApplication4_DrawTower
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File folder
ConsoleApplication5_KTower
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ConsoleApplication6_StateTransition
10/31/2021 11:59 PM
File folder
ConsoleApplication7_DiskAnim
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File folder
win32
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HGIGNORE File
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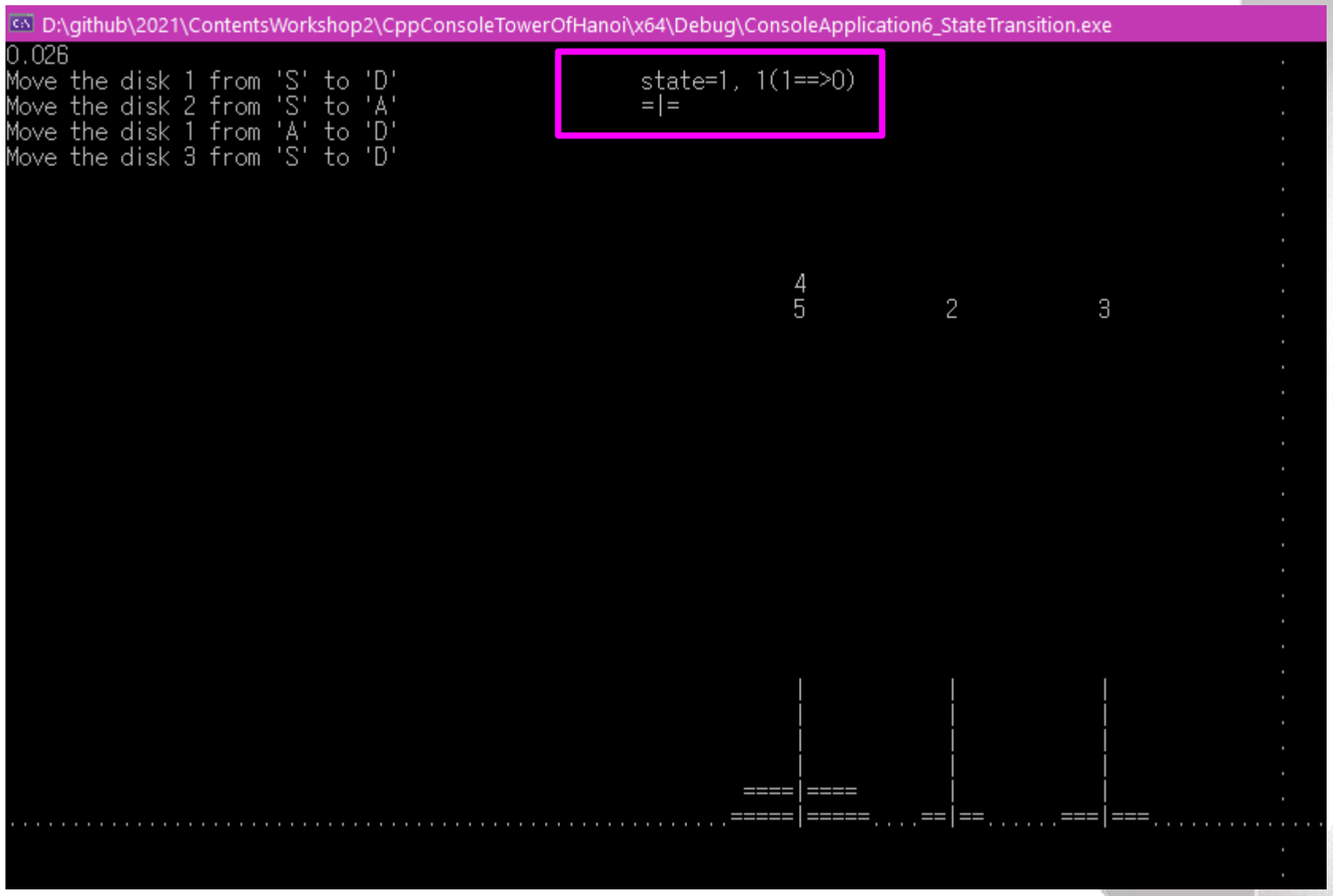
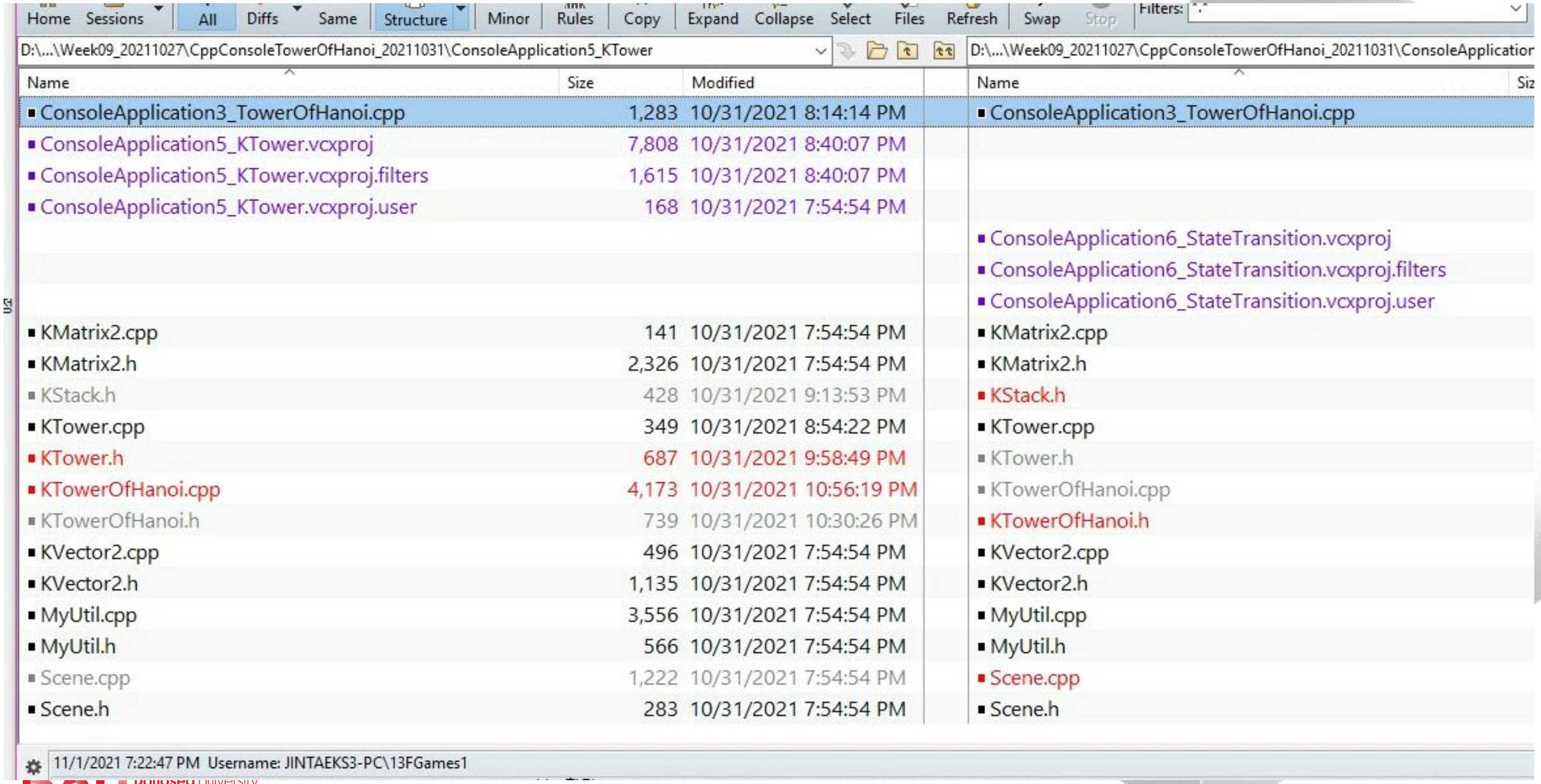
College DSU
지도 MRU_2021예정학생
지도 MRU_2022






Dongseo University 동서대학교


Home Sessions All Diffs Same Structure Minor Rules Copy Expand Collapse Select Files Refresh Swap Stop Filters: *.*
D:\...\Week09_20211027\CppConsoleTowerOfHanoi_20211031\ConsoleApplication5_KTower
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Name Size Modified
ConsoleApplication3_TowerOfHanoi.cpp 1,283 10/31/2021 8:14:14 PM
ConsoleApplication5_KTower.vcxproj 7,808 10/31/2021 8:40:07 PM
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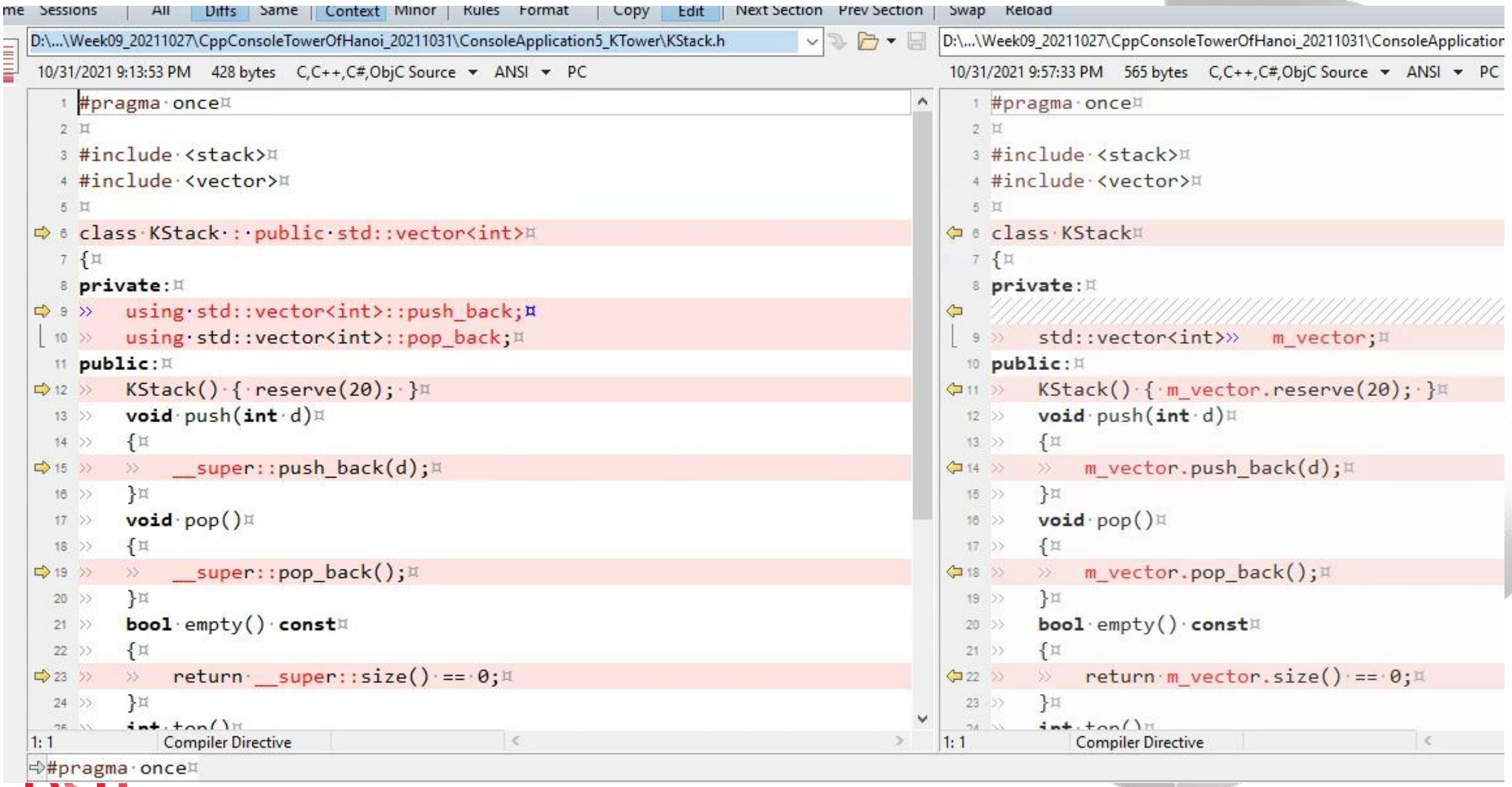
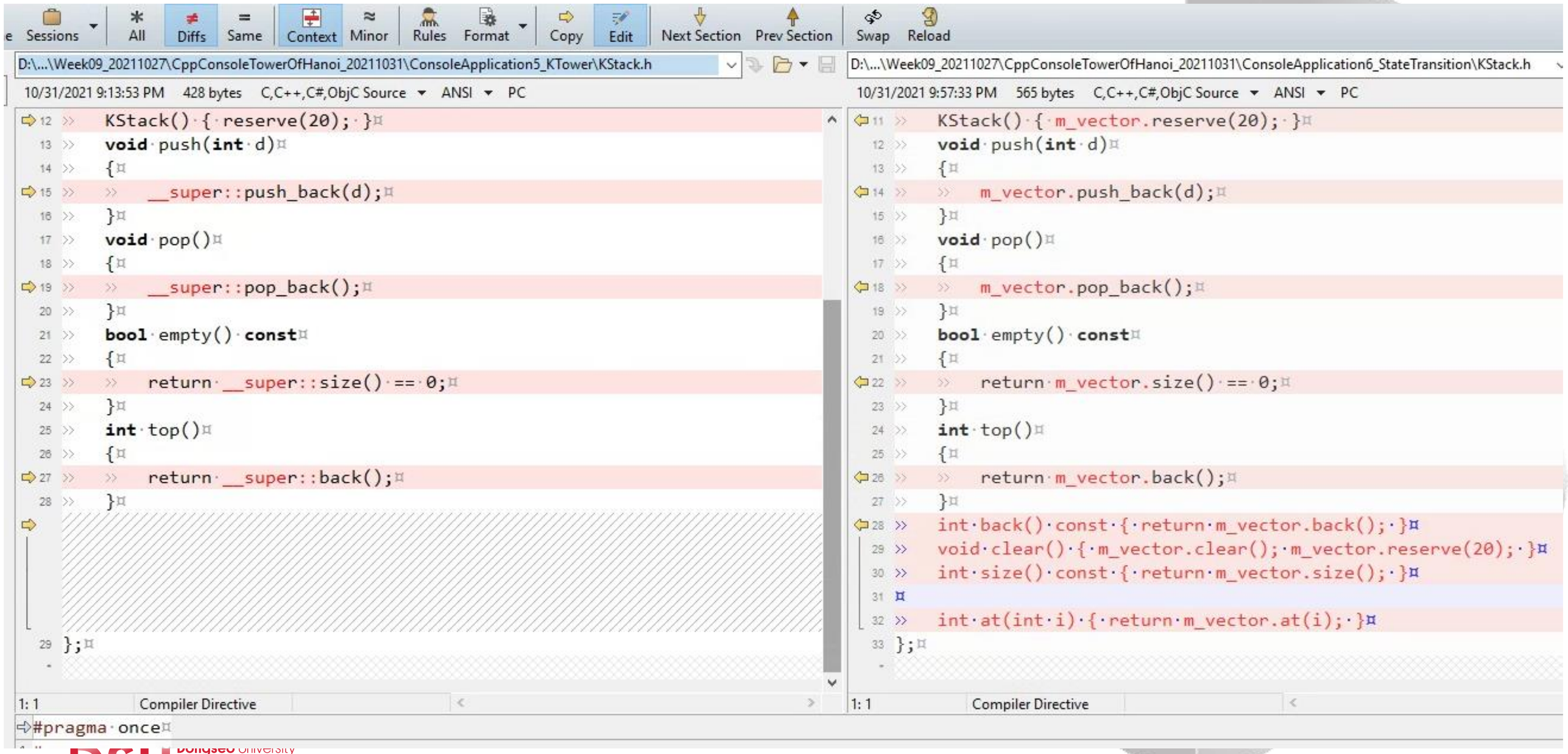
ConsoleApplication5_KTower.vcxproj.user 168 10/31/2021 7:54:54 PM
KMatrix2.cpp 141 10/31/2021 7:54:54 PM
KMatrix2.h 2,326 10/31/2021 7:54:54 PM
KStack.h 428 10/31/2021 9:13:53 PM
KTower.cpp 349 10/31/2021 8:54:22 PM
KTower.h 687 10/31/2021 9:58:49 PM
KTowerOfHanoi.cpp 4,173 10/31/2021 10:56:19 PM
KTowerOfHanoi.h 739 10/31/2021 10:30:26 PM
KVector2.cpp 496 10/31/2021 7:54:54 PM
KVector2.h 1,135 10/31/2021 7:54:54 PM
MyUtil.cpp 3,556 10/31/2021 7:54:54 PM
MyUtil.h 566 10/31/2021 7:54:54 PM
Scene.cpp 1,222 10/31/2021 7:54:54 PM
Scene.h 283 10/31/2021 7:54:54 PM
Name
ConsoleApplication3_TowerOfHanoi.cpp
ConsoleApplication6_StateTransition.vcxproj
ConsoleApplication6_StateTransition.vcxproj.filters
ConsoleApplication6_StateTransition.vcxproj.user
KMatrix2.cpp
KMatrix2.h
KStack.h
KTower.cpp
KTower.h
KTowerOfHanoi.cpp
KTowerOfHanoi.h
KVector2.cpp
KVector2.h
MyUtil.cpp
MyUtil.h
Scene.cpp
Scene.h
11/1/2021 7:22:47 PM Username: JINTAEKS3-PC\13FGames1


Sessions | All | Diffs | Same | Context | Minor | Rules | Format | Copy | Edit | Next Section | Prev Section | Swap | Reload
D:\...\Week09_20211027\CppConsoleTowerOfHanoi_20211031\ConsoleApplication5_KTower\KStack.h
10/31/2021 9:13:53 PM 428 bytes C,C++,C#,ObjC Source ANSI PC
#pragma once
#include <stack>
#include <vector>
class KStack : public std::vector<int>
{
private:
using std::vector<int>::push_back;
using std::vector<int>::pop_back;
public:
KStack() { reserve(20); }
void push(int d)
{
__super::push_back(d);
}
void pop()
{
__super::pop_back();
}
bool empty() const
{
return __super::size() == 0;
}
1: 1 Compiler Directive
D:\...\Week09_20211027\CppConsoleTowerOfHanoi_20211031\ConsoleApplicatior
10/31/2021 9:57:33 PM 565 bytes C,C++,C#,ObjC Source ANSI PC
#pragma once
#include <stack>
#include <vector>
class KStack
{
private:
std::vector<int>> m_vector;
public:
KStack() { m_vector.reserve(20); }
void push(int d)
{
m_vector.push_back(d);
}
void pop()
{
m_vector.pop_back();
}
bool empty() const
{
return m_vector.size() == 0;
}
1: 1 Compiler Directive
#pragma once


Sessions
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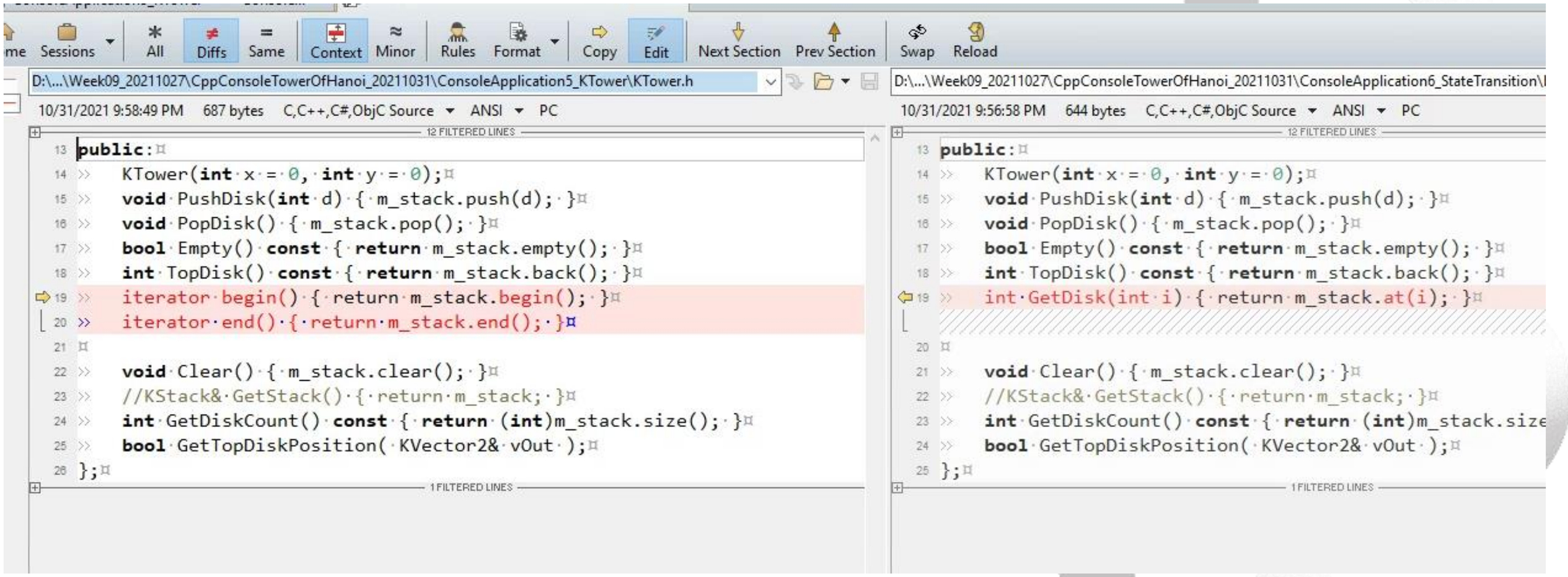
D:\...\Week09_20211027\CppConsoleTowerOfHanoi_20211031\ConsoleApplication5_KTower\KStack.h
10/31/2021 9:13:53 PM 428 bytes C,C++,C#,ObjC Source ANSI PC
KStack() { reserve(20); }
void push(int d)
{
__super::push_back(d);
}
void pop()
{
__super::pop_back();
}
bool empty() const
{
return __super::size() == 0;
}
int top()
{
return __super::back();
}
};
1: 1 Compiler Directive
#pragma once
D:\...\Week09_20211027\CppConsoleTowerOfHanoi_20211031\ConsoleApplication6_StateTransition\KStack.h
10/31/2021 9:57:33 PM 565 bytes C,C++,C#,ObjC Source ANSI PC
KStack() { m_vector.reserve(20); }
void push(int d)
{
m_vector.push_back(d);
}
void pop()
{
m_vector.pop_back();
}
bool empty() const
{
return m_vector.size() == 0;
}
int top()
{
return m_vector.back();
}
int back() const { return m_vector.back(); }
void clear() { m_vector.clear(); m_vector.reserve(20); }
int size() const { return m_vector.size(); }
int at(int i) { return m_vector.at(i); }
};
1: 1 Compiler Directive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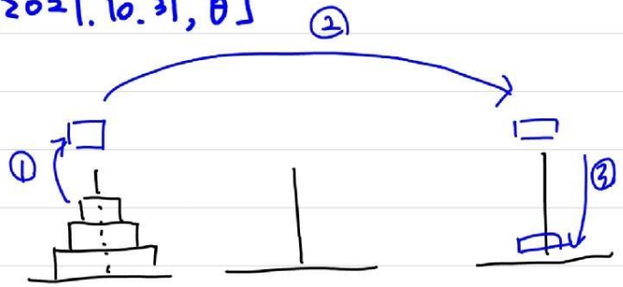
D:\...\Week09_20211027\CppConsoleTowerOfHanoi_20211031\ConsoleApplication5_KTower\KTower.h
10/31/2021 9:58:49 PM 687 bytes C,C++,C#,ObjC Source ANSI PC
12 FILTERED LINES
public:
KTower(int x = 0, int y = 0);
void PushDisk(int d) { m_stack.push(d); }
void PopDisk() { m_stack.pop(); }
bool Empty() const { return m_stack.empty(); }
int TopDisk() const { return m_stack.back(); }
iterator begin() { return m_stack.begin(); }
iterator end() { return m_stack.end(); }
void Clear() { m_stack.clear(); }
//KStack& GetStack() { return m_stack; }
int GetDiskCount() const { return (int)m_stack.size(); }
bool GetTopDiskPosition( KVector2& vOut );
};
1 FILTERED LINES
D:\...\Week09_20211027\CppConsoleTowerOfHanoi_20211031\ConsoleApplication6_StateTransition\
10/31/2021 9:56:58 PM 644 bytes C,C++,C#,ObjC Source ANSI PC
12 FILTERED LINES
public:
KTower(int x = 0, int y = 0);
void PushDisk(int d) { m_stack.push(d); }
void PopDisk() { m_stack.pop(); }
bool Empty() const { return m_stack.empty(); }
int TopDisk() const { return m_stack.back(); }
int GetDisk(int i) { return m_stack.at(i); }
void Clear() { m_stack.clear(); }
//KStack& GetStack() { return m_stack; }
int GetDiskCount() const { return (int)m_stack.size
bool GetTopDiskPosition( KVector2& vOut );
};
1 FILTERED LINES

[2021.10.31, 日]

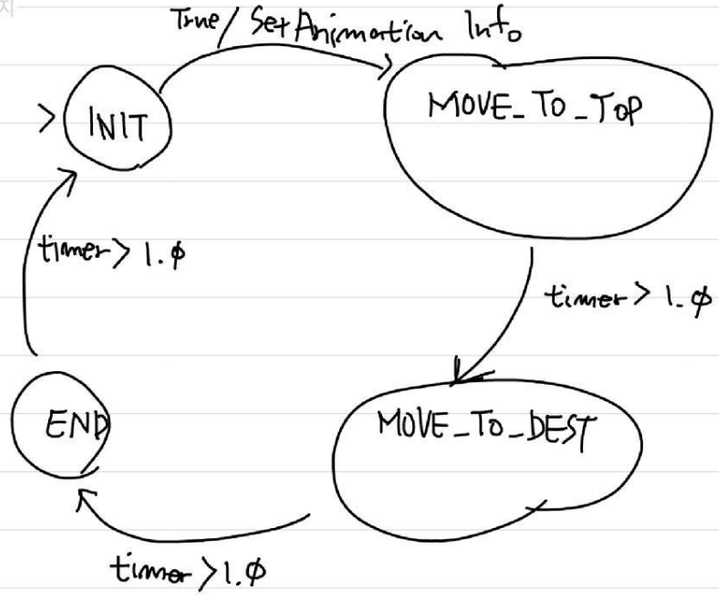



① MOVE_TO_TOP — iAnimSrcTower
② MOVE_TO_DEST — iAnimDestTower
③ END — iAnimDisk
vAnimBegin
vAnimEnd

66 페이지

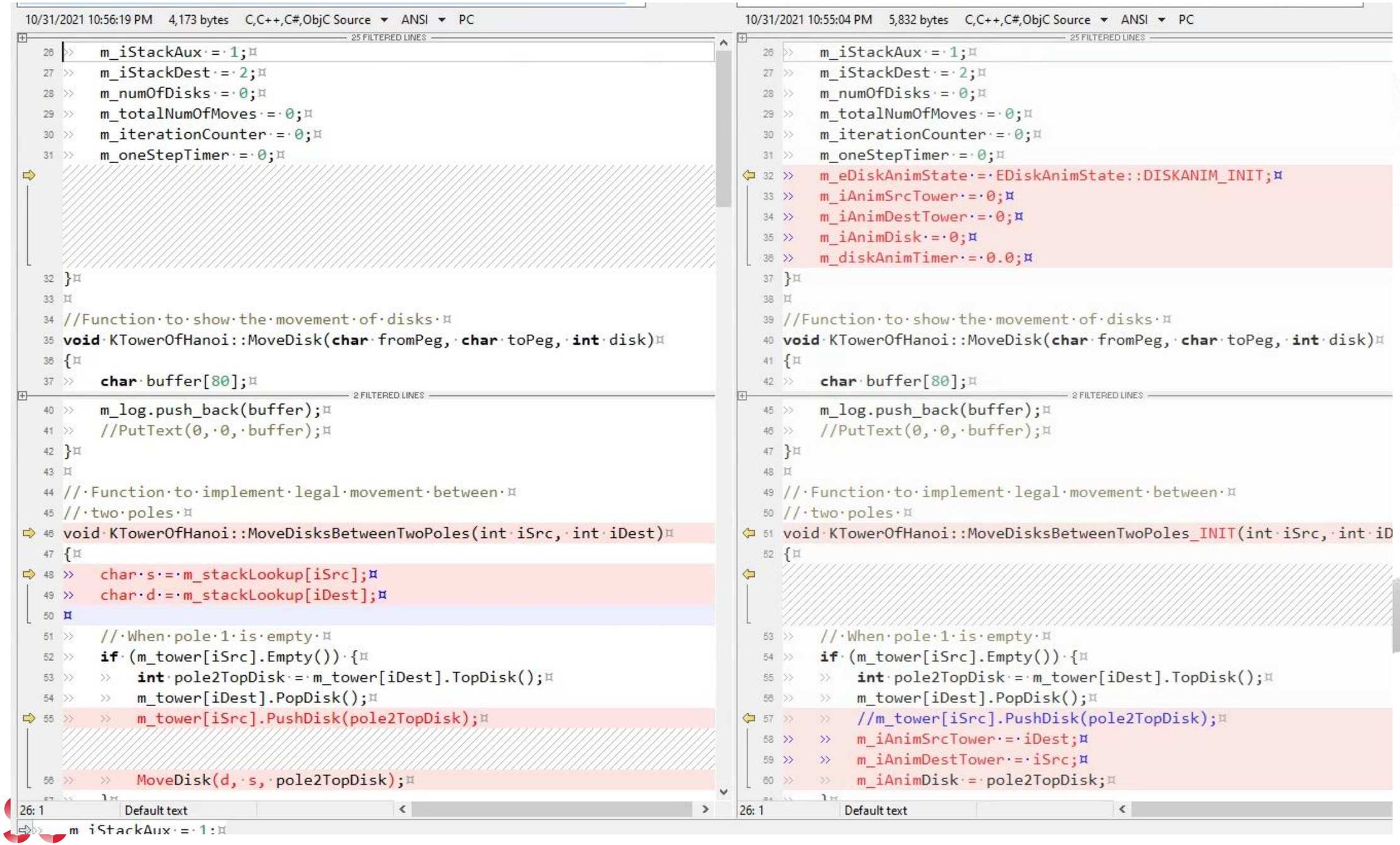
67 페이지

(61)



```
    int m_iterationCounter;
    EMoveState m_moveState;
    std::vector<std::string> m_log;
    double m_oneStepTimer;

public:
    KTowerOfHanoi();
    void Initialize(int numOfDisks);
    void Iterate(double elapsedTime);
    void Draw();
private:
    void MoveDisk(char fromPeg, char toPeg, int disk);
    void MoveDisksBetweenTwoPoles(int iSrc, int iDest);

};
```

```
    int m_iterationCounter;
    EMoveState m_moveState;
    std::vector<std::string> m_log;
    double m_oneStepTimer;

    enum class EDiskAnimState
    {
        DISKANIM_INIT = 0,
        DISKANIM_MOVE_TO_TOP,
        DISKANIM_MOVE_TO_DEST,
        DISKANIM_END,
    };

    EDiskAnimState  m_eDiskAnimState;
    int             m_iAnimSrcTower;
    int             m_iAnimDestTower;
    int             m_iAnimDisk;
    KVector2        m_vAnimBegin;
    KVector2        m_vAnimEnd;
    double          m_diskAnimTimer;

public:
    KTowerOfHanoi();
    void Initialize(int numOfDisks);
    void Iterate(double elapsedTime);
    void Draw();
private:
    void MoveDisk(char fromPeg, char toPeg, int disk);
    void MoveDisksBetweenTwoPoles(int iSrc, int iDest);
    void MoveDisksBetweenTwoPoles_INIT(int iSrc, int iDest);
};
```


10/31/2021 10:56:19 PM 4,173 bytes C,C++,C#,ObjC Source ANSI PC
25 FILTERED LINES
m_iStackAux = 1;
m_iStackDest = 2;
m_numOfDisks = 0;
m_totalNumOfMoves = 0;
m_iterationCounter = 0;
m_oneStepTimer = 0;
}
//Function to show the movement of disks
void KTowerOfHanoi::MoveDisk(char fromPeg, char toPeg, int disk)
{
char buffer[80];
2 FILTERED LINES
m_log.push_back(buffer);
//PutText(0, 0, buffer);
}
// Function to implement legal movement between
// two poles
void KTowerOfHanoi::MoveDisksBetweenTwoPoles(int iSrc, int iDest)
{
char s = m_stackLookup[iSrc];
char d = m_stackLookup[iDest];
// When pole 1 is empty
if (m_tower[iSrc].Empty()) {
int pole2TopDisk = m_tower[iDest].TopDisk();
m_tower[iDest].PopDisk();
m_tower[iSrc].PushDisk(pole2TopDisk);
MoveDisk(d, s, pole2TopDisk);
26: 1
Default text
m_iStackAux = 1;
10/31/2021 10:55:04 PM 5,832 bytes C,C++,C#,ObjC Source ANSI PC
25 FILTERED LINES
m_iStackAux = 1;
m_iStackDest = 2;
m_numOfDisks = 0;
m_totalNumOfMoves = 0;
m_iterationCounter = 0;
m_oneStepTimer = 0;
m_eDiskAnimState = EDiskAnimState::DISKANIM_INIT;
m_iAnimSrcTower = 0;
m_iAnimDestTower = 0;
m_iAnimDisk = 0;
m_diskAnimTimer = 0.0;
}
//Function to show the movement of disks
void KTowerOfHanoi::MoveDisk(char fromPeg, char toPeg, int disk)
{
char buffer[80];
2 FILTERED LINES
m_log.push_back(buffer);
//PutText(0, 0, buffer);
}
// Function to implement legal movement between
// two poles
void KTowerOfHanoi::MoveDisksBetweenTwoPoles_INIT(int iSrc, int iD
{
// When pole 1 is empty
if (m_tower[iSrc].Empty()) {
int pole2TopDisk = m_tower[iDest].TopDisk();
m_tower[iDest].PopDisk();
//m_tower[iSrc].PushDisk(pole2TopDisk);
m_iAnimSrcTower = iDest;
m_iAnimDestTower = iSrc;
m_iAnimDisk = pole2TopDisk;
26: 1
Default text

10/31/2021 10:56:19 PM 4,173 bytes C,C++,C#,ObjC Source ANSI PC

```
46 void KTowerOfHanoi::MoveDisksBetweenTwoPoles(int iSrc, int iDest)
47 {
48     char s = m_stackLookup[iSrc];
49     char d = m_stackLookup[iDest];
50
51     // When pole 1 is empty
52     if (m_tower[iSrc].Empty()) {
53         int pole2TopDisk = m_tower[iDest].TopDisk();
54         m_tower[iDest].PopDisk();
55         m_tower[iSrc].PushDisk(pole2TopDisk);
56         MoveDisk(d, s, pole2TopDisk);
57     }
58     // When pole2 pole is empty
59     else if (m_tower[iDest].Empty()) {
60         int pole1TopDisk = m_tower[iSrc].TopDisk();
61         m_tower[iSrc].PopDisk();
62         m_tower[iDest].PushDisk(pole1TopDisk);
63         MoveDisk(s, d, pole1TopDisk);
64     }
65     else {
66         int pole1TopDisk = m_tower[iSrc].TopDisk();
67         int pole2TopDisk = m_tower[iDest].TopDisk();
68         m_tower[iSrc].PopDisk();
69         m_tower[iDest].PopDisk();
70         // When top disk of pole1 > top disk of pole2
71         if (pole1TopDisk > pole2TopDisk) {
72             m_tower[iSrc].PushDisk(pole1TopDisk);
73             m_tower[iSrc].PushDisk(pole2TopDisk);
74             MoveDisk(d, s, pole2TopDisk);
75         }
```

10/31/2021 10:55:04 PM 5,832 bytes C,C++,C#,ObjC Source ANSI PC

```
51 void KTowerOfHanoi::MoveDisksBetweenTwoPoles_INIT(int iSrc, int i
52 {
53     // When pole 1 is empty
54     if (m_tower[iSrc].Empty()) {
55         int pole2TopDisk = m_tower[iDest].TopDisk();
56         m_tower[iDest].PopDisk();
57         //m_tower[iSrc].PushDisk(pole2TopDisk);
58         m_iAnimSrcTower = iDest;
59         m_iAnimDestTower = iSrc;
60         m_iAnimDisk = pole2TopDisk;
61     }
62     // When pole2 pole is empty
63     else if (m_tower[iDest].Empty()) {
64         int pole1TopDisk = m_tower[iSrc].TopDisk();
65         m_tower[iSrc].PopDisk();
66         //m_tower[iDest].PushDisk(pole1TopDisk);
67         m_iAnimSrcTower = iSrc;
68         m_iAnimDestTower = iDest;
69         m_iAnimDisk = pole1TopDisk;
70     }
71     else {
72         int pole1TopDisk = m_tower[iSrc].TopDisk();
73         int pole2TopDisk = m_tower[iDest].TopDisk();
74         // When top disk of pole1 > top disk of pole2
75         if (pole1TopDisk > pole2TopDisk) {
76             m_tower[iDest].PopDisk();
77             //m_tower[iSrc].PushDisk(pole2TopDisk);
78             m_iAnimSrcTower = iDest;
79             m_iAnimDestTower = iSrc;
80             m_iAnimDisk = pole2TopDisk;
81         }
```

10/31/2021 10:56:19 PM 4,173 bytes C,C++,C#,ObjC Source ANSI PC

```
69      m_tower[iDest].PopDisk();
70      //·When·top·disk·of·pole1·>·top·disk·of·pole2·
71      if·(pole1TopDisk·>·pole2TopDisk)·{
72          m_tower[iSrc].PushDisk(pole1TopDisk);
73          m_tower[iSrc].PushDisk(pole2TopDisk);


74          MoveDisk(d,·s,·pole2TopDisk);
75      }
76      //·When·top·disk·of·pole1·<·top·disk·of·pole2·
77      else·{


78          m_tower[iDest].PushDisk(pole2TopDisk);
```

26: 1 Default text

10/31/2021 10:55:04 PM 5,832 bytes C,C++,C#,ObjC Source ANSI PC

```
74      //·When·top·disk·of·pole1·>·top·disk·of·pole2·
75      if·(pole1TopDisk·>·pole2TopDisk)·{
76          m_tower[iDest].PopDisk();
77          //m_tower[iSrc].PushDisk(pole2TopDisk);
78          m_iAnimSrcTower·=·iDest;
79          m_iAnimDestTower·=·iSrc;
80          m_iAnimDisk·=·pole2TopDisk;
81      }
82      //·When·top·disk·of·pole1·<·top·disk·of·pole2·
83      else·{
84          m_tower[iSrc].PopDisk();
85          //m_tower[iDest].PushDisk(pole1TopDisk);
86          m_iAnimSrcTower·=·iSrc;
87          m_iAnimDestTower·=·iDest;
88          m_iAnimDisk·=·pole1TopDisk;
89      }
90  }
91  }
92
93  void·KTowerOfHanoi::MoveDisksBetweenTwoPoles(int·iSrc,·int·iDest)
94  {
95      char·buffer[80];
96      sprintf_s(buffer,·sizeof(buffer),·"state=%i,·%i(%i==>%i)"
97          ,·m_eDiskAnimState,·m_iAnimDisk,·m_iAnimSrcTower,·m_iAnimDestT
98      PutText(50,·1,·buffer);
99      if·(m_eDiskAnimState·!=·EDiskAnimState::DISKANIM_END)
100         PrintDisc(50,·2,·m_iAnimDisk);
101
102     char·s·=·m_stackLookup[iSrc];
103     char·d·=·m_stackLookup[iDest];
104     if·(m_eDiskAnimState·==·EDiskAnimState::DISKANIM_INIT)
105     {
106         MoveDisksBetweenTwoPoles_INIT(iSrc,·iDest);
107         m_eDiskAnimState·=·EDiskAnimState::DISKANIM_MOVE_TO_TOP;
108         m_diskAnimTimer·=·0.0;
109     }
```

26: 1 Default text

```
void KTowerOfHanoi::MoveDisksBetweenTwoPoles(int iSrc, int iDest)
{
    char buffer[80];
    sprintf_s(buffer, sizeof(buffer), "state=%i, %i(%i==>%i)"
        , m_eDiskAnimState, m_iAnimDisk, m_iAnimSrcTower, m_iAnimDestTower);
    PutText(50, 1, buffer);
    if (m_eDiskAnimState != EDiskAnimState::DISKANIM_END)
        PrintDisc(50, 2, m_iAnimDisk);

    char s = m_stackLookup[iSrc];
    char d = m_stackLookup[iDest];
    if (m_eDiskAnimState == EDiskAnimState::DISKANIM_INIT)
    {
        MoveDisksBetweenTwoPoles_INIT(iSrc, iDest);
        m_eDiskAnimState = EDiskAnimState::DISKANIM_MOVE_TO_TOP;
        m_diskAnimTimer = 0.0;
    }
    else if (m_eDiskAnimState == EDiskAnimState::DISKANIM_MOVE_TO_TOP)
    {
        if (m_diskAnimTimer >= 1.0) {
            m_eDiskAnimState = EDiskAnimState::DISKANIM_MOVE_TO_DEST;
            m_diskAnimTimer = 0.0;
        }
    }
    else if (m_eDiskAnimState == EDiskAnimState::DISKANIM_MOVE_TO_DEST)
    {
        if (m_diskAnimTimer >= 1.0) {
            m_eDiskAnimState = EDiskAnimState::DISKANIM_END;
            m_diskAnimTimer = 0.0;
            // action
            m_tower[m_iAnimDestTower].PushDisk(m_iAnimDisk);
            MoveDisk(s, d, m_iAnimDisk);
        }
    }
    else if (m_eDiskAnimState == EDiskAnimState::DISKANIM_END)
    {
        if (m_diskAnimTimer >= 1.0) {
            m_eDiskAnimState = EDiskAnimState::DISKANIM_INIT;
            m_diskAnimTimer = 0.0;
            m_iterationCounter += 1; // update iteration
        }
    }
}
```

```
86  void KTowerOfHanoi::Initialize(int numOfDisks)
87  {
88      for (KTower& s : m_tower) {
89          s.Clear();
90      }
91      m_log.clear();
92
93      m_moveState = EMoveState::ESTATE_DOING;
94      m_iStackSrc = 0;
95      m_iStackAux = 1;
```

20 FILTERED LINES

```
116 void KTowerOfHanoi::Iterate(double elapsedTime)
117 {
118     if (m_moveState == EMoveState::ESTATE_FINISHED) {
119         return;
120     }
121
122     m_oneStepTimer += elapsedTime;
123     if (m_oneStepTimer < 1.0) {
124         return;
125     }
126     m_oneStepTimer = 0.0;
127
128     m_iterationCounter += 1;
129     if (m_iterationCounter > m_totalNumOfMoves) {
130         m_moveState = EMoveState::ESTATE_FINISHED;
131         return;
132     }
133
134     if (m_iterationCounter % 3 == 1)
135         MoveDisksBetweenTwoPoles(m_iStackSrc, m_iStackDest);
136     else if (m_iterationCounter % 3 == 2)
137         MoveDisksBetweenTwoPoles( m_iStackSrc, m_iStackAux);
138     else if (m_iterationCounter % 3 == 0)
139         MoveDisksBetweenTwoPoles( m_iStackAux, m_iStackDest);
140 }
```

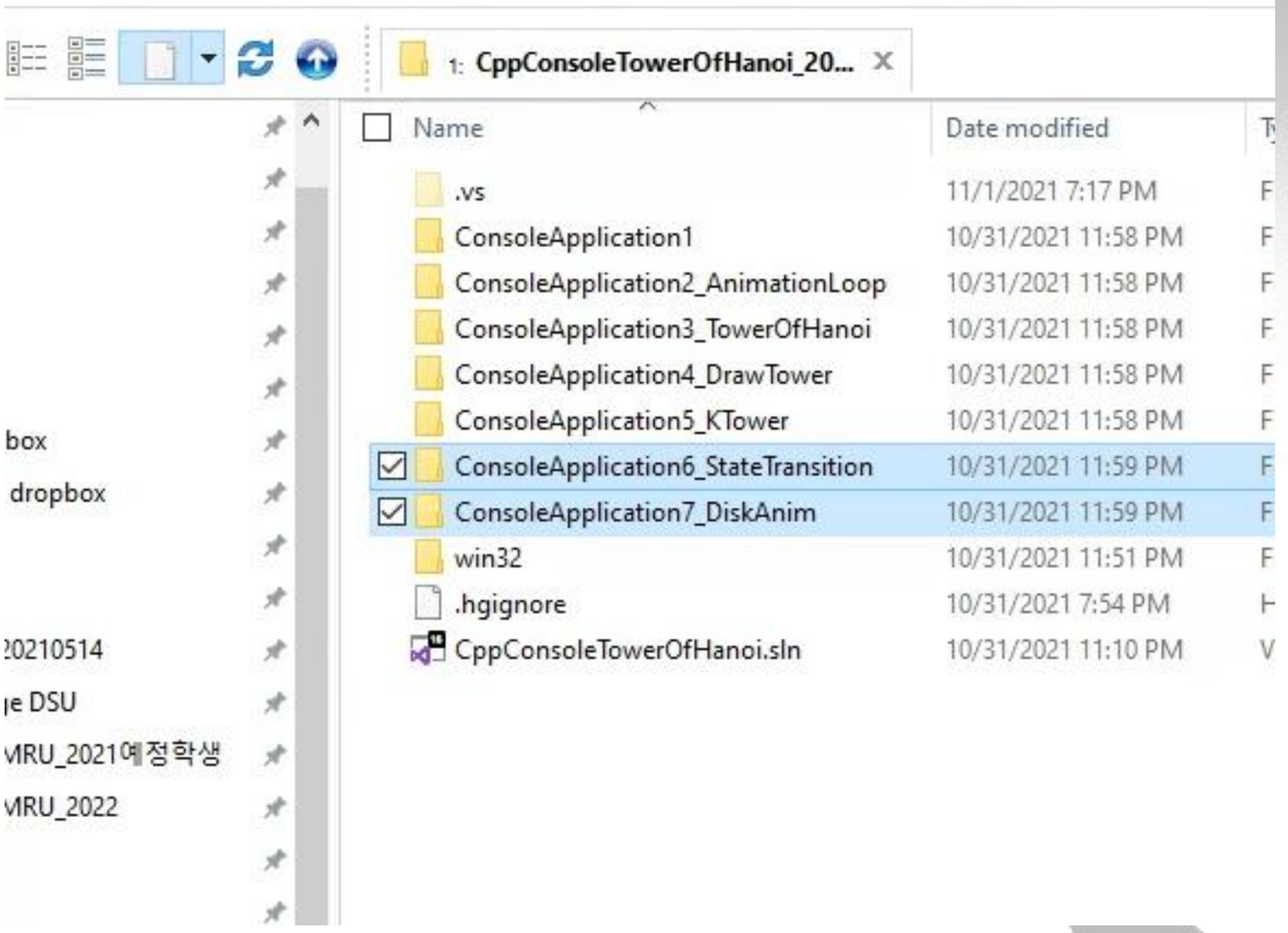
```
138 void KTowerOfHanoi::Initialize(int numOfDisks)
139 {
140     for (int i = 0; i < 3;++i) {
141         m_tower[i].Clear();
142     }
143     m_log.clear();
144
145     m_moveState = EMoveState::ESTATE_DOING;
146     m_iStackSrc = 0;
147     m_iStackAux = 1;
```

20 FILTERED LINES

```
168 void KTowerOfHanoi::Iterate(double elapsedTime)
169 {
170     if (m_moveState == EMoveState::ESTATE_FINISHED) {
171         return;
172     }
173
174     //m_oneStepTimer += elapsedTime;
175     //if (m_oneStepTimer < 1.0) {
176     //  return;
177     //}
178     //m_oneStepTimer = 0.0;
179
180     //m_iterationCounter += 1;
181     if (m_iterationCounter >= m_totalNumOfMoves) {
182         m_moveState = EMoveState::ESTATE_FINISHED;
183         return;
184     }
185
186     m_diskAnimTimer += elapsedTime;
187     if (m_iterationCounter % 3 == 0)
188         MoveDisksBetweenTwoPoles(m_iStackSrc, m_iStackDest);
189     else if (m_iterationCounter % 3 == 1)
190         MoveDisksBetweenTwoPoles( m_iStackSrc, m_iStackAux);
191     else if (m_iterationCounter % 3 == 2)
192         MoveDisksBetweenTwoPoles( m_iStackAux, m_iStackDest);
193 }
```

```
    m_iterationCounter += 1;
    if (m_iterationCounter > m_totalNumOfMoves) {
        m_moveState = EMoveState::ESTATE_FINISHED;
        return;
    }

    if (m_iterationCounter % 3 == 1)
        MoveDisksBetweenTwoPoles(m_iStackSrc, m_iStackDest);
    else if (m_iterationCounter % 3 == 2)
        MoveDisksBetweenTwoPoles( m_iStackSrc, m_iStackAux);
    else if (m_iterationCounter % 3 == 0)
        MoveDisksBetweenTwoPoles( m_iStackAux, m_iStackDest);
}

void KTowerOfHanoi::Draw()
{
    int x = 0;
    11 FILTERED LINES
    y = starty;
    for (int i = 0; i < 3; ++i) {
        x += width;
        y = starty;
        for (int j = 0; j < m_numOfDisks + 1; ++j)
            PutText(x, 20 + y - j, "|");

        for (int n : m_tower[i]) { // custom iterator, 20211031
            _itoa_s(n, buffer, 10);
            PutText(x, y, buffer);
            PrintDisc(x - n, 20 + y, n); // jintaek on 20211031
            y -= 1;
        }
    }
    1 FILTERED LINES
```

```
    //m_iterationCounter += 1;
    if (m_iterationCounter >= m_totalNumOfMoves) {
        m_moveState = EMoveState::ESTATE_FINISHED;
        return;
    }

    m_diskAnimTimer += elapsedTime;
    if (m_iterationCounter % 3 == 0)
        MoveDisksBetweenTwoPoles(m_iStackSrc, m_iStackDest);
    else if (m_iterationCounter % 3 == 1)
        MoveDisksBetweenTwoPoles( m_iStackSrc, m_iStackAux);
    else if (m_iterationCounter % 3 == 2)
        MoveDisksBetweenTwoPoles( m_iStackAux, m_iStackDest);
}

void KTowerOfHanoi::Draw()
{
    int x = 0;
    11 FILTERED LINES
    y = starty;
    for (int i = 0; i < 3; ++i) {
        x += width;
        y = starty;
        for (int j = 0; j < m_numOfDisks + 1; ++j)
            PutText(x, 20 + y - j, "|");
        for (int j=0;j<m_tower[i].GetDiskCount();++j) {
            const int n = m_tower[i].GetDisk(j);
            _itoa_s(n, buffer, 10);
            PutText(x, y, buffer);
            PrintDisc(x - n, 20 + y, n); // jintaek on 20211031
            y -= 1;
        }
    }
    1 FILTERED LINES
```


1: CppConsoleTowerOfHanoi_20...
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ConsoleApplication1
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ConsoleApplication2_AnimationLoop
10/31/2021 11:58 PM
ConsoleApplication3_TowerOfHanoi
10/31/2021 11:58 PM
ConsoleApplication4_DrawTower
10/31/2021 11:58 PM
ConsoleApplication5_KTower
10/31/2021 11:58 PM
ConsoleApplication6_StateTransition
10/31/2021 11:59 PM
ConsoleApplication7_DiskAnim
10/31/2021 11:59 PM
win32
10/31/2021 11:51 PM
.hgignore
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CppConsoleTowerOfHanoi.sln
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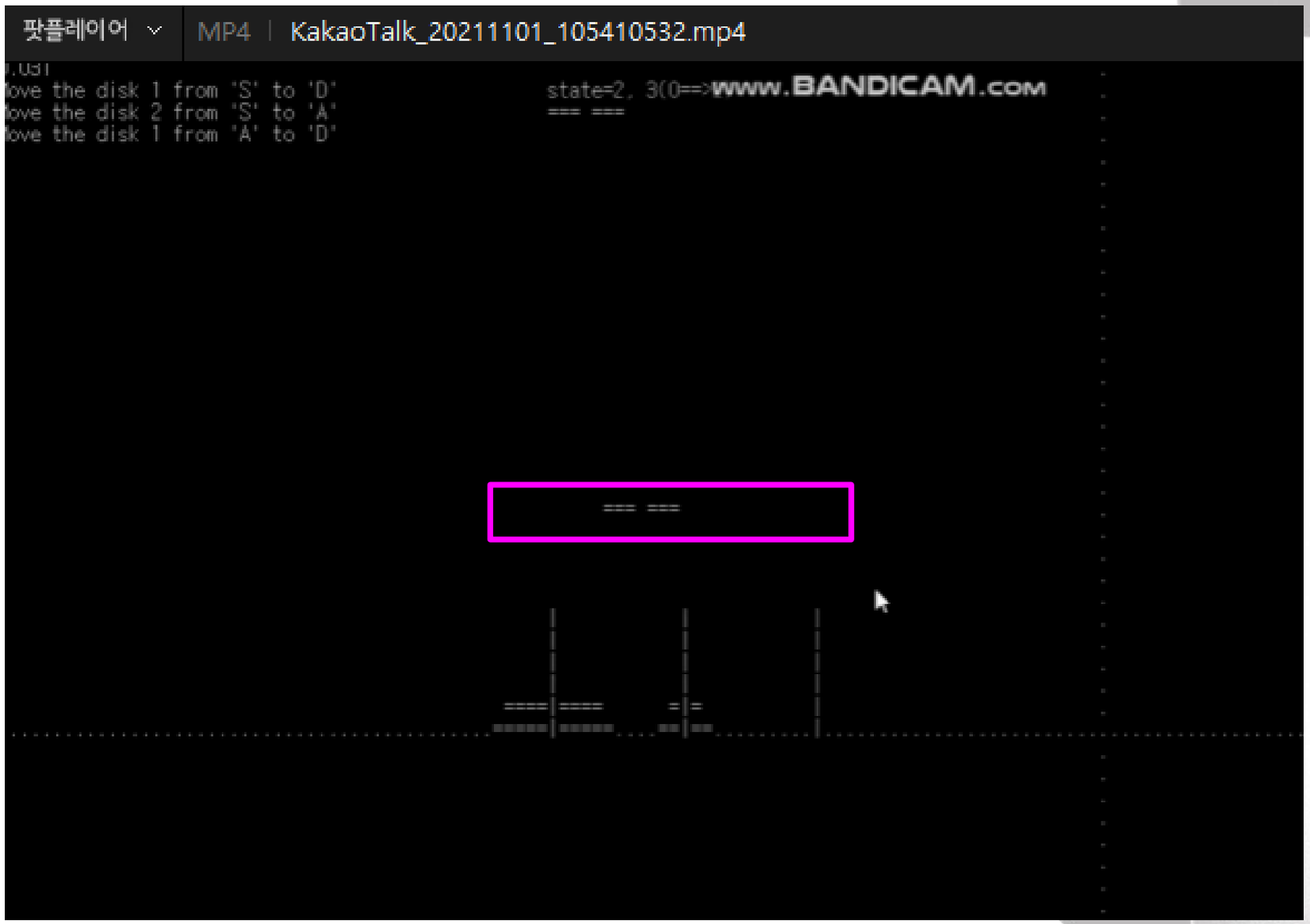
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ove the disk 1 from 'S' to 'D'
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ove the disk 1 from 'A' to 'D'
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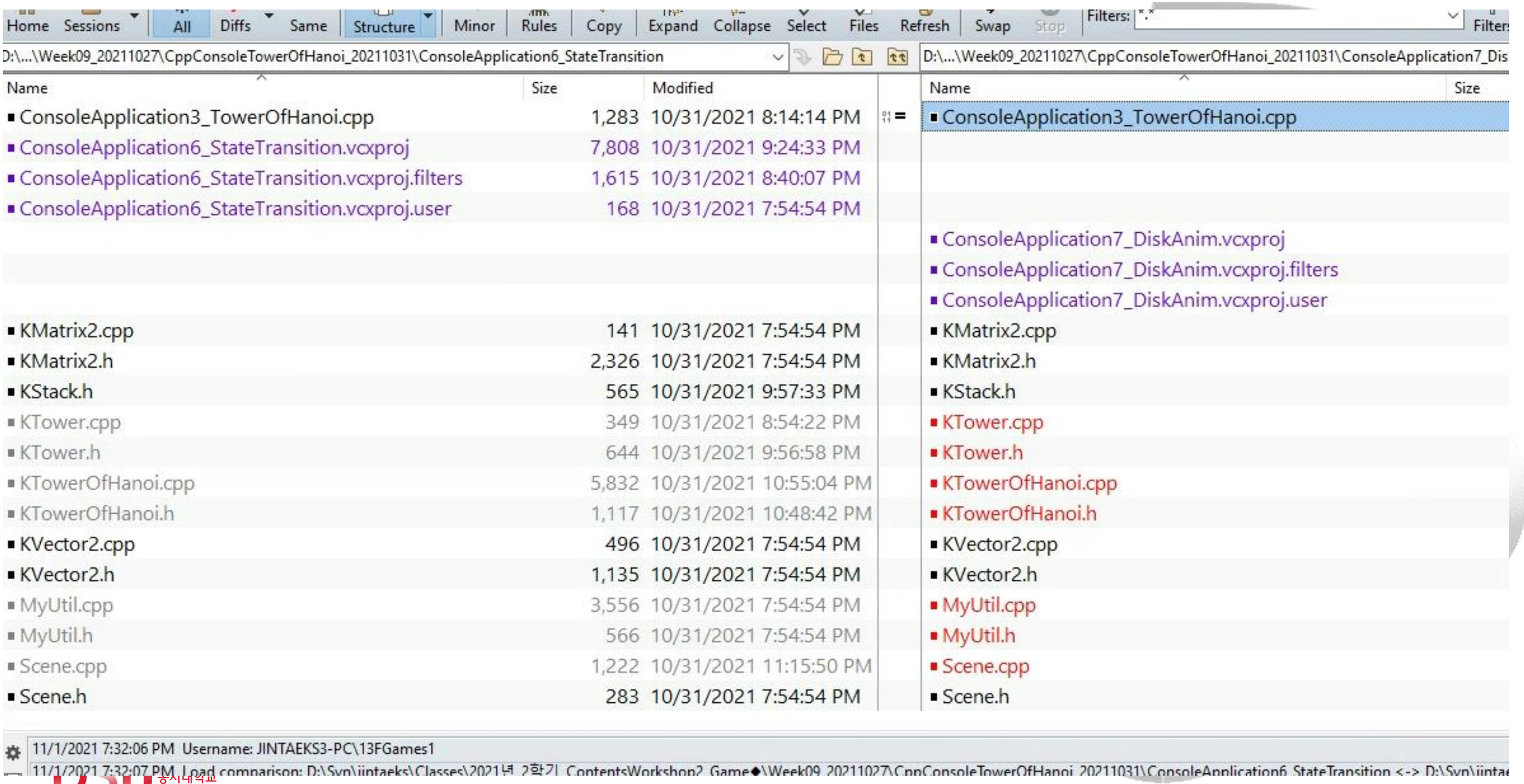
Home Sessions All Diffs Same Structure Minor Rules Copy Expand Collapse Select Files Refresh Swap Stop Filters: *.* Filters
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ConsoleApplication3_TowerOfHanoi.cpp 1,283 10/31/2021 8:14:14 PM
ConsoleApplication6_StateTransition.vcxproj 7,808 10/31/2021 9:24:33 PM
ConsoleApplication6_StateTransition.vcxproj.filters 1,615 10/31/2021 8:40:07 PM
ConsoleApplication6_StateTransition.vcxproj.user 168 10/31/2021 7:54:54 PM
KMatrix2.cpp 141 10/31/2021 7:54:54 PM
KMatrix2.h 2,326 10/31/2021 7:54:54 PM
KStack.h 565 10/31/2021 9:57:33 PM
KTower.cpp 349 10/31/2021 8:54:22 PM
KTower.h 644 10/31/2021 9:56:58 PM
KTowerOfHanoi.cpp 5,832 10/31/2021 10:55:04 PM
KTowerOfHanoi.h 1,117 10/31/2021 10:48:42 PM
KVector2.cpp 496 10/31/2021 7:54:54 PM
KVector2.h 1,135 10/31/2021 7:54:54 PM
MyUtil.cpp 3,556 10/31/2021 7:54:54 PM
MyUtil.h 566 10/31/2021 7:54:54 PM
Scene.cpp 1,222 10/31/2021 11:15:50 PM
Scene.h 283 10/31/2021 7:54:54 PM
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KMatrix2.cpp
KMatrix2.h
KStack.h
KTower.cpp
KTower.h
KTowerOfHanoi.cpp
KTowerOfHanoi.h
KVector2.cpp
KVector2.h
MyUtil.cpp
MyUtil.h
Scene.cpp
Scene.h
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11/1/2021 7:32:07 PM Load comparison: D:\Svn\jintaeks\Classes\2021년 2학기 ContentsWorkshop2 Game◆\Week09_20211027\CppConsoleTowerOfHanoi_20211031\ConsoleApplication6_StateTransition <-> D:\Svn\jintae

D:\...\Week09_20211027\CppConsoleTowerOfHanoi_20211031\ConsoleApplication6_StateTransition\KTower.h

10/31/2021 9:56:58 PM 644 bytes C,C++,C#,ObjC Source ANSI PC

5 FILTERED LINES

```
{
public:
    typedef std::vector<int>::iterator iterator;
private:
    KStack      m_stack;
    KVector2    m_position;

public:
    KTower(int x = 0, int y = 0);
    void PushDisk(int d) { m_stack.push(d); }
    void PopDisk() { m_stack.pop(); }
    bool Empty() const { return m_stack.empty(); }
```

1 FILTERED LINES

```
    int GetDisk(int i) { return m_stack.at(i); }

    void Clear() { m_stack.clear(); }
    //KStack& GetStack() { return m_stack; }
    int GetDiskCount() const { return (int)m_stack.size(); }
    bool GetTopDiskPosition( KVector2& vOut );

};
```

D:\...\Week09_20211027\CppConsoleTowerOfHanoi_20211031\ConsoleApplication7_DiskAnim\KT

10/31/2021 11:35:50 PM 771 bytes C,C++,C#,ObjC Source ANSI PC

5 FILTERED LINES

```
{
public:
    typedef std::vector<int>::iterator iterator;
private:
    KStack      m_stack;
    KVector2    m_position;
    int         m_numOfDisks;

public:
    KTower(int x = 0, int y = 0);
    void PushDisk(int d) { m_stack.push(d); }
    void PopDisk() { m_stack.pop(); }
    bool Empty() const { return m_stack.empty(); }
```

1 FILTERED LINES

```
    int GetDisk(int i) { return m_stack.at(i); }

    void Clear() { m_stack.clear(); }
    //KStack& GetStack() { return m_stack; }
    int GetDiskCount() const { return (int)m_stack.si
    bool GetTopDiskPosition( KVector2& vOut );
    KVector2 GetPosition() { return m_position; }
    void Init(int x, int y, int numOfDisk);
    void Draw();
};
```

)/31/2021 8:54:22 PM 349 bytes C,C++,C#,ObjC Source ANSI PC

```cpp
#include "KTower.h"

KTower::KTower(int x, int y)
{
    m_stack.clear();
    m_position = KVector2::zero;

}

bool KTower::GetTopDiskPosition(KVector2& vOut )
{
    if (Empty())
        return false;

    int y = (int)m_position.y - GetDiskCount();
    int x = (int)m_position.x - TopDisk();
    vOut = KVector2(x, y); //set [out] parameter
    return true;
}
```

10/31/2021 11:48:15 PM 906 bytes C,C++,C#,ObjC Source ANSI PC

```cpp
#include "KTower.h"
#include "MyUtil.h"

KTower::KTower(int x, int y)
{
    m_stack.clear();
    m_position = KVector2::zero;
    m_numOfDisks = 0;
}

bool KTower::GetTopDiskPosition(KVector2& vOut )
{
    if (Empty())
        return false;

    int y = (int)m_position.y - GetDiskCount();
    int x = (int)m_position.x - TopDisk();
    vOut = KVector2(x, y); //set [out] parameter
    return true;
}

void KTower::Init(int x, int y, int numOfDisk)
{
    m_position = KVector2(x, y);
    m_numOfDisks = numOfDisk;
}

void KTower::Draw()
{
```

```
    return false;

    int y = (int)m_position.y - GetDiskCount();
    int x = (int)m_position.x - TopDisk();
    vOut = KVector2(x, y); // set [out] parameter
    return true;
}
```

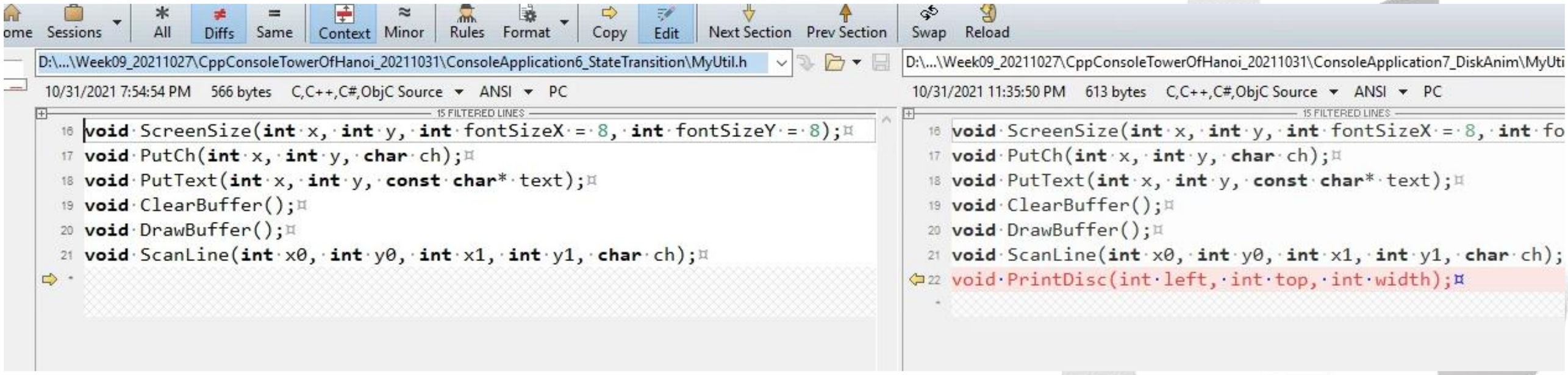
```
    return false;

    int y = (int)m_position.y - GetDiskCount();
    int x = (int)m_position.x - TopDisk();
    vOut = KVector2(x, y); // set [out] parameter
    return true;
}

void KTower::Init(int x, int y, int numOfDisk)
{
    m_position = KVector2(x, y);
    m_numOfDisks = numOfDisk;
}

void KTower::Draw()
{
    int x = (int)m_position.x;
    int y = (int)m_position.y;

    char buffer[80];
    for (int j = 0; j < GetDiskCount(); ++j) {
        const int n = GetDisk(j);
        _itoa_s(n, buffer, 10);
        //PutText(x, y, buffer);
        PrintDisc(x - n, y, n); // jintaek on 20211031
        y -= 1;
    }
    y = (int)m_position.y;
    for (int j = 0; j < m_numOfDisks + 1; ++j)
        PutText(x, y - j, "|");
}
```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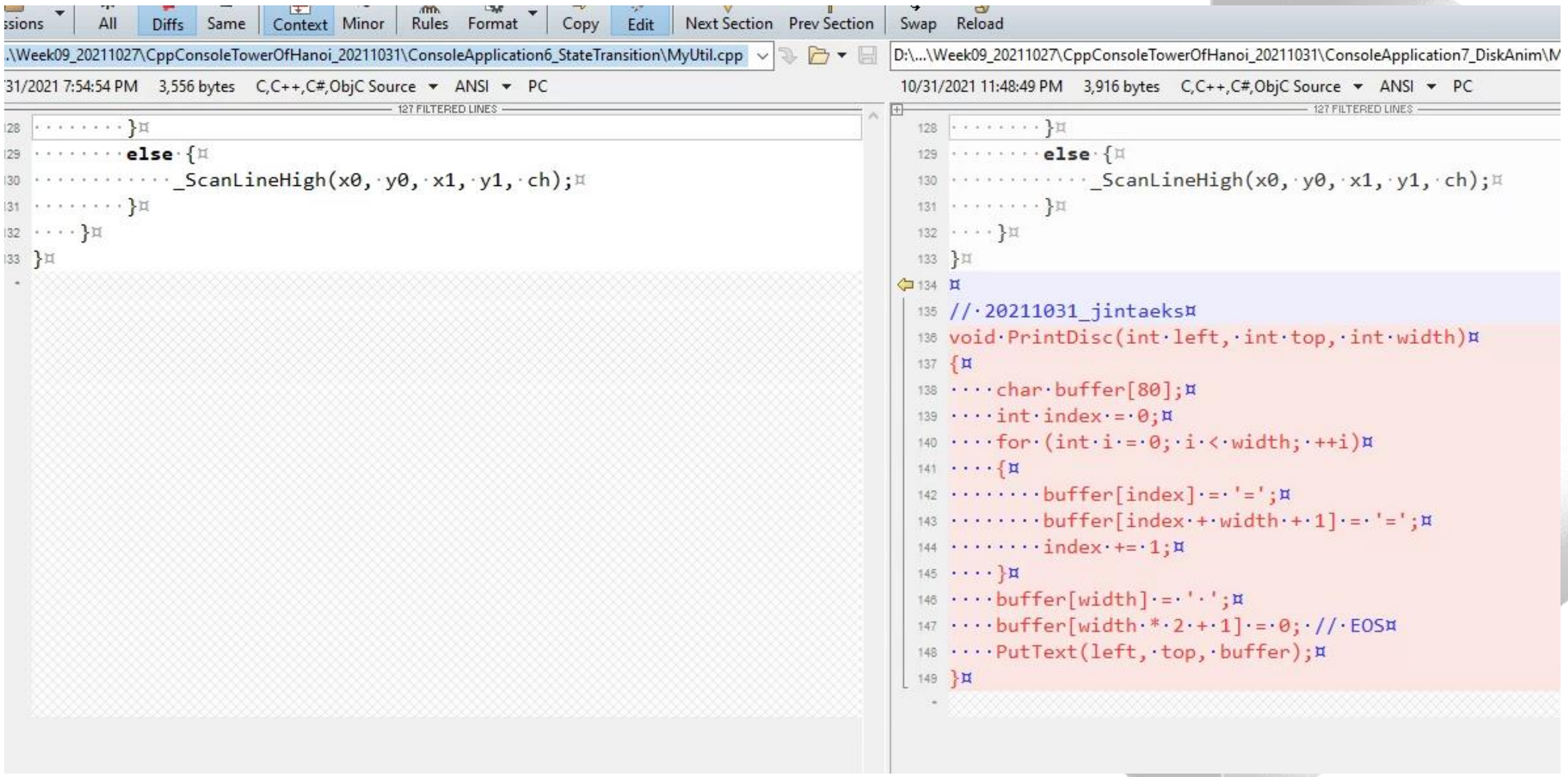
10/31/2021 7:54:54 PM 566 bytes C,C++,C#,ObjC Source ANSI PC
15 FILTERED LINES
16 void ScreenSize(int x, int y, int fontSizeX = 8, int fontSizeY = 8);
17 void PutCh(int x, int y, char ch);
18 void PutText(int x, int y, const char* text);
19 void ClearBuffer();
20 void DrawBuffer();
21 void ScanLine(int x0, int y0, int x1, int y1, char ch);
D:\...\Week09_20211027\CppConsoleTowerOfHanoi_20211031\ConsoleApplication7_DiskAnim\MyUti
10/31/2021 11:35:50 PM 613 bytes C,C++,C#,ObjC Source ANSI PC
15 FILTERED LINES
16 void ScreenSize(int x, int y, int fontSizeX = 8, int fo
17 void PutCh(int x, int y, char ch);
18 void PutText(int x, int y, const char* text);
19 void ClearBuffer();
20 void DrawBuffer();
21 void ScanLine(int x0, int y0, int x1, int y1, char ch);
22 void PrintDisc(int left, int top, int width);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31/2021 7:54:54 PM 3,556 bytes C,C++,C#,ObjC Source ANSI PC
127 FILTERED LINES
}
else {
_ScanLineHigh(x0, y0, x1, y1, ch);
}
}
}
D:\...\Week09_20211027\CppConsoleTowerOfHanoi_20211031\ConsoleApplication7_DiskAnim\M
10/31/2021 11:48:49 PM 3,916 bytes C,C++,C#,ObjC Source ANSI PC
127 FILTERED LINES
}
else {
_ScanLineHigh(x0, y0, x1, y1, ch);
}
}
}
//20211031_jintaeks
void PrintDisc(int left, int top, int width)
{
char buffer[80];
int index = 0;
for (int i = 0; i < width; ++i)
{
buffer[index] = '=';
buffer[index + width + 1] = '=';
index += 1;
}
buffer[width] = '.';
buffer[width * 2 + 1] = 0; //EOS
PutText(left, top, buffer);
}

```
51 void KTowerOfHanoi::MoveDisksBetweenTwoPoles_INIT(int iSrc, int iDest)
52 {
53     // When pole 1 is empty
54     if (m_tower[iSrc].Empty()) {
55         int pole2TopDisk = m_tower[iDest].TopDisk();
56         m_tower[iDest].PopDisk();
57         //m_tower[iSrc].PushDisk(pole2TopDisk);
58         m_iAnimSrcTower = iDest;
59         m_iAnimDestTower = iSrc;
60         m_iAnimDisk = pole2TopDisk;
61     }
62     // When pole2 pole is empty
63     else if (m_tower[iDest].Empty()) {
64         int pole1TopDisk = m_tower[iSrc].TopDisk();
65         m_tower[iSrc].PopDisk();
66         //m_tower[iDest].PushDisk(pole1TopDisk);
67         m_iAnimSrcTower = iSrc;
68         m_iAnimDestTower = iDest;
69         m_iAnimDisk = pole1TopDisk;
70     }
71     else {
72         int pole1TopDisk = m_tower[iSrc].TopDisk();
73         int pole2TopDisk = m_tower[iDest].TopDisk();
74         // When top disk of pole1 > top disk of pole2
75         if (pole1TopDisk > pole2TopDisk) {
76             m_tower[iDest].PopDisk();
77             //m_tower[iSrc].PushDisk(pole2TopDisk);
78             m_iAnimSrcTower = iDest;
79             m_iAnimDestTower = iSrc;
```

```
35 void KTowerOfHanoi::MoveDisksBetweenTwoPoles_INIT(int iSrc, int i
36 {
37     // When pole 1 is empty
38     if (m_tower[iSrc].Empty()) {
39         int pole2TopDisk = m_tower[iDest].TopDisk();
40         m_tower[iDest].GetTopDiskPosition(m_vAnimBegin);
41         m_tower[iDest].PopDisk();
42         //m_tower[iSrc].PushDisk(pole2TopDisk);
43         m_iAnimSrcTower = iDest;
44         m_iAnimDestTower = iSrc;
45         m_iAnimDisk = pole2TopDisk;
46     }
47     // When pole2 pole is empty
48     else if (m_tower[iDest].Empty()) {
49         int pole1TopDisk = m_tower[iSrc].TopDisk();
50         m_tower[iSrc].GetTopDiskPosition(m_vAnimBegin);
51         m_tower[iSrc].PopDisk();
52         //m_tower[iDest].PushDisk(pole1TopDisk);
53         m_iAnimSrcTower = iSrc;
54         m_iAnimDestTower = iDest;
55         m_iAnimDisk = pole1TopDisk;
56     }
57     else {
58         int pole1TopDisk = m_tower[iSrc].TopDisk();
59         int pole2TopDisk = m_tower[iDest].TopDisk();
60         // When top disk of pole1 > top disk of pole2
61         if (pole1TopDisk > pole2TopDisk) {
62             m_tower[iDest].GetTopDiskPosition(m_vAnimBegin);
63             m_tower[iDest].PopDisk();
64             //m_tower[iSrc].PushDisk(pole2TopDisk);
65             m_iAnimSrcTower = iDest;
66             m_iAnimDestTower = iSrc;
```

```
73      int pole2TopDisk = m_tower[iDest].TopDisk();
74      //When top disk of pole1 > top disk of pole2
75      if (pole1TopDisk > pole2TopDisk) {
76          m_tower[iDest].PopDisk();
77          //m_tower[iSrc].PushDisk(pole2TopDisk);
78          m_iAnimSrcTower = iDest;
79          m_iAnimDestTower = iSrc;
80          m_iAnimDisk = pole2TopDisk;
81      }
82      //When top disk of pole1 < top disk of pole2
83      else {
84          m_tower[iSrc].PopDisk();
85          //m_tower[iDest].PushDisk(pole1TopDisk);
86          m_iAnimSrcTower = iSrc;
87          m_iAnimDestTower = iDest;
88          m_iAnimDisk = pole1TopDisk;
89      }
90  }
91 }
92
93 void KTowerOfHanoi::MoveDisksBetweenTwoPoles(int iSrc, int iDest)
94 {
95      char buffer[80];
96      sprintf_s(buffer, sizeof(buffer), "state=%i, %i(%i==>%i)"
```

12 FILTERED LINES

```
59      int pole2TopDisk = m_tower[iDest].TopDisk();
60      //When top disk of pole1 > top disk of pole2
61      if (pole1TopDisk > pole2TopDisk) {
62          m_tower[iDest].GetTopDiskPosition(m_vAnimBegin);
63          m_tower[iDest].PopDisk();
64          //m_tower[iSrc].PushDisk(pole2TopDisk);
65          m_iAnimSrcTower = iDest;
66          m_iAnimDestTower = iSrc;
67          m_iAnimDisk = pole2TopDisk;
68      }
69      //When top disk of pole1 < top disk of pole2
70      else {
71          m_tower[iSrc].GetTopDiskPosition(m_vAnimBegin);
72          m_tower[iSrc].PopDisk();
73          //m_tower[iDest].PushDisk(pole1TopDisk);
74          m_iAnimSrcTower = iSrc;
75          m_iAnimDestTower = iDest;
76          m_iAnimDisk = pole1TopDisk;
77      }
78  }
79
80      //set animation info
81      //m_tower[m_iAnimSrcTower].GetTopDiskPosition(m_vAnimBegin);
82      m_vAnimEnd = m_tower[m_iAnimSrcTower].GetPosition();
83      m_vAnimEnd.x = m_vAnimBegin.x;
84      m_vAnimEnd.y -= m_numOfDisks*2;
85 }
86
87 void KTowerOfHanoi::MoveDisksBetweenTwoPoles(int iSrc, int iDest)
88 {
89      char buffer[80];
90      sprintf_s(buffer, sizeof(buffer), "state=%i, %i(%i==>%i)"
```

12 FILTERED LINES

```
93  void KTowerOfHanoi::MoveDisksBetweenTwoPoles(int iSrc, int iDest)
94  {
95      char buffer[80];
96      sprintf_s(buffer, sizeof(buffer), "state=%i, %i(%i==>%i)"
        12 FILTERED LINES
109     }
110     else if (m_eDiskAnimState == EDiskAnimState::DISKANIM_MOVE_TO_TOP)
111     {
112         if (m_diskAnimTimer >= 1.0) {
113             m_eDiskAnimState = EDiskAnimState::DISKANIM_MOVE_TO_DEST;
114             m_diskAnimTimer = 0.0;
115         }
116     }
117     else if (m_eDiskAnimState == EDiskAnimState::DISKANIM_MOVE_TO_DEST)
118     {
119         if (m_diskAnimTimer >= 1.0) {
120             m_eDiskAnimState = EDiskAnimState::DISKANIM_END;
        38 FILTERED LINES
159     m_totalNumOfMoves = (int)pow(2, numOfDisks) - 1;
160
161     KTower& src = m_tower[m_iStackSrc];
162     //Larger disks will be pushed first
```

```
87  void KTowerOfHanoi::MoveDisksBetweenTwoPoles(int iSrc, int iDest)
88  {
89      char buffer[80];
90      sprintf_s(buffer, sizeof(buffer), "state=%i, %i(%i==>%i)"
        12 FILTERED LINES
103     }
104     else if (m_eDiskAnimState == EDiskAnimState::DISKANIM_MOVE_TO_T
105     {
106         if (m_diskAnimTimer >= 1.0) {
107             m_eDiskAnimState = EDiskAnimState::DISKANIM_MOVE_TO_DES
108             m_diskAnimTimer = 0.0;
109             m_vAnimBegin = m_vAnimEnd;
110             m_vAnimEnd = m_tower[m_iAnimDestTower].GetPosition();
111             m_vAnimEnd.x -= m_iAnimDisk;
112             m_vAnimEnd.y = m_vAnimBegin.y;
113         }
114     }
115     else if (m_eDiskAnimState == EDiskAnimState::DISKANIM_MOVE_TO_D
116     {
117         if (m_diskAnimTimer >= 1.0) {
118             m_eDiskAnimState = EDiskAnimState::DISKANIM_END;
        38 FILTERED LINES
157     m_totalNumOfMoves = (int)pow(2, numOfDisks) - 1;
158
159     KTower& src = m_tower[m_iStackSrc];
160     //Larger disks will be pushed first
```

```
void KTowerOfHanoi::Initialize(int numOfDisks)
{
    for (int i = 0; i < 3;++i) {
        m_tower[i].Clear();
    }
    m_log.clear();

    m_moveState = EMoveState::ESTATE_DOING;
    m_iStackSrc = 0;
    m_iStackAux = 1;
    m_iStackDest = 2;
    m_iterationCounter = 0;

    //If number of disks is even, then interchange
    //destination pole and auxiliary pole
    if (numOfDisks % 2 == 0) {
        char temp = m_iStackDest;
        m_iStackDest = m_iStackAux;
        m_iStackAux = temp;
    }
    m_numOfDisks = numOfDisks;
    m_totalNumOfMoves = (int)pow(2, numOfDisks) - 1;

    KTower& src = m_tower[m_iStackSrc];
    //Larger disks will be pushed first
    for (int i = m_numOfDisks; i >= 1; i--)
        src.PushDisk(i);
```

```
void KTowerOfHanoi::Initialize(int numOfDisks)
{
    for (int i = 0; i < 3;++i) {
        m_tower[i].Clear();
    }
    m_log.clear();

    m_moveState = EMoveState::ESTATE_DOING;
    m_iStackSrc = 0;
    m_iStackAux = 1;
    m_iStackDest = 2;
    m_iterationCounter = 0;

    //If number of disks is even, then interchange
    //destination pole and auxiliary pole
    if (numOfDisks % 2 == 0) {
        char temp = m_iStackDest;
        m_iStackDest = m_iStackAux;
        m_iStackAux = temp;
    }
    m_numOfDisks = numOfDisks;
    m_totalNumOfMoves = (int)pow(2, numOfDisks) - 1;

    KTower& src = m_tower[m_iStackSrc];
    //Larger disks will be pushed first
    for (int i = m_numOfDisks; i >= 1; i--)
        src.PushDisk(i);

    int startx = 50;
    int starty = 30;
    const int width = m_numOfDisks * 2 + 2;
    int x = startx;
    int y = starty;
    for (int i = 0; i < 3; ++i) {
        m_tower[i].Init(x, y, m_numOfDisks);
        x += width;
    }
```

D:\...\CppConsoleTowerOfHanoi_20211031\ConsoleApplication6_StateTransition\KTowerOfHanoi.cpp

10/31/2021 10:55:04 PM 5,832 bytes C,C++,C#,ObjC Source ANSI PC

```
168 void KTowerOfHanoi::Iterate(double elapsedTime)
169 {
170     if (m_moveState == EMoveState::ESTATE_FINISHED) {
    27 FILTERED LINES
198     int y = 1;
199     for (std::string& str : m_log) {
200         PutText(x, y, str.c_str());
201         y += 1;
202     }
203
204     char buffer[80];
205     int startx = 50;
206     int starty = 10;
207     const int width = m_numOfDisks * 2 + 2;
208     x = startx;
209     y = starty;
210     for (int i = 0; i < 3; ++i) {
211         x += width;
212         y = starty;
213         for (int j = 0; j < m_numOfDisks + 1; ++j)
214             PutText(x, 20 + y--j, "|");
215         for (int j=0;j<m_tower[i].GetDiskCount();++j) {
216             const int n = m_tower[i].GetDisk(j);
217             _itoa_s(n, buffer, 10);
218             PutText(x, y, buffer);
219             PrintDisc(x--n, 20 + y, n); // jintaek on 20211031
220             y -= 1;
221         }
222     }
223 }
```

D:\...\CppConsoleTowerOfHanoi_20211031\ConsoleApplication7_DiskAnim\KTowerOfHanoi.cpp

10/31/2021 11:43:41 PM 6,253 bytes C,C++,C#,ObjC Source ANSI PC

```
176 void KTowerOfHanoi::Iterate(double elapsedTime)
177 {
178     if (m_moveState == EMoveState::ESTATE_FINISHED) {
    27 FILTERED LINES
206     int y = 1;
207     for (std::string& str : m_log) {
208         PutText(x, y, str.c_str());
209         y += 1;
210     }
211
212     for (int i = 0; i < 3; ++i) {
213         m_tower[i].Draw();
214     }
215
216     if (m_eDiskAnimState == EDiskAnimState::DISKANIM_MOVE_TO_TOP)
217     {
218         KVector2 pos = KVector2::Lerp(m_vAnimBegin, m_vAnimEnd, m_disk
219         PrintDisc(pos.x, pos.y, m_iAnimDisk);
220     }
221     else if (m_eDiskAnimState == EDiskAnimState::DISKANIM_MOVE_TO_DEST
222     {
223         KVector2 pos = KVector2::Lerp(m_vAnimBegin, m_vAnimEnd, m_disk
224         PrintDisc(pos.x, pos.y, m_iAnimDisk);
225     }
226 }
```

# THANKS!

## Any questions?

MY **BRIGHT** FUTURE

DSU Dongseo University 동서대학교