

TP MODUL 6
Design by Contract dan Defensive Programming



Nama :

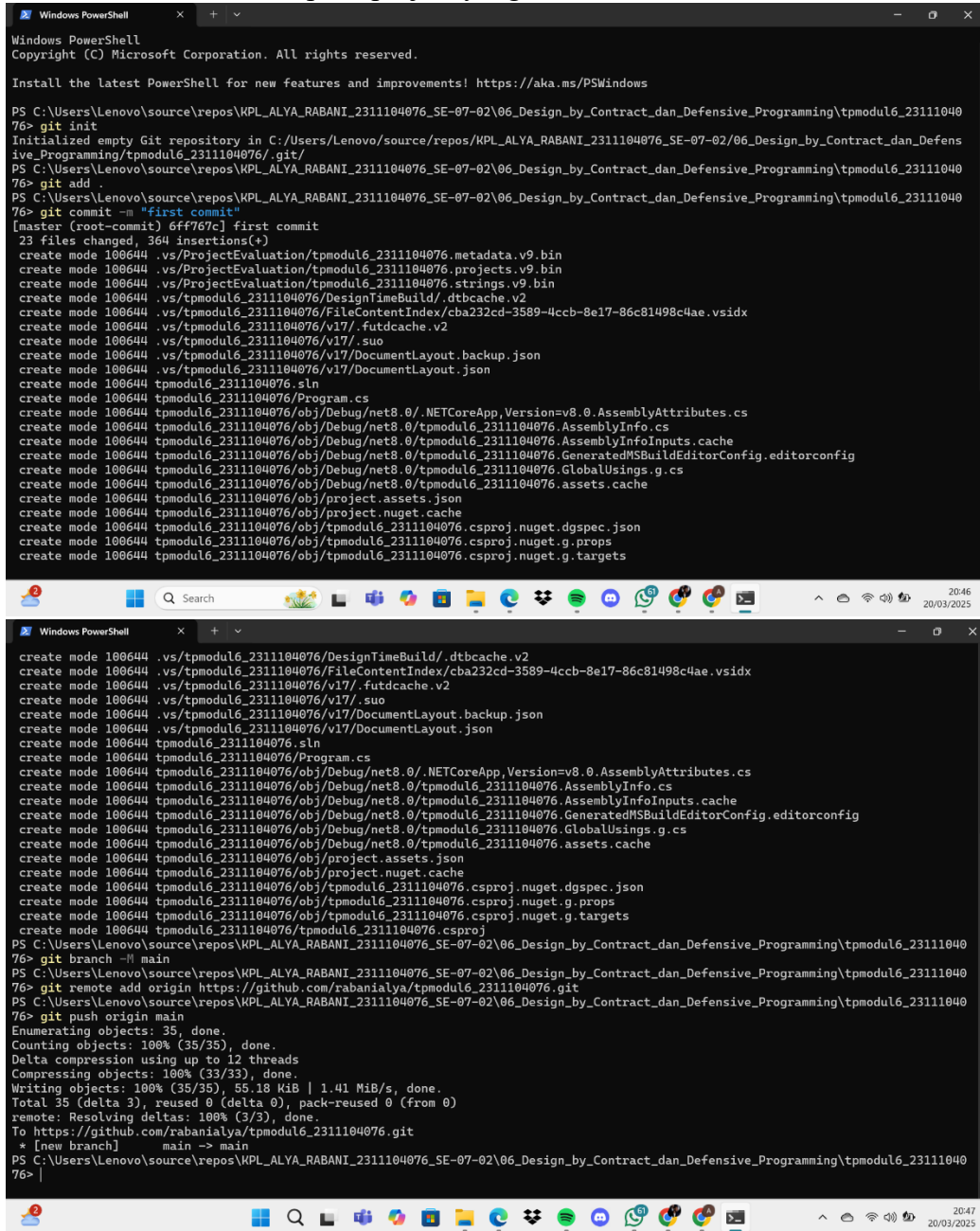
Alya Rabani (2311104076)

Dosen :

YUDHA ISLAMI SULISTYA

**PROGRAM STUDI S1 REKAYASA PERANGKAT
LUNAK
TELKOM UNIVERSITY PURWOKERTO
2025**

1. Melakukan GIT commit pada project yang dibuat



```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

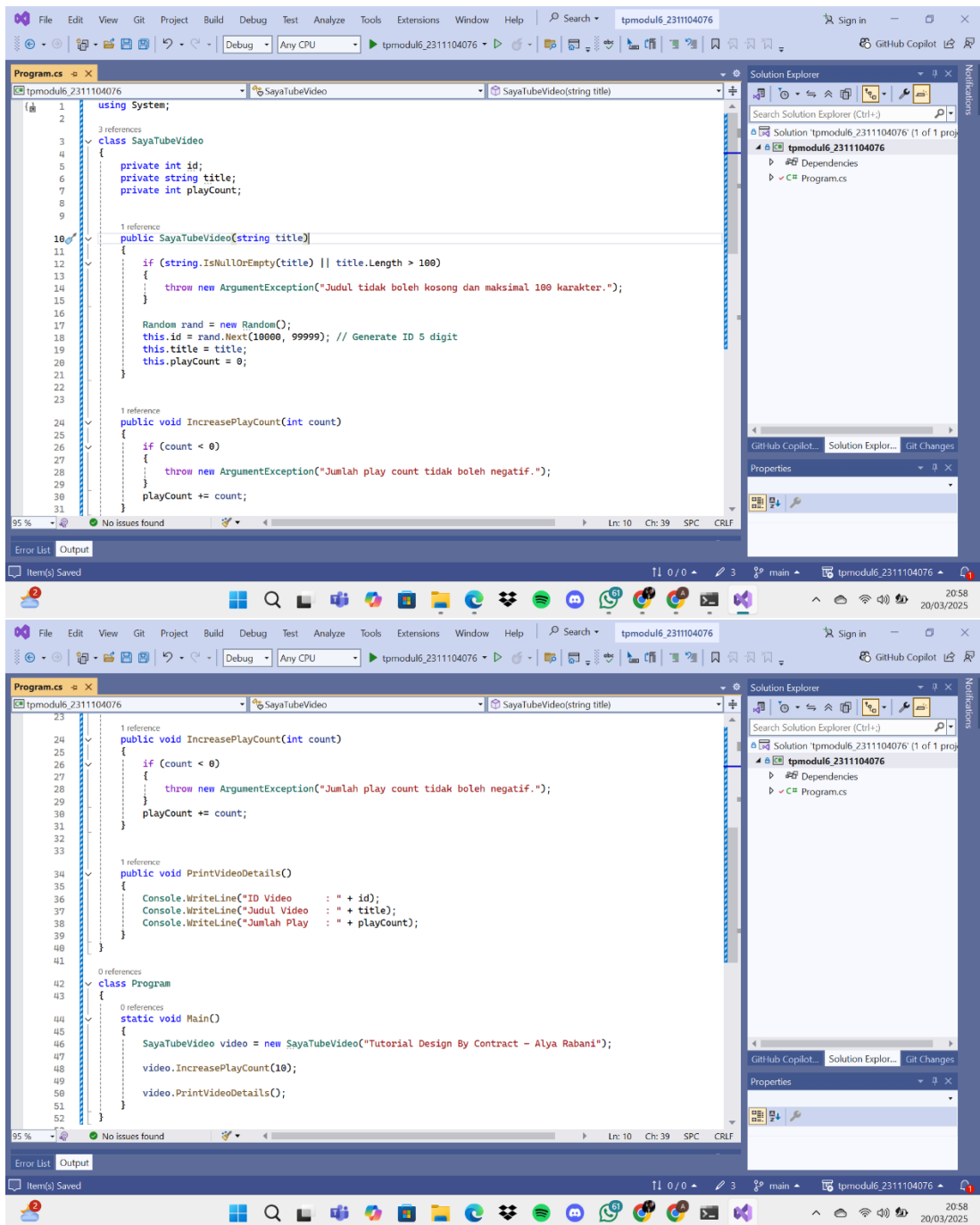
Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\Users\Lenovo\source\repos\KPL_ALYA_RABANI_2311104076_SE-07-02\06_Design_by_Contract_dan_Defensive_Programming\tpmodul6_2311104076> git init
Initialized empty Git repository in C:/Users/Lenovo/source/repos/KPL_ALYA_RABANI_2311104076_SE-07-02\06_Design_by_Contract_dan_Defensive_Programming\tpmodul6_2311104076/.git/
PS C:\Users\Lenovo\source\repos\KPL_ALYA_RABANI_2311104076_SE-07-02\06_Design_by_Contract_dan_Defensive_Programming\tpmodul6_2311104076> git add .
PS C:\Users\Lenovo\source\repos\KPL_ALYA_RABANI_2311104076_SE-07-02\06_Design_by_Contract_dan_Defensive_Programming\tpmodul6_2311104076> git commit -m "First commit"
[master (root-commit) 6ff767c] first commit
23 files changed, 364 insertions(+)
create mode 100644 .vs/ProjectEvaluation/tpmodul6_2311104076.metadata.v9.bin
create mode 100644 .vs/ProjectEvaluation/tpmodul6_2311104076.projects.v9.bin
create mode 100644 .vs/ProjectEvaluation/tpmodul6_2311104076.strings.v9.bin
create mode 100644 .vs/tpmodul6_2311104076/DesignTimeBuild/.dtbcache.v2
create mode 100644 .vs/tpmodul6_2311104076/FileContentIndex/cba232cd-3589-4ccb-8e17-86c81498c4ae.vsidx
create mode 100644 .vs/tpmodul6_2311104076/v17/.fudtcache.v2
create mode 100644 .vs/tpmodul6_2311104076/v17/.suo
create mode 100644 .vs/tpmodul6_2311104076/v17/DocumentLayout.backup.json
create mode 100644 .vs/tpmodul6_2311104076/v17/DocumentLayout.json
create mode 100644 tpmodul6_2311104076.sln
create mode 100644 tpmodul6_2311104076/Program.cs
create mode 100644 tpmodul6_2311104076/obj/Debug/net8.0/.NETCoreApp,Version=v8.0.AssemblyAttributes.cs
create mode 100644 tpmodul6_2311104076/obj/Debug/net8.0/tpmodul6_2311104076.AssemblyInfo.cs
create mode 100644 tpmodul6_2311104076/obj/Debug/net8.0/tpmodul6_2311104076.AssemblyInfoInputs.cache
create mode 100644 tpmodul6_2311104076/obj/Debug/net8.0/tpmodul6_2311104076.GeneratedMSBuildEditorConfig.editorconfig
create mode 100644 tpmodul6_2311104076/obj/Debug/net8.0/tpmodul6_2311104076.GlobalUsings.g.cs
create mode 100644 tpmodul6_2311104076/obj/Debug/net8.0/tpmodul6_2311104076.assets.cache
create mode 100644 tpmodul6_2311104076/obj/project.assets.json
create mode 100644 tpmodul6_2311104076/obj/project.nuget.cache
create mode 100644 tpmodul6_2311104076/obj/tpmodul6_2311104076.csproj.nuget.dgspec.json
create mode 100644 tpmodul6_2311104076/obj/tpmodul6_2311104076.csproj.nuget.g.props
create mode 100644 tpmodul6_2311104076/obj/tpmodul6_2311104076.csproj.nuget.g.targets

PS C:\Users\Lenovo\source\repos\KPL_ALYA_RABANI_2311104076_SE-07-02\06_Design_by_Contract_dan_Defensive_Programming\tpmodul6_2311104076> git branch -M main
PS C:\Users\Lenovo\source\repos\KPL_ALYA_RABANI_2311104076_SE-07-02\06_Design_by_Contract_dan_Defensive_Programming\tpmodul6_2311104076> git remote add origin https://github.com/rabaniaalya/tpmodul6_2311104076.git
PS C:\Users\Lenovo\source\repos\KPL_ALYA_RABANI_2311104076_SE-07-02\06_Design_by_Contract_dan_Defensive_Programming\tpmodul6_2311104076> git push origin main
Enumerating objects: 35, done.
Counting objects: 100% (35/35), done.
Delta compression using up to 12 threads
Compressing objects: 100% (33/33), done.
Writing objects: 100% (35/35), 55.18 KiB | 1.41 MiB/s, done.
Total 35 (delta 3), reused 0 (delta 0), pack-reused 0 (from 0)
remote: Resolving deltas: 100% (3/3), done.
To https://github.com/rabaniaalya/tpmodul6_2311104076.git
 * [new branch] main -> main
PS C:\Users\Lenovo\source\repos\KPL_ALYA_RABANI_2311104076_SE-07-02\06_Design_by_Contract_dan_Defensive_Programming\tpmodul6_2311104076>
```

2. Menambahkan kode awal SayaTubeVideo

Pada kodingan ini, konstruktor SayaTubeVideo menginisialisasi id dengan nilai acak 5 digit menggunakan Random, serta mengatur playCount ke 0. Selain itu, konstruktor juga melakukan validasi untuk memastikan bahwa title tidak kosong dan tidak melebihi 100 karakter. Method IncreasePlayCount(int count) berfungsi untuk menambahkan jumlah penonton (playCount) dengan validasi tambahan agar nilai yang dimasukkan tidak negatif. Sementara itu, method PrintVideoDetails() digunakan untuk mencetak informasi video, termasuk id, title, dan playCount. Pada class Program, method Main() membuat sebuah objek SayaTubeVideo dengan judul video tertentu, menambah play count sebanyak 10, lalu mencetak detail video ke konsol.



Dari kodingan tersebut menghasilkan output ini:

```
Microsoft Visual Studio Debu: x + v
ID Video      : 88373
Judul Video   : Tutorial Design By Contract - Alya Rabani
Jumlah Play   : 10

C:\Users\Lenovo\source\repos\KPL_ALYA_RABANI_2311104076_SE-07-02\06_Design_by_Contract_dan_Defensive_Programming\tpmodul
6_2311104076\tpmodul6_2311104076\bin\Debug\net8.0\tpmodul6_2311104076.exe (process 328) exited with code 0 (0x0).
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the conso
le when debugging stops.
Press any key to close this window . . .|
```

3. Melakukan commit kedua

```
C:\Windows\system32\cmd.exe
*****
** Visual Studio 2022 Developer Command Prompt v17.13.0
** Copyright (c) 2022 Microsoft Corporation
*****

C:\Users\Lenovo\source\repos\KPL_ALYA_RABANI_2311104076_SE-07-02\06_Design_by_Contract_dan_Defensive_Programming\tpmodul6_2311104076>
git add .

C:\Users\Lenovo\source\repos\KPL_ALYA_RABANI_2311104076_SE-07-02\06_Design_by_Contract_dan_Defensive_Programming\tpmodul6_2311104076>
git commit -m "menambahkan class SayaTubeVideo"
[main f595311] menambahkan class SayaTubeVideo
24 files changed, 108 insertions(+), 6 deletions(-)
create mode 100644 .vs\tpmodul6_2311104076\FileContentIndex\1cec9722-f332-4c35-90e9-2060394d11dc.vsidx
delete mode 100644 .vs\tpmodul6_2311104076\FileContentIndex\cba232cd-3589-4ccb-8e17-86c81498c4ae.vsidx
create mode 100644 tpmodul6_2311104076\bin\Debug\net8.0\tpmodul6_2311104076.deps.json
create mode 100644 tpmodul6_2311104076\bin\Debug\net8.0\tpmodul6_2311104076.dll
create mode 100644 tpmodul6_2311104076\bin\Debug\net8.0\tpmodul6_2311104076.exe
create mode 100644 tpmodul6_2311104076\bin\Debug\net8.0\tpmodul6_2311104076.pdb
create mode 100644 tpmodul6_2311104076\bin\Debug\net8.0\tpmodul6_2311104076.runtimeconfig.json
create mode 100644 tpmodul6_2311104076\obj\Debug\net8.0\apphost.exe
create mode 100644 tpmodul6_2311104076\obj\Debug\net8.0\ref\tpmodul6_2311104076.dll
create mode 100644 tpmodul6_2311104076\obj\Debug\net8.0\refint\tpmodul6_2311104076.dll
create mode 100644 tpmodul6_2311104076\obj\Debug\net8.0\tpmodul6_2311104076.csproj.BuildWithSkipAnalyzers
create mode 100644 tpmodul6_2311104076\obj\Debug\net8.0\tpmodul6_2311104076.csproj.CoreCompileInputs.cache
create mode 100644 tpmodul6_2311104076\obj\Debug\net8.0\tpmodul6_2311104076.csproj.FileListAbsolute.txt
create mode 100644 tpmodul6_2311104076\obj\Debug\net8.0\tpmodul6_2311104076.dll
create mode 100644 tpmodul6_2311104076\obj\Debug\net8.0\tpmodul6_2311104076.genruntimeconfig.cache
create mode 100644 tpmodul6_2311104076\obj\Debug\net8.0\tpmodul6_2311104076.pdb
create mode 100644 tpmodul6_2311104076\obj\Debug\net8.0\tpmodul6_2311104076.sourceLink.json

C:\Users\Lenovo\source\repos\KPL_ALYA_RABANI_2311104076_SE-07-02\06_Design_by_Contract_dan_Defensive_Programming\tpmodul6_2311104076>
git push origin main
Enumerating objects: 46, done.
Counting objects: 100% (46/46), done.
Delta compression using up to 12 threads
Compressing objects: 100% (28/28), done.
Writing objects: 100% (32/32), 79.70 KiB | 3.32 MiB/s, done.

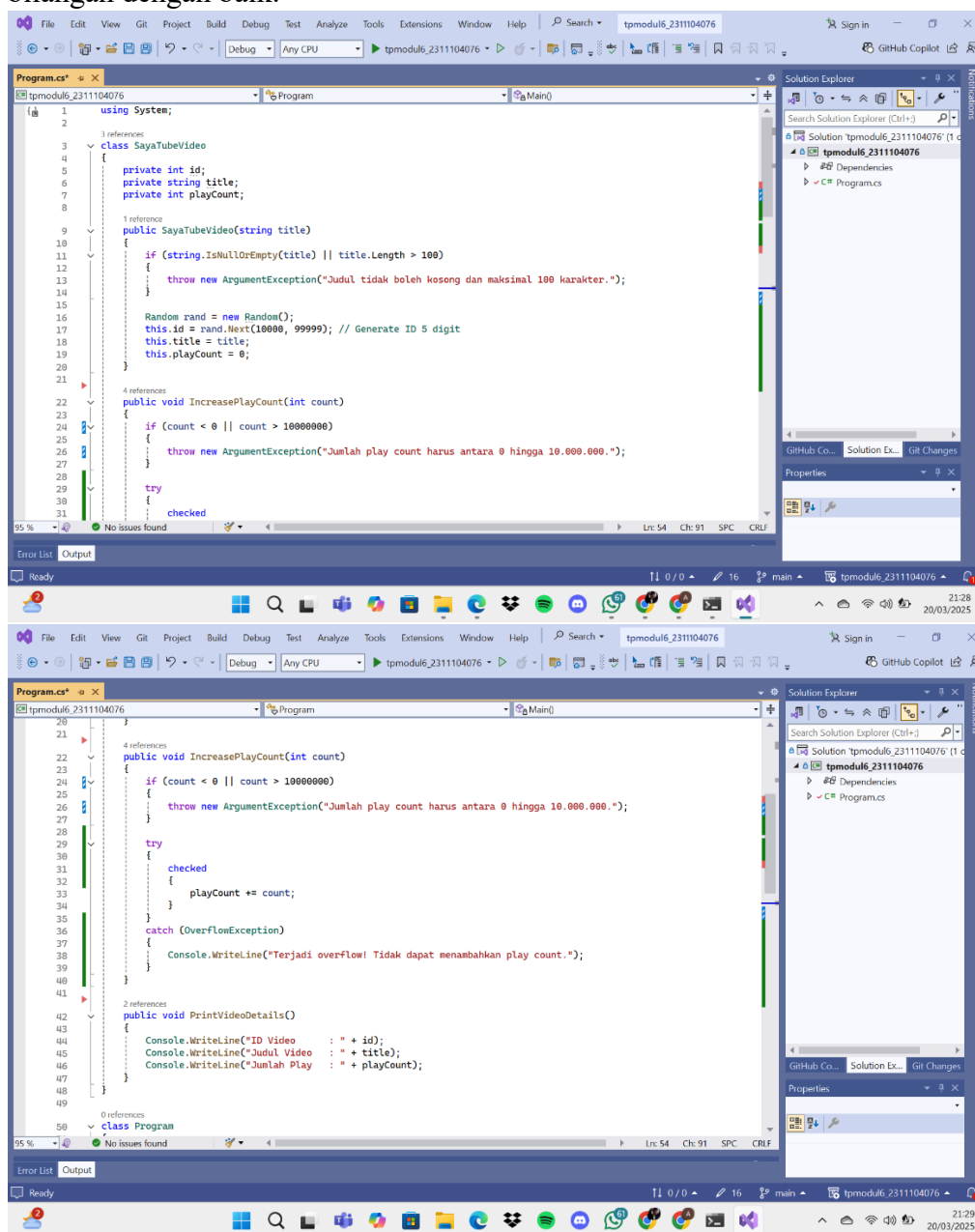
C:\Users\Lenovo\source\repos\KPL_ALYA_RABANI_2311104076_SE-07-02\06_Design_by_Contract_dan_Defensive_Programming\tpmodul6_2311104076>
create mode 100644 tpmodul6_2311104076\bin\Debug\net8.0\tpmodul6_2311104076.deps.json
create mode 100644 tpmodul6_2311104076\bin\Debug\net8.0\tpmodul6_2311104076.dll
create mode 100644 tpmodul6_2311104076\bin\Debug\net8.0\tpmodul6_2311104076.exe
create mode 100644 tpmodul6_2311104076\bin\Debug\net8.0\tpmodul6_2311104076.pdb
create mode 100644 tpmodul6_2311104076\bin\Debug\net8.0\tpmodul6_2311104076.runtimeconfig.json
create mode 100644 tpmodul6_2311104076\obj\Debug\net8.0\apphost.exe
create mode 100644 tpmodul6_2311104076\obj\Debug\net8.0\ref\tpmodul6_2311104076.dll
create mode 100644 tpmodul6_2311104076\obj\Debug\net8.0\refint\tpmodul6_2311104076.dll
create mode 100644 tpmodul6_2311104076\obj\Debug\net8.0\tpmodul6_2311104076.csproj.BuildWithSkipAnalyzers
create mode 100644 tpmodul6_2311104076\obj\Debug\net8.0\tpmodul6_2311104076.csproj.CoreCompileInputs.cache
create mode 100644 tpmodul6_2311104076\obj\Debug\net8.0\tpmodul6_2311104076.csproj.FileListAbsolute.txt
create mode 100644 tpmodul6_2311104076\obj\Debug\net8.0\tpmodul6_2311104076.dll
create mode 100644 tpmodul6_2311104076\obj\Debug\net8.0\tpmodul6_2311104076.genruntimeconfig.cache
create mode 100644 tpmodul6_2311104076\obj\Debug\net8.0\tpmodul6_2311104076.pdb
create mode 100644 tpmodul6_2311104076\obj\Debug\net8.0\tpmodul6_2311104076.sourceLink.json

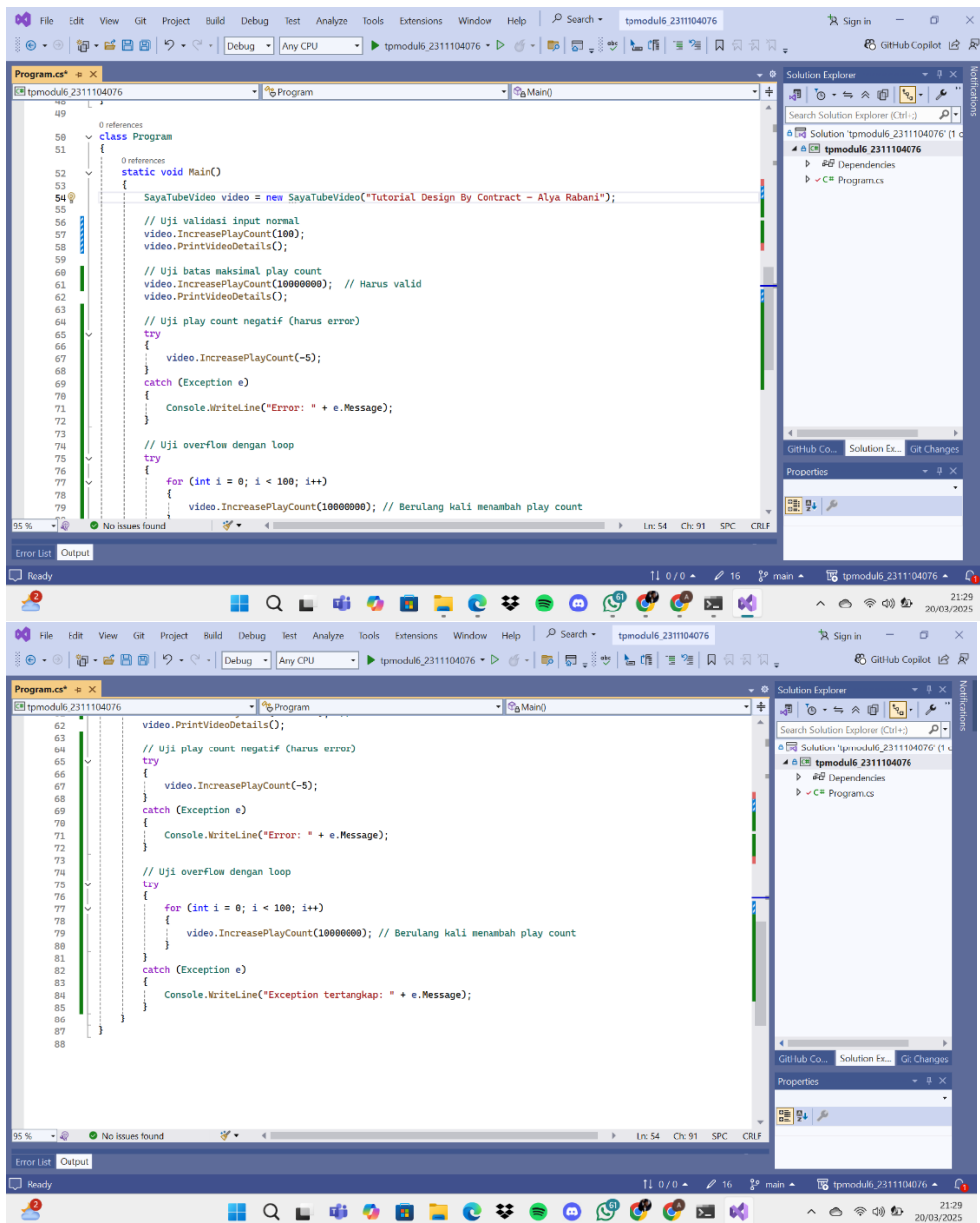
C:\Users\Lenovo\source\repos\KPL_ALYA_RABANI_2311104076_SE-07-02\06_Design_by_Contract_dan_Defensive_Programming\tpmodul6_2311104076>
git push origin main
Enumerating objects: 46, done.
Counting objects: 100% (46/46), done.
Delta compression using up to 12 threads
Compressing objects: 100% (28/28), done.
Writing objects: 100% (32/32), 79.70 KiB | 3.32 MiB/s, done.
Total 32 (delta 7), reused 0 (delta 0), pack-reused 0 (from 0)
remote: Resolving deltas: 100% (7/7), completed with 6 local objects.
To https://github.com/rabania/tpmodul6_2311104076.git
6ff767c..f595311 main -> main

C:\Users\Lenovo\source\repos\KPL_ALYA_RABANI_2311104076_SE-07-02\06_Design_by_Contract_dan_Defensive_Programming\tpmodul6_2311104076>
```

4. Menambahkan implementasi design by contract

Dalam konstruktor, terdapat prekondisi yang memastikan bahwa title tidak boleh kosong atau melebihi 100 karakter. Sementara itu, dalam method `IncreasePlayCount(int count)`, nilai `count` harus berada dalam rentang 0 hingga 10.000.000 untuk mencegah input yang tidak valid. Untuk menangani overflow, digunakan blok `checked { }`, sehingga jika terjadi `OverflowException`, program dapat menangkapnya dan menampilkan pesan error tanpa menyebabkan crash. Pada tahap pengujian di `Main()`, dilakukan beberapa skenario: normal case, yaitu menambah play count dengan nilai valid; edge case, dengan menambahkan 10 juta play count dalam satu panggilan; serta error case, di mana program mencoba memasukkan nilai negatif yang harus tertangkap sebagai error. Selain itu, dilakukan looping uji overflow untuk mempercepat terjadinya integer overflow, memastikan sistem dapat menangani batasan bilangan dengan baik.





Outputnya seperti berikut:

```

Microsoft Visual Studio Debug Console
ID Video : 60338
Judul Video : Tutorial Design By Contract - Alya Rabani
Jumlah Play : 100
ID Video : 60338
Judul Video : Tutorial Design By Contract - Alya Rabani
Jumlah Play : 10000100
Error: Jumlah play count harus antara 0 hingga 10.000.000.

C:\Users\Lenovo\source\repos\WPL_ALYA_RABANI_2311104076_SE-07-02\06_Design_by_Contract_dan_Defensive_Programming\tpmodul
6_2311104076\tpmodul6_2311104076\bin\Debug\net8.0\tpmodul6_2311104076.exe (process 19640) exited with code 0 (0x0).
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the conso
le when debugging stops.
Press any key to close this window . . .

```

5. Melakukan commit terakhir

The screenshot shows a Windows command prompt window with the following commands and output:

```
*****
** Visual Studio 2022 Developer Command Prompt v17.13.0
** Copyright (c) 2022 Microsoft Corporation
*****

C:\Users\Lenovo\source\repos\KPL_ALYA_RABANI_2311104076_SE-07-02\06_Design_by_Contract_dan_Defensive_Programming\tpmodul6_2311104076> git add .

C:\Users\Lenovo\source\repos\KPL_ALYA_RABANI_2311104076_SE-07-02\06_Design_by_Contract_dan_Defensive_Programming\tpmodul6_2311104076> git commit -m "implementasi design by contract"
[main 9246d9f] implementasi design by contract
18 files changed, 51 insertions(+), 15 deletions(-)
delete mode 100644 .vs\tpmodul6_2311104076\FileContentIndex\1cec9722-f332-4c35-90e9-2060394d11dc.vsidx
create mode 100644 .vs\tpmodul6_2311104076\FileContentIndex\7dac2d04-a19f-4878-b292-55d388b21766.vsidx

C:\Users\Lenovo\source\repos\KPL_ALYA_RABANI_2311104076_SE-07-02\06_Design_by_Contract_dan_Defensive_Programming\tpmodul6_2311104076> git push origin main
Enumerating objects: 50, done.
Counting objects: 100% (49/49), done.
Delta compression using up to 12 threads
Compressing objects: 100% (24/24), done.
Writing objects: 100% (27/27), 9.35 KiB | 957.00 KiB/s, done.
Total 27 (delta 14), reused 0 (delta 0), pack-reused 0 (from 0)
remote: Resolving deltas: 100% (14/14), completed with 13 local objects.
To https://github.com/rabania/tpmodul6_2311104076.git
 f595311..9246d9f  main -> main

C:\Users\Lenovo\source\repos\KPL_ALYA_RABANI_2311104076_SE-07-02\06_Design_by_Contract_dan_Defensive_Programming\tpmodul6_2311104076>
```

The screenshot also shows the GitHub repository page for `rabania/tpmodul6_2311104076`. The repository is public and has 1 branch and 0 tags. The commit history shows the following commits:

| Commit | Author | Message | Time |
|---------|---------|---------------------------------|----------------|
| 9246d9f | rabania | implementasi design by contract | now |
| f595311 | rabania | first commit | 45 minutes ago |

The repository page also shows the README section with the text "Add a README" and a button "Add README".