**C++ - Polymorphism Assignment**

You are supposed to write a console application which use the class information below

Please read the instructions, following rubric has information for assignment.

Here is the rubric for your assessment.

For each of the item I will give yourself the mark that is indicated in each cell of the table

|  |  |  |  |
| --- | --- | --- | --- |
| Code | Commenting | Well structured | User friendly |
| runs with no error 40% | There are sufficient comments 10% | Uses well-structured loops and nested ifs 25% | Create prompts and print outs so all users can understand and follow the program 25% |
| Has logical errors  30% | There are limited amount of comments 5% | Program is not cleanly written 15% | Limited prompts and outputs 15% |
| Not Compiling 0% | No Commenting 0% | No structure is followed 0% | Not enough prompts, ambiguous output 5% |

Simple polymorphic example

All of us are using our cell phone as different devices. The new smart phones give us a lot of functions in one single device. As an example here are some tasks that you would do on daily basis with your phone.

1. Phone
2. Camera
3. Music player
4. Video player
5. Application center
6. Web browser
7. Small Messaging Service provider
8. Calculator
9. Calendar
10. Email Client

Every service from your phone is provided by multiple different apps which are somewhat different but similar in a lot of ways.

I would like you to create the following class hierarchy

1. Class Service
   1. Abstract
   2. Contains the virtual ServiceName() method that returns the name of the service/app. For this class the value is “Device”
   3. Contains the virtual Provider property that is a String
   4. Contains the virtual method UseKeyboard that returns a Boolean based on the application, for example Camera does not use keyboard but Web browser does.
   5. It contains a method called can() which prints out what a service can do, for example for phone it should print “can place calls, receive calls, decline calls, set the voice volume”
2. Class phone is inherited from class service
   1. Has a method named PlaceCall(number), this method is creates a message as its calling a number
   2. Has a method called ReceiveCall(), it provides a message as “receiving call”
   3. Has a method called setVoiceVolume(number) that can set a number between 1 and 10 indicating the voice level
   4. Has a method called DeclineCall(), it provides a message as “Declining call”
   5. The ServiceName() for this class is “Phone”
3. Class Camera is inherited from Service
   1. The ServiceName () for this class is “Camera”
   2. It has a OpenCamera() function.
4. Class VideoCamera inherited from Camera
   1. The service name is VideoCamera
   2. Has a method called Record()
   3. Has a method called StopRecording()
5. Class PictureCamera inherited from Camera
   1. The service name is PictureCamera
   2. Has a method Called TakePicture()
6. Class Player inherited from Service
   1. The service name is Player
   2. Has a method CalledPlay()
   3. Has a method called StopPlaying()
7. Class MusicPlayer inherited from Player
   1. The service name is MusicPlayer
   2. Has a property called MusicFile as string
8. Class VideoPlayer inherited from Player
   1. The service name is VideoPlayer
   2. Has a property called VideoFile as string
9. Class Message inherited from Service
   1. The Service name is Message
   2. It has a Method Send()
   3. It has a method Receive()
10. Class Calculator inherited from Service
    1. Servicename is Calculator
    2. Has a method of Add, Subtruct, Multiply, Divide which takes 2 double and return the result
11. Class ApplicationCenter inherited from Class Service
    1. Servicename is Applications
    2. It has a method called DownloadApp(“app name”)
    3. It has a method called DeleteApp(“app name”)
    4. It has a method called OpenApp(“app name”)
12. Class WebBrowser inherited from class Service
    1. The servicename is HTTPClient
    2. It has a method called Open(Url)
    3. It has a method called Cashe
    4. It has a method called OpenNewTab()
13. Class Calendar inherited from class Service
    1. The Servicename is Calendar
    2. Has a method called NewEvent
    3. Has a method called ModifyEvent
    4. Has a method Called DeleteEvent
14. Class EmailClient inherited from class Service
    1. Service name is Email
    2. Has a method to Send() emails
    3. Has a method to Receive() emails
    4. Has a method to Reply()
    5. Has a method to Forward()
15. Class Gmail inherited from class EmailClient
    1. Servicename is Gmail
    2. Has SignIn(“email”)
    3. Has SignOut()

Each Item 5 marks total (70 Marks)

Your Driver Should be a console application and it should resemble a cell phone by calling its functions. You need to create an array of Devices and assign different objects to it and in a loop show that Dynamic Binding is working. (30 marks)