

BAC.cpp

User manual

Program: BAC.cpp

- This program calculates the blood alcohol content(BAC) based on user input weight, sex and time elapsed after last drink.
- To run the program double click on the BAC.exe. A console window will appear.
- First enter the person's weight. Then press return key.
- Secondly, enter the time elapsed since last drink and press return key.
- At last, enter the sex of the person. Enter 'M' or 'm' for male and 'F' or 'f' for female and press return.
- After pressing the return key, the weight of the person, sex of the person and the time elapsed since last drink will be displayed.
- The number of drink that the person had, person's BAC and the status will also be displayed.
- Then press any key to exit the program and close the console.

System Manual

Program: BAC.cpp

- This program calculates the blood alcohol content(BAC) based on user input weight, sex and time elapsed after last drink.
- It contains a main function and five user-defined functions : promptForInteger, promptForMorF, showImpairmentChart, computeBloodAlcoholConcentration and impairment.
- Five global constant of double data type are initialized and declared.

```
const double safe = 0.00;  
const double someImpairment = 0.04;  
const double significantAffected = 0.08;  
const double someCriminalPenalties = 0.10;  
const double deathPossible = 0.30;
```

- Six global constant of string data type are initialized and declared.

```
const string SAFE = "Safe To Drive";  
const string SOMEIMPAIR = "Some Impairment";  
const string SIGNIFICANT = "Driving Skills Significantly Affected";  
const string MOST_STATES = "Criminal Penalties in Most US States";  
const string ALL_STATES = "Legally Intoxicated - Criminal Penalties in All US States";  
const string YOURE_DEAD = "Death is Possible!";
```

Main function :

```
int main(void)
```

- This function first calls promptForInteger() function passing "Enter your weight <in lbs>: ", 0, 10000 as the argument.
- The value returned by promptForInteger() is then stored in integer variable named "weight".
- This function then again calls promptForInteger() function passing "How many minutes has it been since your last drink? ", 0, 10000 as the argument.
- The value returned by the function is then stored in integer variable "duration".s
- Then the function calls the user defined function promptForMorF(), whose return value is stored in char variable "gender".
- Based on the value of gender, the bool variable m_or_f is assigned. It's value is assigned as true for gender==m and false for gender == f.
- At the end this function calls the used defined function showImpairmentChart(). weight, duration and m_or_f variables are passed as argument to this function.

promptForInteger :

```
int promptForInteger(string const &message, int lower, int upper)
```

- This is a user defined function that displays the message which is passed to it as an argument. It then allows user to input an integer value and also makes sure that the integer value is within the range specified by the programmer.

- In case the integer value is not in the range specified by the programmer, this function continuous to ask the integer value repeatedly.
- This function is called twice from the main function.

promptForMorF

```
char promptForMorF(string const &message)
```

- This is a user defined function that displays the message which is passed to it as an argument. It then allows user to input a character. The character should either be 'M' or 'm' or 'F' or 'f'.
- In case if the user enters some other character, the user is again prompted to enter a character.
- It returns a char as its return value. The return character in this case can either be 'M' or 'm' or 'F' or 'f'.
- This function is called only once from the main function.

computeBloodAlcoholConcentration

```
void computeBloodAlcoholConcentration(int numDrinks, int weight, int duration, double &maleBAC, double &femaleBAC)
```

- The function is called from the showImpairmentChart() function.
- It calculates the BAC for both male and female based on the number of drinks, weight and time elapsed since last drink value.
- This function does not return any value, rather reflects back the changes to the variable whose value was passed to maleBAC and femaleBAC parameter.

impairment

```
string impairment(double bac)
```

- The value of BAC is passed to this function as argument.
- It then determines the status of the person based on the BAC value given below in the chart.

BAC	0.00	0.00–0.04	0.04–0.08	0.08–0.10	≥0.10
Description	Safe to Drive	Some Impairment	Driving Skills Significantly Affected	Criminal Penalties in Most US States	Legally Intoxicated - Criminal Penalties in All US States

- After determining the status of the person, it then returns the status (string data type) that needs to be displayed.

showImpairmentChart

```
void showImpairmentChart(int weight, int duration, bool isMale)
```

- Objective of this function is to display the Impairment Chart.
- This function first prints out the weight, then gender and then time elapsed since last drink.
- After this the header of the chart containing "# Drinks BAC Status" are displayed with proper formatting.
- This function then creates a loop that sets the number of drinks starting from 0 to 11.
- First it prints the number of drinks then for each number of drinks, this function calls "computeBloodAlcoholConcentration()" function which determines BAC.
- This function then prints BAC, depending on the gender of the person, and the status, depending on the BAC value.

Test Logs

Program: BAC.cpp

```
C:\windows\system32\cmd.exe

Enter your weight <in lbs>: 150
How many minutes has it been since your last drink? 0
Enter your sex as M or F: f
150 pounds, female, 0 minutes since last drink
# drinks    BAC Status
0 0.000 Safe To Drive
1 0.030 Some Impairment
2 0.060 Driving Skills Significantly Affected
3 0.090 Criminal Penalties in Most US States
4 0.120 Legally Intoxicated - Criminal Penalties in All US States
5 0.150 Legally Intoxicated - Criminal Penalties in All US States
6 0.180 Legally Intoxicated - Criminal Penalties in All US States
7 0.210 Legally Intoxicated - Criminal Penalties in All US States
8 0.240 Legally Intoxicated - Criminal Penalties in All US States
9 0.270 Legally Intoxicated - Criminal Penalties in All US States
10 0.300 Legally Intoxicated - Criminal Penalties in All US States
11 0.330 Death is Possible!
Press any key to continue . . .
```

```
C:\windows\system32\cmd.exe

Enter your weight <in lbs>: 210
How many minutes has it been since your last drink? 60
Enter your sex as M or F: m
210 pounds, male, 60 minutes since last drink
# drinks    BAC Status
0 0.000 Safe To Drive
1 0.003 Some Impairment
2 0.021 Some Impairment
3 0.039 Some Impairment
4 0.057 Driving Skills Significantly Affected
5 0.075 Driving Skills Significantly Affected
6 0.094 Criminal Penalties in Most US States
7 0.112 Legally Intoxicated - Criminal Penalties in All US States
8 0.130 Legally Intoxicated - Criminal Penalties in All US States
9 0.148 Legally Intoxicated - Criminal Penalties in All US States
10 0.166 Legally Intoxicated - Criminal Penalties in All US States
11 0.184 Legally Intoxicated - Criminal Penalties in All US States
Press any key to continue . . .
```

```
C:\windows\system32\cmd.exe

Enter your weight <in lbs>: 121
How many minutes has it been since your last drink? 61
Enter your sex as M or F: m
121 pounds, male, 61 minutes since last drink
# drinks    BAC Status
  0 0.000 Safe To Drive
  1 0.016 Some Impairment
  2 0.048 Driving Skills Significantly Affected
  3 0.079 Driving Skills Significantly Affected
  4 0.110 Legally Intoxicated - Criminal Penalties in All US States
  5 0.142 Legally Intoxicated - Criminal Penalties in All US States
  6 0.173 Legally Intoxicated - Criminal Penalties in All US States
  7 0.205 Legally Intoxicated - Criminal Penalties in All US States
  8 0.236 Legally Intoxicated - Criminal Penalties in All US States
  9 0.267 Legally Intoxicated - Criminal Penalties in All US States
 10 0.299 Legally Intoxicated - Criminal Penalties in All US States
 11 0.330 Death is Possible!
Press any key to continue . . .
```