**Language Map C#**

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| **Variable Declaration**  *Is this language strongly typed or dynamically typed? Provide at least three examples (with different data types or keywords) of how variables are declared in this language.* | C# is a strongly typed language.  Example: type variableName = value;  string name = “Jorge”;  int myNum = 15;  bool answer = false; |
| **Data Types**  *List all of the data types (and ranges) supported by this language.* | int 4 bytes Stores whole numbers from -2,147,483,648 to 2,147,483,647  long 8 bytes Stores whole numbers from -9,223,372,036,854,775,808 to 9,223,372,036,854,775,807  float 4 bytes Stores fractional numbers. Sufficient for storing 6 to 7 decimal digits  double 8 bytes Stores fractional numbers. Sufficient for storing 15 decimal digits  bool 1 bit Stores true or false values  char 2 bytes Stores a single character/letter, surrounded by single quotes  string 2 bytes per character Stores a sequence of characters, surrounded by double quotes |
| **Selection Structures**  *Provide examples of all selection structures supported by this language (if, if else, etc.)* ***Don’t just list them, show code samples of how each would look in a real program.*** | **if statements**  string name = “Rheann”;  if (name == “Rheann”) {  Console.WriteLine(“My name is Rheann!”);  }  **If-else statement**  string name = “apple”;  if (name == “apple”) {  Console.WriteLine(“Fruit of the day is apple”);  } else {  Console.WriteLine(“Check menu for fruit of the day”);  }  **If-else-if statement**  {  int x = 24;  if (x == 6)  Console.WriteLine(“x is 6”);  else if (x == 12)  Console.WriteLine(“x is 12”);  else if (x == 24)  Console.WriteLine(“x is 24”);  else  Console.WriteLine(“x is not present”);  }  **Nested If**  {  int x = 24;  if (x == 24) {  if (x < 30)  Console.WriteLine(“x is smaller than 30”);  else  Console.WriteLine(“x is greater than 20”);  }  }  **Switch statement**  {  int match = 20;  switch(match)  {  case 10: Console.WriteLine(“case 10”);  break;  case 15: Console.WriteLine(“case 15”);  break;  case 20: Console.WriteLine(“case 20”);  break;  default: Console.WriteLine(“no matches made”);  break;  }  } |
| **Repetition Structures**  *Provide examples of all repetition structures supported by this language (loops, etc.)* ***Don’t just list them, show code samples of how each would look in a real program.*** | **While loop**  int i = 0;  while ( i > 0)  {  Console.WriteLine(i);  i++;  }  **Do/while loop**  int i = 0;  do {  Console.WriteLine(i);  i++;  } while (i > 0);  **For loop**  for (int i = 0; i > 0; i++)  {  Console.WriteLine(i);  } |
| **Arrays**  *If this language supports arrays, provide* ***at least two examples*** *of creating an array with a primitive or String data types (e.g. float, int, String, etc.) If the language supports declaring arrays in multiple ways, provide an example of way.* | string[] citiesAZ;  string[] citiesAZ = {“Mesa”, “Tempe”, “Phoenix”, “Gilbert”};  Console.WriteLine(citiesAZ[3]);  //Outputs Gilbert  int[] newNum = {5, 10, 15, 20};  int[] newNum = new int [4];  int[] newNum = new int [4] {5, 10, 15, 20};  int[] newNum = new int[] {5, 10, 15, 20}; |
| **Data Structures**  *If this language provides a standard set of data structures, provide a list of the data structures and their Big-Oh complexity (identify what the complexity represents).* | |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | Access | Search | Insertion | Deletion | | Array | O(1) | O(n) | O(n) | O(n) | | Stack | O(n) | O(n) | O(1) | O(1) | | Queue | O(n) | O(n) | O(1) | O(1) | | Hash table | O(n) | O(n) | O(n) | O(n) | | Dictionary | O(n) | O(n) | O(n) | O(n) | | Linked list | O(n) | O(n) | O(n) | O(n) | |
| **Objects**  *If this language support object-orientation, provide an example of how you would write a simple object with a default constructor and then how you would instantiate it.* | class Flower  {  public string type;  public Flower(string flowerType)  {  type = flowerType;  }  static void Main(string[] args)  {  Flower Peony = new Flower(“Herbacous”);  Console.WriteLine(Flower.type);  //Outputs “Herbacous”  }  } |
| **Runtime Environment**  *What runtime environment does this language compile to? For example, Java compiles to the Java Virtual Machine.*  *Do other languages also compile to this runtime? If so, what these other languages?* | Common Language Runtime (CLR), other language that compile to this runtime include any languages written in any language that uses .NET Framework like VB.Net and F#. |
| **Libraries/Frameworks**  *What are the popular libraries or frameworks used by programmers for this language? List at least three (3) and describe what they are used for.* | * Entity Framework Core (EF Core) is an object-relational mapping (ORM) framework allowing developers to work with databases using C# objects, instead of SQL queries. * AutoMapper is a mapping library that streamlines the process of mapping objects between different types by removing the need for repetitive mapping code and lowers the risk of errors. * LINQ, language integrated query is a library that provides a consistent query syntax for querying data from various data sources such as collections, databases, and XML. |
| **Domains**  *What industries or domains use this programming language? Provide at least three specific examples of companies that use this language and what they use it for****. E.g. Company X uses C# for its line of business applications.*** | * Microsoft utilizes C# for web applications, Microsoft web services, and Game development such as Xbox. * Stack Overflow uses C# for web services and application development. * Accenture uses C# for faster and more flexible applications at Accenture Labs for clients. |