**MERCY JEPLETING-SCT 222-0158/2023**

**Q2: Define the following terms:**

**1.Compiler:** Special program that translates a programming language’s source code into machine code, byte code or another programming language.

**2.Source code:** Programming statements that are created by are created by a programmer with a text editor or a visual programming tool and then saved in a file.

**3.Object code:** The output, a compiled file, which is produced when the source code is compiled with a compiler.

**4.Linkers:** Important utility programs that takes the object file, produced by the assembler and compiler and other code to join them into a single executable file.

**Q4: Explain the differences between a compiler and an interpreter. (six comparisons)**

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| --- | --- | --- |
| **No.** | **Compiler( C Compiler)** | **Interpreter(BASIC)** |
| **1.** | Compiler takes entire program as input. | Interpreter takes single instructions as input. |
| **2.** | Intermediate object code is generated. | No intermediate object code is generated. |
| **3.** | Conditional control statements are executed faster. | Conditional control statements are executed slower. |
| **4.** | Memory requirement is more.  (since object code is generated) | Memory requirement is less. |
| **5.** | Program need not be compiled every time. | Every time higher level program is converted into lower level program. |
| **6.** | Errors are displayed after entire program is checked. | Errors are displayed for every instruction interpreted(if any) |

**Q3: Using an example, explain the compilation process of a C program.**

**1.Source code:** This file contains the human readable code written by the programmer. Example starting with a c source code typically with a .c extension.

**2.Preprocessing:** The preprocessor is the first step. It handles directives like #include and #define , and it may also be used to remove comments .The output is a preprocessed version of your code ,often saved with a .i extension.

**3.Compilation:** The preprocessed code is then sent to the compiler ( cc1), which translates it into assembly code .The output is saved in the assembly file, often with a .s extension.

**4.Assembly:** The assembly code is then converted into machine code or object code by the assembler (as), producing an object file(.o)

**5.Linking:** The final step involves linking all the necessary object files and libraries to create the executable. The linker (ld) performs this task.

**Q5: List all the categories of operators available in the c program and the specific operators under each category.**

**1.Arithmetic operators:** Are used to perform common mathematical operations.

Example: Addition (+)

Subtraction (-)

Division (/)

Modulus (%)-gives the remainder of division. They are used to assign values to variables.

Examples: =(assignment)

+= (addition assignment)

-= (subtraction assignment)

**3.Comparison operator/Relational operator**

Used to compare two values or variables. Helps find answers and make decisions.

Examples: greater than operator (>)

**4.Logical operator**

Used to determine variables or values.

Examples; ‘! ‘( logical not)

**5.Increment and Decrement operators**

Examples; ++ (increment by 1)

--(decrement by 1)

**6.Bitwise operators**

Example; & (bitwise AND)

<< (left shift)

>> (right shift)

**7.Conditional operator**

Example; ?: (conditional operator used for decision making)