**COMSATS University Islamabad Attock Campus**

**Department of Computer Science**

**Program: BCS-VII**

**Fall 2024 Terminal Examination**

**Course: - Compiler Construction Dated: - 28/10/2024**

**Time Allowed: - 3 Hours Marks: 50**

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Regn. No: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Note:- Don’t write anything on Question Paper except your name & Reg. No.**

**Q1. Compare and contrast (9 marks)**

1. The different types of ambiguity in grammars and discuss their impact on syntax analysis.
2. Predictive parsing and backtracking parsing techniques with examples.
3. Synthesized and inherited attributes in syntax-directed translation, with examples

*[CLO 1: Summarize the theoretical concepts of compilers.]*

**Q2. Discuss and illustrate the following using examples (9 marks)**

1. The significance of intermediate code generation in a compiler and list common forms of intermediate representations
2. Any four register allocation strategies
3. The role of semantic analysis in compilers and discuss techniques for type checking.

*[CLO 2: Illustrate the phases required for the construction of a compiler.]*

**Q3. For the code given on page 2 (32 marks)**

1. Create Symbol table of entire code.
2. Convert code of wxyz and abcd functions into 3 address code.
3. Represent the three address code in (ii) into triples.
4. Perform 10 optimization for the 3 address code in (iii) above.

*[CLO 3: Perform memory management, code generation and optimization phases of compiler construction]*

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| --- | --- |
| **int wxyz(int y, int z)**  **{**  int x, a, b, c, returnme;  x = y \* 16;  a = z / 4;  b = y \* 2;  c= a + b / 2 + z;  if (b>y)  a = z \*4;  else  a=z\*8;  returnme = c- 5 + (32 + x/16 + 10);  return returnme;  **}**  **int abcd(int c, int d)**  **{**  int a, b, e, g, returnyou;  a = 2 - (c / d \* 16);  b = ((c / d \* 8) \* 2) + 2;  e = c \* d;  g = (a / b) \* (c / a) \* (b / c);  c=24;  if (c<g)  {  returnyou = e + (a + 24) + g - d;  }  else  returnyou = e + (a + 24) - g - d;  return returnyou;  } | **void main**  **{**  int nuke, result=0,Donald=1,Duck=2, Russel=3,UP=4;  cout<< “press 1 for NK press 2 for USA”<<endl;  cin>>nuke;  switch(nuke)  {  case 1:  cout<<”please enter 1st value”<<endl;  cin>> Donald;  cout<<”please enter 2nd value”<<endl;  cin>> Donald;  result=wxyz(Donald,Duck); result=wxyz(Duck, Donald);  break;  case 2:  cout<<”please enter 1st value”<<endl;  cin>> Russel;  cout<<”please enter 2nd value”<<endl;  cin>> UP;  result=abcd (Russel,UP);  break;  result=abcd (UP,Russel);  default:break;  cout<<result;  }  } |