

International Institute of Information Technology, Hyderabad
ICS101:M-17:Computer Programming
Mid Term 1 - Set B

Max. Points: 75

[Time: 90 Mins]

Part I: Give short (half-a-page) and precise answers to the following questions.

[5 × 5 = 25]

1. List 4 operators that work on and results in floats. Explain each with an example.
2. What will happen if you try to compile and run the following code inside a valid `main(){..}`?

```
int i = 256, j = 256;  
i >>= 8;    j <<= 24;  
printf("%d , %d \n", i , j );
```

3. Given an array: `int arr[10];`, i) What is an index expression?, ii) what is the largest value that the index expression can take? why?
4. arrange the following data types in increasing order of space taken: `int`, `char`, `double`, `short`. Explain your answer with the space taken by each.
5. Arrange the following operators in decreasing (non-increasing) order of precedence, below.

+ - * / = & % || == ()

Part II: Give brief and precise answers in the space provided.

1. Given +ve integer `i`, Write a program to find the `i`th composite number (starting with 4). [10 marks]
2. Spot the errors in the following code fragments: [2 × 5 = 10]

The following code fragment is supposed to print `x = 0`.

```
int x = 5;  
while( x > 0 );  
    x /= 2;  
print("x = %c\n", x);
```

The following code is supposed to print the sum of all elements in an array: `int a[10];`

```
for(int i=0, sum=0; i <= 10; i++)  
    sum += a[i];  
printf("Sum = %d\n",sum);
```

3. A set of integers is represented using an array `char S[128]`, where an integer `i` is present in the set if `S[i] = 1` (else `S[i] = 0`). Given two sets, `char S1[128]` and `char S2[128]`, write the code to:
 - (a) Print the sum of elements in the *Intersection* of `S1` and `S2`. You should NOT use a third array to compute the intersection. Give brief comments to help understand your code. [10 marks]
 - (b) The *Symmetric Difference* of `S1` and `S2` (defined as the set of elements that present in `S1` OR `S2`, but NOT BOTH) and store the result in the set `char S3[128]`. Give brief comments to help understand your code. [10 marks]
4. Write a program to read a sentence and count the number of capital letters in it. [10 marks]

Handwritten notes:
a1, a2, a3, a4, a5, a6, a7, a8, a9, a10, a11, a12, a13, a14, a15, a16, a17, a18, a19, a20, a21, a22, a23, a24, a25, a26, a27, a28, a29, a30, a31, a32, a33, a34, a35, a36, a37, a38, a39, a40, a41, a42, a43, a44, a45, a46, a47, a48, a49, a50, a51, a52, a53, a54, a55, a56, a57, a58, a59, a60, a61, a62, a63, a64, a65, a66, a67, a68, a69, a70, a71, a72, a73, a74, a75, a76, a77, a78, a79, a80, a81, a82, a83, a84, a85, a86, a87, a88, a89, a90, a91, a92, a93, a94, a95, a96, a97, a98, a99, a100, a101, a102, a103, a104, a105, a106, a107, a108, a109, a110, a111, a112, a113, a114, a115, a116, a117, a118, a119, a120, a121, a122, a123, a124, a125, a126, a127, a128, a129, a130, a131, a132, a133, a134, a135, a136, a137, a138, a139, a140, a141, a142, a143, a144, a145, a146, a147, a148, a149, a150, a151, a152, a153, a154, a155, a156, a157, a158, a159, a160, a161, a162, a163, a164, a165, a166, a167, a168, a169, a170, a171, a172, a173, a174, a175, a176, a177, a178, a179, a180, a181, a182, a183, a184, a185, a186, a187, a188, a189, a190, a191, a192, a193, a194, a195, a196, a197, a198, a199, a200, a201, a202, a203, a204, a205, a206, a207, a208, a209, a210, a211, a212, a213, a214, a215, a216, a217, a218, a219, a220, a221, a222, a223, a224, a225, a226, a227, a228, a229, a230, a231, a232, a233, a234, a235, a236, a237, a238, a239, a240, a241, a242, a243, a244, a245, a246, a247, a248, a249, a250, a251, a252, a253, a254, a255, a256, a257, a258, a259, a260, a261, a262, a263, a264, a265, a266, a267, a268, a269, a270, a271, a272, a273, a274, a275, a276, a277, a278, a279, a280, a281, a282, a283, a284, a285, a286, a287, a288, a289, a290, a291, a292, a293, a294, a295, a296, a297, a298, a299, a300, a301, a302, a303, a304, a305, a306, a307, a308, a309, a310, a311, a312, a313, a314, a315, a316, a317, a318, a319, a320, a321, a322, a323, a324, a325, a326, a327, a328, a329, a330, a331, a332, a333, a334, a335, a336, a337, a338, a339, a340, a341, a342, a343, a344, a345, a346, a347, a348, a349, a350, a351, a352, a353, a354, a355, a356, a357, a358, a359, a360, a361, a362, a363, a364, a365, a366, a367, a368, a369, a370, a371, a372, a373, a374, a375, a376, a377, a378, a379, a380, a381, a382, a383, a384, a385, a386, a387, a388, a389, a390, a391, a392, a393, a394, a395, a396, a397, a398, a399, a400, a401, a402, a403, a404, a405, a406, a407, a408, a409, a410, a411, a412, a413, a414, a415, a416, a417, a418, a419, a420, a421, a422, a423, a424, a425, a426, a427, a428, a429, a430, a431, a432, a433, a434, a435, a436, a437, a438, a439, a440, a441, a442, a443, a444, a445, a446, a447, a448, a449, a450, a451, a452, a453, a454, a455, a456, a457, a458, a459, a460, a461, a462, a463, a464, a465, a466, a467, a468, a469, a470, a471, a472, a473, a474, a475, a476, a477, a478, a479, a480, a481, a482, a483, a484, a485, a486, a487, a488, a489, a490, a491, a492, a493, a494, a495, a496, a497, a498, a499, a500, a501, a502, a503, a504, a505, a506, a507, a508, a509, a510, a511, a512, a513, a514, a515, a516, a517, a518, a519, a520, a521, a522, a523, a524, a525, a526, a527, a528, a529, a530, a531, a532, a533, a534, a535, a536, a537, a538, a539, a540, a541, a542, a543, a544, a545, a546, a547, a548, a549, a550, a551, a552, a553, a554, a555, a556, a557, a558, a559, a560, a561, a562, a563, a564, a565, a566, a567, a568, a569, a570, a571, a572, a573, a574, a575, a576, a577, a578, a579, a580, a581, a582, a583, a584, a585, a586, a587, a588, a589, a590, a591, a592, a593, a594, a595, a596, a597, a598, a599, a600, a601, a602, a603, a604, a605, a606, a607, a608, a609, a610, a611, a612, a613, a614, a615, a616, a617, a618, a619, a620, a621, a622, a623, a624, a625, a626, a627, a628, a629, a630, a631, a632, a633, a634, a635, a636, a637, a638, a639, a640, a641, a642, a643, a644, a645, a646, a647, a648, a649, a650, a651, a652, a653, a654, a655, a656, a657, a658, a659, a660, a661, a662, a663, a664, a665, a666, a667, a668, a669, a670, a671, a672, a673, a674, a675, a676, a677, a678, a679, a680, a681, a682, a683, a684, a685, a686, a687, a688, a689, a690, a691, a692, a693, a694, a695, a696, a697, a698, a699, a700, a701, a702, a703, a704, a705, a706, a707, a708, a709, a710, a711, a712, a713, a714, a715, a716, a717, a718, a719, a720, a721, a722, a723, a724, a725, a726, a727, a728, a729, a730, a731, a732, a733, a734, a735, a736, a737, a738, a739, a740, a741, a742, a743, a744, a745, a746, a747, a748, a749, a750, a751, a752, a753, a754, a755, a756, a757, a758, a759, a760, a761, a762, a763, a764, a765, a766, a767, a768, a769, a770, a771, a772, a773, a774, a775, a776, a777, a778, a779, a780, a781, a782, a783, a784, a785, a786, a787, a788, a789, a790, a791, a792, a793, a794, a795, a796, a797, a798, a799, a800, a801, a802, a803, a804, a805, a806, a807, a808, a809, a810, a811, a812, a813, a814, a815, a816, a817, a818, a819, a820, a821, a822, a823, a824, a825, a826, a827, a828, a829, a830, a831, a832, a833, a834, a835, a836, a837, a838, a839, a840, a841, a842, a843, a844, a845, a846, a847, a848, a849, a850, a851, a852, a853, a854, a855, a856, a857, a858, a859, a860, a861, a862, a863, a864, a865, a866, a867, a868, a869, a870, a871, a872, a873, a874, a875, a876, a877, a878, a879, a880, a881, a882, a883, a884, a885, a886, a887, a888, a889, a890, a891, a892, a893, a894, a895, a896, a897, a898, a899, a900, a901, a902, a903, a904, a905, a906, a907, a908, a909, a910, a911, a912, a913, a914, a915, a916, a917, a918, a919, a920, a921, a922, a923, a924, a925, a926, a927, a928, a929, a930, a931, a932, a933, a934, a935, a936, a937, a938, a939, a940, a941, a942, a943, a944, a945, a946, a947, a948, a949, a950, a951, a952, a953, a954, a955, a956, a957, a958, a959, a960, a961, a962, a963, a964, a965, a966, a967, a968, a969, a970, a971, a972, a973, a974, a975, a976, a977, a978, a979, a980, a981, a982, a983, a984, a985, a986, a987, a988, a989, a990, a991, a992, a993, a994, a995, a996, a997, a998, a999, a1000, a1001, a1002, a1003, a1004, a1005, a1006, a1007, a1008, a1009, a1010, a1011, a1012, a1013, a1014, a1015, a1016, a1017, a1018, a1019, a1020, a1021, a1022, a1023, a1024, a1025, a1026, a1027, a1028, a1029, a1030, a1031, a1032, a1033, a1034, a1035, a1036, a1037, a1038, a1039, a1040, a1041, a1042, a1043, a1044, a1045, a1046, a1047, a1048, a1049, a1050, a1051, a1052, a1053, a1054, a1055, a1056, a1057, a1058, a1059, a1060, a1061, a1062, a1063, a1064, a1065, a1066, a1067, a1068, a1069, a1070, a1071, a1072, a1073, a1074, a1075, a1076, a1077, a1078, a1079, a1080, a1081, a1082, a1083, a1084, a1085, a1086, a1087, a1088, a1089, a1090, a1091, a1092, a1093, a1094, a1095, a1096, a1097, a1098, a1099, a1100, a1101, a1102, a1103, a1104, a1105, a1106, a1107, a1108, a1109, a1110, a1111, a1112, a1113, a1114, a1115, a1116, a1117, a1118, a1119, a1120, a1121, a1122, a1123, a1124, a1125, a1126, a1127, a1128, a1129, a1130, a1131, a1132, a1133, a1134, a1135, a1136, a1137, a1138, a1139, a1140, a1141, a1142, a1143, a1144, a1145, a1146, a1147, a1148, a1149, a1150, a1151, a1152, a1153, a1154, a1155, a1156, a1157, a1158, a1159, a1160, a1161, a1162, a1163, a1164, a1165, a1166, a1167, a1168, a1169, a1170, a1171, a1172, a1173, a1174, a1175, a1176, a1177, a1178, a1179, a1180, a1181, a1182, a1183, a1184, a1185, a1186, a1187, a1188, a1189, a1190, a1191, a1192, a1193, a1194, a1195, a1196, a1197, a1198, a1199, a1200, a1201, a1202, a1203, a1204, a1205, a1206, a1207, a1208, a1209, a1210, a1211, a1212, a1213, a1214, a1215, a1216, a1217, a1218, a1219, a1220, a1221, a1222, a1223, a1224, a1225, a1226, a1227, a1228, a1229, a1230, a1231, a1232, a1233, a1234, a1235, a1236, a1237, a1238, a1239, a1240, a1241, a1242, a1243, a1244, a1245, a1246, a1247, a1248, a1249, a1250, a1251, a1252, a1253, a1254, a1255, a1256, a1257, a1258, a1259, a1260, a1261, a1262, a1263, a1264, a1265, a1266, a1267, a1268, a1269, a1270, a1271, a1272, a1273, a1274, a1275, a1276, a1277, a1278, a1279, a1280, a1281, a1282, a1283, a1284, a1285, a1286, a1287, a1288, a1289, a1290, a1291, a1292, a1293, a1294, a1295, a1296, a1297, a1298, a1299, a1300, a1301, a1302, a1303, a1304, a1305, a1306, a1307, a1308, a1309, a1310, a1311, a1312, a1313, a1314, a1315, a1316, a1317, a1318, a1319, a1320, a1321, a1322, a1323, a1324, a1325, a1326, a1327, a1328, a1329, a1330, a1331, a1332, a1333, a1334, a1335, a1336, a1337, a1338, a1339, a1340, a1341, a1342, a1343, a1344, a1345, a1346, a1347, a1348, a1349, a1350, a1351, a1352, a1353, a1354, a1355, a1356, a1357, a1358, a1359, a1360, a1361, a1362, a1363, a1364, a1365, a1366, a1367, a1368, a1369, a1370, a1371, a1372, a1373, a1374, a1375, a1376, a1377, a1378, a1379, a1380, a1381, a1382, a1383, a1384, a1385, a1386, a1387, a1388, a1389, a1390, a1391, a1392, a1393, a1394, a1395, a1396, a1397, a1398, a1399, a1400, a1401, a1402, a1403, a1404, a1405, a1406, a1407, a1408, a1409, a1410, a1411, a1412, a1413, a1414, a1415, a1416, a1417, a1418, a1419, a1420, a1421, a1422, a1423, a1424, a1425, a1426, a1427, a1428, a1429, a1430, a1431, a1432, a1433, a1434, a1435, a1436, a1437, a1438, a1439, a1440, a1441, a1442, a1443, a1444, a1445, a1446, a1447, a1448, a1449, a1450, a1451, a1452, a1453, a1454, a1455, a1456, a1457, a1458, a1459, a1460, a1461, a1462, a1463, a1464, a1465, a1466, a1467, a1468, a1469, a1470, a1471, a1472, a1473, a1474, a1475, a1476, a1477, a1478, a1479, a1480, a1481, a1482, a1483, a1484, a1485, a1486, a1487, a1488, a1489, a1490, a1491, a1492, a1493, a1494, a1495, a1496, a1497, a1498, a1499, a1500, a1501, a1502, a1503, a1504, a1505, a1506, a1507, a1508, a1509, a1510, a1511, a1512, a1513, a1514, a1515, a1516, a1517, a1518, a1519, a1520, a1521, a1522, a1523, a1524, a1525, a1526, a1527, a1528, a1529, a1530, a1531, a1532, a1533, a1534, a1535, a1536, a1537, a1538, a1539, a1540, a1541, a1542, a1543, a1544, a1545, a1546, a1547, a1548, a1549, a1550, a1551, a1552, a1553, a1554, a1555, a1556, a1557, a1558, a1559, a1560, a1561, a1562, a1563, a1564, a1565, a1566, a1567, a1568, a1569, a1570, a1571, a1572, a1573, a1574, a1575, a1576, a1577, a1578, a1579, a1580, a1581, a1582, a1583, a1584, a1585, a1586, a1587, a1588, a1589, a1590, a1591, a1592, a1593, a1594, a1595, a1596, a1597, a1598, a1599, a1600, a1601, a1602, a1603, a1604, a1605, a1606, a1607, a1608, a1609, a1610, a1611, a1612, a1613, a1614, a1615, a1616, a1617, a1618, a1619, a1620, a1621, a1622, a1623, a1624, a1625, a1626, a1627, a1628, a1629, a1630, a1631, a1632, a1633, a1634, a1635, a1636, a1637, a1638, a1639, a1640, a1641, a1642, a1643, a1644, a1645, a1646, a1647, a1648, a1649, a1650, a1651, a1652, a1653, a1654, a1655, a1656, a1657, a1658, a1659, a1660, a1661, a1662, a1663, a1664, a1665, a1666, a1667, a1668, a1669, a1670, a1671, a1672, a1673, a1674, a1675, a1676, a1677, a1678, a1679, a1680, a1681, a1682, a1683, a1684, a1685, a1686, a1687, a1688, a1689, a1690, a1691, a1692, a1693, a1694, a1695, a1696, a1697, a1698, a1699, a1700, a1701, a1702, a1703, a1704, a1705, a1706, a1707, a1708, a1709, a1710, a1711, a1712, a1713, a1714, a1715, a1716, a1717, a1718, a1719, a1720, a1721, a1722, a1723, a1724, a1725, a1726, a1727, a1728, a1729, a1730, a1731, a1732, a1733, a1734, a1735, a1736, a1737, a1738, a1739, a1740, a1741, a1742, a1743, a1744, a1745, a1746, a1747, a1748, a1749, a1750, a1751, a1752, a1753, a1754, a1755, a1756, a1757, a1758, a1759, a1760, a1761, a1762, a1763, a1764, a1765, a1766, a1767, a1768, a1769, a1770, a1771, a1772, a1773, a1774, a1775, a1776, a1777, a1778, a1779, a1780, a1781, a1782, a1783, a1784, a1785, a1786, a1787, a1788, a1789, a1790, a1791, a1792, a1793, a1794, a1795, a1796, a1797, a1798, a1799, a1800, a1801, a1802, a1803, a1804, a1805, a1806, a1807, a1808, a1809, a1810, a1811, a1812, a1813, a1814, a1815, a1816, a1817, a1818, a1819, a1820, a1821, a1822, a1823, a1824, a1825, a1826, a1827, a1828, a1829, a1830, a1831, a1832, a1833, a1834, a1835, a1836, a1837, a1838, a1839, a1840, a1841, a1842, a1843, a1844, a1845, a1846, a1847, a1848, a1849, a1850, a1851, a1852, a1853, a1854, a1855, a1856, a1857, a1858, a1859, a1860, a1861, a1862, a1863, a1864, a1865, a1866, a1867, a1868, a1869, a1870, a1871, a1872, a1873, a1874, a1875, a1876, a1877, a1878, a1879, a1880, a1881, a1882, a1883, a1884, a1885, a1886, a1887, a1888, a1889, a1890, a1891, a1892, a1893, a1894, a1895, a1896, a1897, a1898, a1899, a1900, a1901, a1902, a1903, a1904, a1905, a1906, a1907, a1908, a1909, a1910, a1911, a1912, a1913, a1914, a1915, a1916, a1917, a1918, a1919, a1920, a1921, a1922, a1923, a1924, a1925, a1926, a1927, a1928, a1929, a1930, a1931, a1932, a1933, a1934, a1935, a1936, a1937, a1938, a1939, a1940, a1941, a1942, a1943, a1944, a1945, a1946, a1947, a1948, a1949, a1950, a1951, a1952, a1953, a1954, a1955, a1956, a1957, a1958, a1959, a1960, a1961, a1962, a1963, a1964, a1965, a1966, a1967, a1968, a1969, a1970, a1971, a1972, a1973, a1974, a1975, a1976, a1977, a1978, a1979, a1980, a1981, a1982, a1983, a1984, a1985, a1986, a1987, a1988, a1989, a1990, a1991, a1992, a1993, a1994, a1995, a1996, a1997, a1998, a1999, a2000, a2001, a2002, a2003, a2004, a2005, a2006, a2007, a2008, a2009, a2010, a2011, a2012, a2013, a2014, a2015, a20