**BTEC Assignment Brief**

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| **Qualification** | Pearson BTEC Higher Nationals in Digital Technologies |
| **Unit number and title** | Unit 10: Database Design and Development |
| **Learning aim(s)** | Ushbu bo‘lim oxirida talabalar quyidagilarga qodir bo‘ladilar: **LO1: Muammolarni hal qilish uchun mos loyihalash vositasidan foydalanib, relyatsion ma'lumotlar bazasi tizimini loyihalash.**  **LO2: Mavjud tizim loyihasiga asoslangan to‘liq funksional relyatsion ma'lumotlar bazasini ishlab chiqish.**  **LO3: Tizimni foydalanuvchi va tizim talablariga mos ravishda sinab ko‘rish.**  **LO4: Texnik va foydalanuvchi hujjatlarini tayyorlash.** |
| **Assignment title** | HVAC Ma'lumotlar modeli (HVAC Data Model) |
| **Assessor** |  |
| **Issue date** | 2024-yil 2-dekabr |
| **Hand in deadline** |  |

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| **Scenario or Context** | **Assignment Title: HVAC Data Model**  **Vaziyat (Scenario):**  TechnoHVAC — bu O‘zbekistonda joylashgan xayoliy sanoat HVAC yechimlari yetkazib beruvchisi. Sizdan TechnoHVAC uchun ma'lumotlar talablariga mos keladigan ma'lumotlar bazasini loyihalash va amalga oshirish so‘ralgan. Ushbu talablar ushbu vaziyatda belgilangan va quyida TechnoHVAC tomonidan hozirda foydalaniladigan qog‘ozdagi yozuvlar namunalarini ko‘rishingiz mumkin.  TechnoHVAC sanoat mijozlari uchun konditsionerlar, issiqlik nasoslari, pechlar, havo uskunalari, havo o'tkazgichlari, namlagichlar/namsizlantirgichlar, termostatlar, qozonlar, geotermal issiqlik nasoslari kabi mahsulotlarni yetkazib berishga ixtisoslashgan. Mijozlar bir nechta o‘rnatishlarni talab qilishlari mumkin, ammo har bir o‘rnatish aniq sanoat ehtiyojlari uchun maxsus tayyorlanadi.  Ob’ektlar turlarga bo‘lingan holda tasniflanadi. Har bir ob’ektga bir yoki bir nechta xodimlar biriktiriladi. Ushbu ob’ektlar odatda juda katta bo‘lgani uchun, ular duradgorlar, g‘isht teruvchilar, muhandislar va suv o‘tkazuvchilardan iborat bo‘lishi mumkin. Har bir ob’ektda bir nechta kompyuterlar bo‘lishi mumkin. Quyida TechnoHVAC tomonidan hozirgi vaqtda saqlanadigan qog‘ozdagi yozuvlarning misollari keltirilgan.  **Staff Management Record**   |  |  |  | | --- | --- | --- | | Staff Number | Name | Type | | SHA1 | Alisher | Mason | | SHA8 | Abdul Aziz | Installation Engineer | | SHA2 | Ulugbek | Aquatics installer | | SHA11 | Yusuf | Installation Engineer | | SHA23 | Eric | Plumber | | SHA66 | Ardaq | Aquatics installer | | SHA55 | Asilbek | Brick Layer |   **Equipment Type Table**   |  |  | | --- | --- | | Type | Equipment | | Air handlers | Ductless | | Thermostats | Standard, Super | | Air Pumps | Standard, Super | | Filters | Air driven, Under gravel | | Humidifiers | Standard, Super | | Dehumidifiers | Standard, Super |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | Installation ID | Installation Type | Installation Name and Address | Customer | Equipment | Types of Staff Required | Period of Staff assignment | | 234 | Cooling Ventilation | Tashkent | Bobur  ABC Textile | 2 x Air handlers  1 x standard thermostat | 1 x Carpenter  1 x Aquatics installer  1 x Installation Engineer | From 1st September 2023 | | 654 | Heating and cooling | Samarkand | Alice  DEF Fertilizers | 2 air pumps 2 x Humidifiers  2 x Dehumidifiers  standard thermostats | 1 x Plumber  2 x Aquatics installer  2 x Installation Engineer | 1st June 2022 – 1st June 2024 | | 767 | Geo Thermal Heating | Bukhara | Dmitry  GHI Flour mills | 2 air pumps 2 x Humidifiers  2 x Dehumidifiers  standard thermostats | 1 x Plumber  2 x Aquatics installer  2 x Installation Engineer | From 30th June2023 | | 943 | Dehumidification | Nukus | Eric  JKL Autos | 2 air pumps 2 x Humidifiers  2 x Dehumidifiers | No staff required |  | | 157 | Radiant Heating | Angren | Shahzod MNO Plastics and Aluminum | 2 x Humidifiers  standard thermostats | 1 x Installation Engineer | 1st September 2021 – 1st September 2022 |   **Vazifa 1**   * **Foydalanuvchi va tizim talablarini aniqlang, yuqoridagi vaziyatga mos keladigan ma'lumotlar bazasini loyihalash uchun relyatsion ma'lumotlar bazasi tizimini konseptual dizayndan (ER modeli) foydalangan holda yarating. Mazkur modelga obyektlarning identifikatorlarini (asosiy kalit), kardinaliklarini va bog‘lanishlar ishtirokini kiriting. ER modelini relyatsion ma'lumotlar bazasi dizayniga o‘tkazing, bunda asosiy kalitlar, tashqi kalitlar va referensial yaxlitliklar kiritilishi lozim. Loyihada kamida beshta o‘zaro bog‘langan jadval bo‘lishi kerak. Taqdim etilgan mantiqiy dizaynni normalizatsiyalanganligini tekshiring. Agar u normalizatsiyalangan bo‘lmasa, anomaliyalarni bartaraf etish orqali uni normallashtiring. Eslatma: Mazkur vaziyat doirasida o‘zingizning taxminlaringiz va tegishli atributlaringizni qo‘shishga ruxsat etiladi.** * **Yuqoridagi vaziyatga mos keladigan kirish va chiqish interfeyslarini Mockup ekranlar yoki boshqa interfeys-dizayn vositalaridan foydalangan holda loyihalash. Ushbu dizaynning (ERD va mantiqiy dizayn) foydalanuvchi va tizim talablariga mosligini baholang.**   **Vazifa 2**   * **Yaratilgan ER diagrammasiga muvofiq relyatsion ma'lumotlar bazasi tizimini ishlab chiqing (SQL DDL buyruqlaridan foydalaning). Ma'lumotlar bazasiga ma'lumot kiritish, yangilash va o‘chirish uchun oddiy interfeys yaratishda mos IDEdan foydalanganingizni isbotlang.** * **Quyidagi DML buyruqlaridan foydalanishni tushuntiring va har bir buyruq bo‘yicha ishlab chiqilgan ma'lumotlar bazasidan kamida bitta misol keltiring. Quyidagi SQL buyruqlari ma'lumotni o‘ziga xos holatga mos ravishda olib chiqib berayotganligini misollar bilan baholang:**    + **Select / Where / Update / Between / In / Group by / Order by / Having**   **Vazifa 3**   * **Tizimni foydalanuvchi va tizim talablariga mosligini sinash uchun mos test rejasi taqdim eting. Joriy etilgan ma'lumotlar bazasi uchun tegishli test holatlarini (yaxlitlik cheklovlarini) taqdim eting. Tanlangan test ma'lumotlaridan foydalanish sinov samaradorligini qanday yaxshilashi mumkinligini baholang. Eslatma: Talaba kutilayotgan natijalarni jadval shaklida berishi va amaldagi natijalarni ekranning skrinshotlari bilan birga keltirishi kerak.** * **Foydalanuvchilardan mustaqil fikr-mulohaza oling (texnik bo‘lmagan foydalanuvchilar va ba'zi ishlab chiquvchilar bilan so‘rovnomalar, intervyular yoki boshqa fikr olish usullaridan foydalaning). Fikrlar asosida takomillashtirish bo‘yicha tavsiyalarni alohida xulosa/tavsiyalar bo‘limida taqdim eting.**   **Vazifa 4**   * **Ishlab chiqilgan ma'lumotlar bazasi tizimi uchun texnik hujjatlar va foydalanuvchi qo‘llanmasini tayyorlang. Texnik hujjatlarda tizimdagi ma'lumotlar harakati va anomaliyalar yo‘qligini ko‘rsatish uchun mos diagrammalar (oqim diagrammalari, ERD va 3NF gacha normallashtirilgan jadvallar) kiritilishi kerak. Tizim samaradorligini ta'minlash uchun kelajakdagi yaxshilanishlarni tavsiya eting.** |
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Learning Outcomes and Assessment Criteria

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| **Pass** | **Merit** | **Distinction** |
| **LO1: Tegishli loyihalash vositasidan foydalanib, muhim muammoni hal qilish uchun relyatsion ma'lumotlar bazasini loyihalash** | | **D1: Dizaynning foydalanuvchi va tizim talablariga mos kelishini baholash.** |
| P1: Tegishli loyihalash vositalari va uslublaridan foydalangan holda kamida to‘rtta o‘zaro bog‘langan jadvallardan iborat relyatsion ma'lumotlar bazasi tizimini loyihalash. Foydalanuvchi va tizim talablarini aniq belgilash kerak. | **M1: To‘liq funksional tizim uchun keng qamrovli dizayn ishlab chiqish, unda interfeys va chiqish dizaynlari, ma'lumotlarni tasdiqlash va normalizatsiya kiritilishi kerak.** |
| **LO2: Mavjud tizim loyihasi asosida to‘liq funksional relyatsion ma'lumotlar bazasini ishlab chiqish** | |  |
| **P2: Foydalanuvchi interfeysi, chiqish va ma'lumotlarni tasdiqlash dalillari bilan ma'lumotlar bazasi tizimini ishlab chiqish.**  **P3: Relyatsion ma'lumotlar bazasi tizimida so‘rovlar (query language) qo‘llash.** | **M2: Tizim xavfsizligi va ma'lumotlar bazasi texnik xizmat ko‘rsatishni o‘z ichiga olgan to‘liq funksional ma'lumotlar bazasini ishlab chiqish.**  **M3: Ma'lumotni boshqarishga oid tegishli ma'lumotlarni ishlab chiqarish uchun so‘rov vositalaridan foydalangan holda ma'lumotlarning mazmunli ekanligini baholash.** |
| **LO3: Tizimlarni foydalanuvchi va tizim talablariga mos ravishda sinovdan o‘tkazish** | | **LO2 & LO3**  **D2: Tizimning foydalanuvchi va tizim talablariga mosligini baholash va takomillashtirish bo‘yicha tavsiyalar kiritish.** |
| **P4: Tizimni foydalanuvchi va tizim talablariga nisbatan sinovdan o‘tkazish.** | **M4: Tanlangan test ma'lumotlaridan foydalanishning samaradorligini baholash, shu jumladan tanlangan test ma'lumotlari tanlash sababini tushuntirish.** |
| **LO4: Texnik va foydalanuvchi hujjatlarini tayyorlash** | | **D4: Tizim samaradorligini davomiy ta'minlash uchun yaxshilanishlar bo‘yicha tavsiyalar bilan birga ma'lumotlar bazasini baholash.** |
| **P5: Texnik va foydalanuvchi hujjatlarini ishlab chiqish.** | **M5: To‘liq funksional tizim uchun texnik va foydalanuvchi hujjatlarini ishlab chiqish, tizimdagi ma'lumotlar harakatini ko‘rsatadigan diagrammalar va tizim qanday ishlashini tavsiflovchi oqim diagrammalarini kiritish.** |

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| **Bu vazifangizni qo'llab-quvvatlash uchun ma'lumot manbalari** | **Taqdim etish Talablari:**  **Vazifa 1: Taqdim etiladigan hujjat qisqa, rasmiy ishbilarmonlik uslubida, bir interval oralig‘ida va 12-shrift o‘lchamida yozilgan individual hisobot shaklida bo‘lishi kerak. Sarlavhalar, paragraflar va kichik bo‘limlardan mos ravishda foydalanishingiz shart. Ishingizni tadqiqot asosida qo‘llab-quvvatlang va Harvard havola tizimidan foydalanib manbalar keltiring. Havola va bibliografiyani Harvard tizimida taqdim eting. Tavsiya etilgan so‘z chegarasi 3,000–3,500 so‘z, lekin belgilangan limitdan oshganingiz uchun jazolanmaysiz.**  **Vazifa 2: Taqdimot o‘qituvchiga ko‘rsatilgan to‘liq funksional relyatsion ma'lumotlar bazasi tizimi va individual yozma hisobot shaklida bo‘lishi kerak (Vazifa 1 talablari bilan tanishing).**  **Vazifa 3: Taqdimot o‘qituvchi tomonidan tasdiqlangan testning guvohlik bayonoti, texnik hujjatlar va yozma hisobot shaklida bo‘lishi kerak (Vazifa 1 talablari bilan tanishing).**  **Kitoblar:**   * **Churcher, C. (2012) *Beginning Database Design: From Novice to Professional*. 2nd Ed. Apress.** * **Connolly, T. va Begg, C. (2014) *Database Systems: A Practical Approach to Design, Implementation and Management*. 6th Ed. Global Edition. Pearson.** * **Kroemke, D. va Auer, D. (2012) *Database Concepts: International Edition*. 6th Ed. Pearson.** * **Paulraj, P. (2008). *Database Design and Development: An Essential Guide for IT Professional*. Wiley.** * **Stephens, R. (2008) *Beginning Database Design Solutions*. Wrox.**   **Juranallar:**   * International Journal of Database Management Systems * Journal of Database Management * The Computer Journal * Journal of Systems Analysis and Software Engineering * Journal of Emerging Trends in Computing and Information Sciences |